

[www.intel.com/education](http://www.intel.com/education)



**Statement of Alignment**

The International Society for Technology in Education (ISTE) completed its initial review of the **Intel® Teach Thinking with Technology course** on October 20, 2005, and has determined that it clearly supports implementation of the ISTE National Educational Technology Standards (NETS) for Teachers in specific, carefully reviewed and documented ways and substantially prepares participants in the following manner:

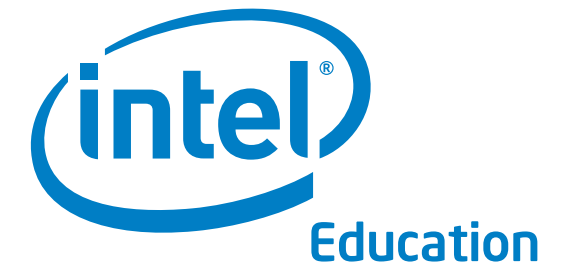
**NETS-T ALIGNMENT**

- Meets: I.A., II.A., II.B., II.D., II.E., III.A., III.C.
- Supports significant growth for: II.C., III.B., III.D., IV.A., IV.C., V.B., V.C., V.D.

Copyright © 2008 Intel Corporation. All rights reserved. Intel and the Intel logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.  
\*Other names and brands may be claimed as the property of others.  
0308/KM/PT/10K 319261-001

Intel® Teach Program  
Thinking with Technology Course

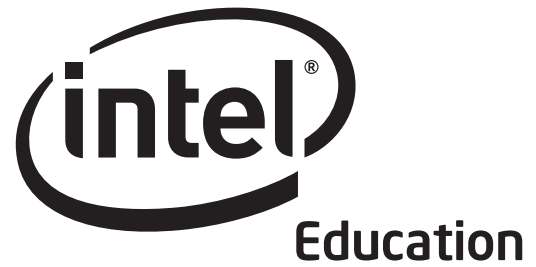
Participant  
Teacher  
Edition



# Intel® Teach Program

## Thinking with Technology Course

Participant Teacher Edition, Version 2.5



# Intel<sup>®</sup> Teach Program

## Thinking with Technology Course

Copyright © 2008 Intel Corporation. All rights reserved. Intel, the Intel logo, Intel Education Initiative, and the Intel Teach Program are trademarks of Intel Corporation in the U.S. and other countries. \*Other names and brands may be claimed as the property of others.

---

**Version 2.5**

**For Participant Teachers**



---

## Welcome to the Intel® Teach Program Thinking with Technology Course.

Thanks to teachers like you, over 5 million educators worldwide have made technology learning more compelling and more relevant.

Dedicated teachers nurture the innovative potential in young people—preparing them to step into a world where an understanding of technology can help shape their success. Like you, Intel is passionate about education, because we know it is the foundation for innovation and opportunity. So, on behalf of Intel, I want to thank you for your participation in this course.

Since 1999, the Intel Teach Program has helped educators in more than 40 countries. Our programs are built by educators, for educators, and they combine best practices with the power of technology. Young people today are entering a global economy where they'll be challenged to analyze information, collaborate, and communicate their ideas using an ever-changing array of technology. As part of our network of teachers, you can help prepare your students to succeed in this competitive environment.

Innovation involves taking calculated risks but yields big rewards. Your participation in the Intel Teach Program brings that same spirit to the classroom, where we know your students will be the true winners.

Best regards,



Paul Otellini  
Chief Executive Officer  
Intel Corporation





# Welcome

We welcome you to the Intel® Teach Thinking with Technology Course! We appreciate your commitment to the future of your students and to your profession as an educator. Students today, more than ever, need the ability to understand and deal with complex issues and problems. This course is designed to help you develop your students' critical thinking and collaborative skills. Thank you for investing your time and energy into this course and for your commitment to preparing your students to be successful in tomorrow's world.

## Course Goal

The Thinking with Technology Course builds on effective technology integration skills where teachers use free online tools to support the development and assessment of students' higher-order thinking skills.

**Goal:** Participants leave the course with a standards-based unit plan, support materials, and implementation strategies to improve and assess students' higher-order thinking with the use of free online tools.

## Course Overview

The Thinking with Technology Course looks at how teachers can use the Internet in new and constructive ways with students. The course helps teachers learn how to integrate into their curriculum unique online thinking tools that enable students to visually represent their understanding of complex and interconnected issues.

This course uses three, free thinking tools available on the Intel® Education Web site:

- *Visual Ranking Tool* ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))
- *Seeing Reason Tool* ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
- *Showing Evidence Tool* ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))

The *Visual Ranking Tool* enables students to identify and refine ranking criteria for a list and then debate differences, reach consensus, and organize ideas. The *Seeing Reason Tool*, an interactive tool to create cause-and-effect maps, helps students investigate relationships in complex systems. The *Showing Evidence Tool*, a scaffold for constructing well-reasoned arguments, requires students to support cases with quality evidence.

## Overview

---

This course helps teachers learn new technology tools, but, more importantly, promotes sound pedagogical practices.

These tools are designed to be thinking tools rather than productivity tools. Mastering the use of the tools technically is fairly straightforward, but working to ensure that they are used to enhance higher-order thinking skills and support student learning takes time and practice. Therefore, this course explains how to use the new tools as well as supports good teaching practices.

In addition to the thinking tools, two online resources support productivity:



- *Assessing Projects* application ([www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects))
- Intel® Education *Help Guide* ([www.intel.com/education/tools](http://www.intel.com/education/tools) - select Help Guide)

The online *Assessing Projects* application and the Intel® Education *Help Guide* support the use of the thinking tools and student learning in general. The *Assessing Projects* portion of the Intel Education Web site provides strategies and resources to support student-centered assessment, including an application that allows teachers to create assessments from scratch or adapt assessments available in a library of editable assessments that focus on thinking skills. The *Help Guide*, a resource for both teachers and students, provides step-by-step instructions for the thinking tools, *Assessing Projects* application, and hundreds of technical skills for commonly used software applications.

The course and tools can be used in PC (using Microsoft Windows\* operating system) or Macintosh\* environments. (See Appendix A.01 for system requirements.)

## Course Objectives

In this course, you will:

- Learn instructional strategies for addressing and assessing thinking skills using technology to increase opportunities for effective student collaboration, student-teacher interactions, and the inquiry process
- Create an instructional plan, sample projects, and assessment(s) that integrate the use of online thinking tools, align to standards, and support a project approach to learning and authentic inquiry
- Understand the online teaching tools and their workspaces, and how to manage a classroom project using an online environment
- Leave prepared to effectively implement a ready-to-use project using the *Visual Ranking*, *Seeing Reason* and/or *Showing Evidence* tools, which will help your students to manage, explore, and communicate their understanding of complex and interconnected issues

In the *Visual Ranking* portion of the course, you will learn strategies and create a technology-enhanced project to help students:

- Establish criteria to evaluate and prioritize information
- View issues from multiple perspectives and make decisions by seeking consensus and negotiating new options
- Collaborate with peers and community members

In the *Seeing Reason* portion of the course, you will learn strategies and create a technology-enhanced project to help students:

- Understand complex problems or systems that involve cause-and-effect relationships
- Discuss, represent, and defend interpretations of problems or systems that involve cause and effect
- Use mathematical reasoning and understanding across the curriculum through the use of logic, critical thinking, and the visual representation of direct and inverse relationships

In the *Showing Evidence* portion of the course, you will learn strategies and create a technology-enhanced project to help students:

- Develop effective argumentation skills
- Develop strategies for encouraging discussion as students make claims, support claims with evidence, debate differences, and reach conclusions
- Analyze and evaluate criteria for decisions

## Modular Design

The course is designed in a flexible, modular format so that it can be presented in a variety of schedules and in seven formats, integrating the teaching tools:

- *Visual Ranking* only (7 modules, 24 hours)
- *Seeing Reason* only (7 modules, 26 hours)
- *Showing Evidence* only (7 modules, 26 hours)
- *Visual Ranking* and *Seeing Reason* (9 modules, 32 hours)
- *Visual Ranking* and *Showing Evidence* (9 modules, 32 hours)
- *Seeing Reason* and *Showing Evidence* (9 modules, 34 hours)
- *Visual Ranking*, *Seeing Reason*, and *Showing Evidence* (11 modules, 40 hours)

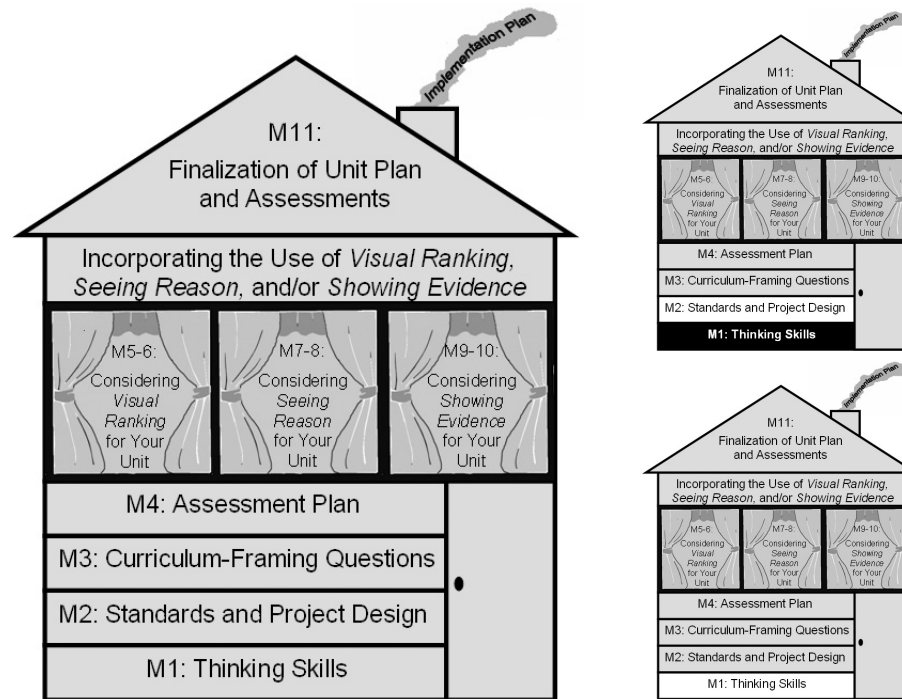
## Building the Unit through the Modules

The table on the next page represents the possible modules available for this course through which you will build your unit. Your facilitator will indicate which modules will be completed in your course.

The house image is a visual organizer that appears on the back of each module divider to serve as a map to show you where you have been and where you are going.

This image is repeated throughout the modules to serve as a “you are here” map and to illustrate your progress as you build your unit. Look on the back side of the dividers to see how the image changes depending on which module you are working on. If you are not doing a full 40-hour course, note which “windows” you will not be exploring. (Refer to the table on the next page.)

On the dividers, a light blue section means that a module’s content has not been started, white means the work is in progress, and dark blue means a module is completed (or that the module is not included in the course).



## Course Content

Note which modules are included in your course by placing a checkmark next to the appropriate modules.

Included in Course	Completed	Module	Module Title/Completed Product
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Targeting Thinking in the Classroom <ul style="list-style-type: none"> <li>▪ "Habits of Learning Taxonomy" for the classroom</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	Designing Standards-Based Projects <ul style="list-style-type: none"> <li>▪ Targeted standards and objectives for your unit</li> <li>▪ Targeted project characteristics</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	Creating Curriculum-Framing Questions to Support Thinking Skills <ul style="list-style-type: none"> <li>▪ Set of Curriculum-Framing Questions for your unit</li> <li>▪ Cause-and-effect map of thinking in the classroom</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4	Planning Student-Centered Assessment (2 hours) <ul style="list-style-type: none"> <li>▪ Assessment Plan and timeline</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	5	Using the Visual Ranking Tool to Target Thinking Skills (2 hours) <ul style="list-style-type: none"> <li>▪ <i>Visual Ranking</i> project ideas</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	6	Considering the Visual Ranking Tool for Your Unit <ul style="list-style-type: none"> <li>▪ Project description and prompt set up online</li> <li>▪ A practice ranked list for your unit</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	7	Using the Seeing Reason Tool to Target Thinking Skills <ul style="list-style-type: none"> <li>▪ Project description and research question set up online</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	8	Considering the Seeing Reason Tool for Your Unit <ul style="list-style-type: none"> <li>▪ A practice causal map for your unit</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	9	Using the Showing Evidence Tool to Target Thinking Skills <ul style="list-style-type: none"> <li>▪ Project description and prompt set up online</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	10	Considering the Showing Evidence Tool for Your Unit <ul style="list-style-type: none"> <li>▪ A practice <i>Showing Evidence</i> case for your unit</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11	Completing Your Unit <ul style="list-style-type: none"> <li>▪ Unit Plan implementation and procedures</li> <li>▪ Assessment Plan and assessment(s)</li> </ul>

## Login Information

This page is provided for you to write down the login information you will be using during this course. This may make referencing login information easier as you proceed through the course modules and use the thinking tools with your students.



**Note:** Alternatively, you may want to save your login information electronically. A “Login Information” form is available in the *Unit Development* folder on the Curriculum Resource CD.

## Teacher Login Information

### Teaching Tool Login Information for Course Use

**Note:** This information will be provided by your facilitator for Modules 1–4.



URL: [www.intel.com/education/tools](http://www.intel.com/education/tools)

Teacher ID: \_\_\_\_\_

Team ID: \_\_\_\_\_

Password: \_\_\_\_\_

### Teaching Tool Login Information for Your Own Classroom

Login ID/Teacher ID: \_\_\_\_\_

Password: \_\_\_\_\_

### Wiki Site (Optional)

Course Wiki URL: \_\_\_\_\_

Login ID: \_\_\_\_\_

Password: \_\_\_\_\_

### Tagging/Bookmarking Site (Optional)

URL: \_\_\_\_\_

Login ID: \_\_\_\_\_

Password: \_\_\_\_\_

### Student Sample Projects Login Information

**Note:** The Teacher ID is the same for all student sample projects (listed on the previous page under Teaching Tool Login Information for Your Own Classroom)

#### Student Sample Project Using the *Visual Ranking Tool*

Teacher ID: \_\_\_\_\_

Team 1 ID: \_\_\_\_\_

Password: \_\_\_\_\_

Teacher ID: \_\_\_\_\_

Password: \_\_\_\_\_

#### Student Sample Project Using the *Seeing Reason Tool*

Teacher ID: \_\_\_\_\_

Team ID: \_\_\_\_\_

Password: \_\_\_\_\_

#### Student Sample Project Using the *Showing Evidence Tool*

Teacher ID: \_\_\_\_\_

Team ID: \_\_\_\_\_

Password: \_\_\_\_\_

Reviewing Team ID: \_\_\_\_\_

Password: \_\_\_\_\_



# Table of Contents

## Module 1: Targeting Thinking in the Classroom

Activity 1: Introducing Yourself .....	1.01
Activity 2: Introducing the Thinking Tools .....	1.02
Activity 3: Applying Models of Thinking.....	1.06
Activity 4: Creating Your Own “Habits of Learning Taxonomy” .....	1.23
Activity 5: Reviewing the Unit Plan Template .....	1.25
Activity 6: Supporting Thinking .....	1.31
Extension Activity: Thinking in the Classroom .....	1.34
Module 1 References .....	1.36
Module 1 Summary.....	1.37

## Module 2: Designing Standards-Based Projects

Activity 1: Identifying Standards and Learning Objectives .....	2.01
Activity 2: Exploring Project Design.....	2.09
Activity 3: Considering a Project Idea for Your Unit.....	2.17
Activity 4: Sharing Project Ideas for Your Unit .....	2.23
Activity 5: Supporting Thinking.....	2.24
Extension Activity: Harnessing the Power of Project-Based Learning.....	2.25
Module 2 References .....	2.26
Module 2 Summary.....	2.27

## Module 3: Creating Curriculum-Framing Questions to Support Thinking Skills

Activity 1: Ranking Questions .....	3.01
Activity 2: Asking Questions in the Classroom .....	3.04
Activity 3: Developing Curriculum-Framing Questions.....	3.07
Activity 4: Supporting Higher-Order Thinking Skills with Curriculum-Framing Questions .....	3.17
Activity 5: Writing Your Own Curriculum-Framing Questions .....	3.19
Activity 6: Sharing Your Curriculum-Framing Questions.....	3.22
Activity 7: Supporting Thinking.....	3.23
Extension Activity: Focusing on Essential Questions.....	3.24
Module 3 References .....	3.25
Module 3 Summary.....	3.26

## Module 4: Planning Student-Centered Assessment

<b>Activity 1:</b> Exploring an Assessment Plan .....	<b>4.01</b>
<b>Activity 2:</b> Using the Showing Evidence Tool to Analyze Assessment Plan Ideas .....	<b>4.16</b>
<b>Activity 3:</b> Drafting an Outline for Your Assessment Plan .....	<b>4.20</b>
<b>Extension Activity:</b> Browsing Assessments .....	<b>4.22</b>
<b>Module 4 Summary.</b> .....	<b>4.24</b>

## Module 5: Using the Visual Ranking Tool to Target Thinking Skills

<b>Activity 1:</b> Looking at Visual Ranking in Action .....	<b>5.01</b>
<b>Activity 2:</b> Viewing Project Ideas .....	<b>5.08</b>
<b>Activity 3:</b> Thinking About Your Unit .....	<b>5.11</b>
<b>Extension Activity:</b> Understanding Best Practices with Visual Ranking .....	<b>5.12</b>
<b>Module 5 References</b> .....	<b>5.13</b>
<b>Module 5 Summary.</b> .....	<b>5.14</b>

## Module 6: Considering the Visual Ranking Tool for Your Unit

<b>Activity 1:</b> Clarifying Project Ideas for Using Visual Ranking .....	<b>6.01</b>
<b>Activity 2:</b> Planning Your Project .....	<b>6.08</b>
<b>Activity 3:</b> Setting Up a Visual Ranking Project .....	<b>6.12</b>
<b>Activity 4:</b> Trying Out Your Visual Ranking Idea .....	<b>6.16</b>
<b>Activity 5:</b> Revisiting Your Unit Plan .....	<b>6.21</b>
<b>Activity 6:</b> Sharing Your Results .....	<b>6.26</b>
<b>Extension Activity:</b> Finalizing Your Visual Ranking Project .....	<b>6.27</b>
<b>Module 6 References</b> .....	<b>6.28</b>
<b>Module 6 Summary.</b> .....	<b>6.29</b>

## Module 7: Using the Seeing Reason Tool to Target Thinking Skills

<b>Activity 1:</b> Looking at Seeing Reason in Action .....	<b>7.01</b>
<b>Activity 2:</b> Digging Deeper into Cause and Effect .....	<b>7.06</b>
<b>Activity 3:</b> Viewing Project Ideas .....	<b>7.14</b>
<b>Activity 4:</b> Clarifying Project Ideas for Using Seeing Reason .....	<b>7.20</b>
<b>Activity 5:</b> Sharing Your Ideas .....	<b>7.25</b>
<b>Activity 6:</b> Planning Your Project .....	<b>7.26</b>
<b>Extension Activity:</b> Understanding Best Practices with Seeing Reason .....	<b>7.31</b>
<b>Module 7 References</b> .....	<b>7.32</b>
<b>Module 7 Summary.</b> .....	<b>7.33</b>

## Module 8: Considering the Seeing Reason Tool for Your Unit

Activity 1: Trying Out Your Seeing Reason Idea .....	8.01
Activity 2: Sharing Causal Maps and Practicing Effective Questioning .....	8.04
Activity 3: Revising Your Project .....	8.08
Activity 4: Revisiting Your Unit Plan .....	8.10
Activity 5: Sharing Your Results .....	8.14
Extension Activity: Finalizing Your Seeing Reason Project .....	8.15
Module 8 References .....	8.16
Module 8 Summary .....	8.17

## Module 9: Using the Showing Evidence Tool to Target Thinking Skills

Activity 1: Looking at Showing Evidence in Action .....	9.01
Activity 2: Digging Deeper into Argumentation .....	9.06
Activity 3: Viewing Project Ideas .....	9.20
Activity 4: Clarifying Project Ideas for Using Showing Evidence .....	9.27
Activity 5: Sharing Your Results .....	9.32
Activity 6: Planning Your Project .....	9.33
Extension Activity: Understanding Best Practices with Showing Evidence .....	9.41
Module 9 References .....	9.42
Module 9 Summary .....	9.43

## Module 10: Considering the Showing Evidence Tool for Your Unit

Activity 1: Creating a Practice Case .....	10.01
Activity 2: Reviewing Student Work .....	10.05
Activity 3: Sharing Your Practice Case .....	10.06
Activity 4: Revising Your Project .....	10.08
Activity 5: Revisiting Your Unit Plan .....	10.09
Activity 6: Sharing Your Results .....	10.13
Extension Activity: Finalizing Your Showing Evidence Project .....	10.14
Module 10 References .....	10.15
Module 10 Summary .....	10.16

## Module 11: Completing Your Unit







<b>Activity 1:</b> Supporting Your Assessment Plan .....	<b>11.01</b>
<b>Activity 2:</b> Creating an Assessment .....	<b>11.05</b>
<b>Activity 3:</b> Finalizing Your Assessment Plan.....	<b>11.13</b>
<b>Activity 4:</b> Reflecting on Your Unit .....	<b>11.15</b>
<b>Activity 5:</b> Completing Your Unit Plan.....	<b>11.16</b>
<b>Activity 6:</b> Showcasing Your Unit .....	<b>11.20</b>
<b>Activity 7:</b> Reflecting on the Course.....	<b>11.27</b>
<b>Extension Activity:</b> Enhancing Assessment in Your Unit.....	<b>11.29</b>
<b>Module 11 References</b> .....	<b>11.30</b>
<b>Module 11 Summary</b> .....	<b>11.31</b>

## Appendix

<b>System Requirements</b> .....	<b>Appendix A</b>
System Requirements .....	<b>A.01</b>
Having Trouble Registering? .....	<b>A.02</b>
<b>Curriculum-Framing Questions</b> .....	<b>Appendix B</b>
Sample Elementary Grade Questions .....	<b>B.01</b>
Sample Middle School Questions .....	<b>B.04</b>
Sample High School Questions .....	<b>B.07</b>
<b>A Project Approach to Learning</b> .....	<b>Appendix C</b>
Sample Topic Ideas .....	<b>C.01</b>
Sample Project Descriptions, Questions, and Prompts.....	<b>C.03</b>
Sample K-3 Unit Plan with Three Thinking Tools: Birds, Birds, Birds! .....	<b>C.24</b>
<b>Assessment Resources</b> .....	<b>Appendix D</b>
Assessment Plan Examples .....	<b>D.01</b>
<b>Visual Ranking Tool Resources</b> .....	<b>Appendix E</b>
Sample Project Idea: River City Water .....	<b>E.01</b>
Sample Unit Plan: Grow a Business .....	<b>E.05</b>
<b>Seeing Reason Tool Resources</b> .....	<b>Appendix F</b>
Sample Unit Plan: Ecology Explorers .....	<b>F.01</b>
<b>Index</b> .....	<b>Appendix G</b>

### Icon Definitions

In this curriculum manual, icons help to guide you throughout the activities:

-  Save your work
-  View resources on the Course CD-ROM
-  View resources on the Web
-  Note helpful hint, idea, or warning
-  Discuss or share with your colleagues
-  View the Intel® Education *Help Guide* for technical instructions

### Curriculum Resource CD

The Curriculum Resource CD is an integral part of the curriculum and is used throughout the unit creation process. Files can be accessed through the CD Index or directly through its folder structure. Directions for use are available electronically on the Curriculum Resource CD.

### ISTE Alignment

The International Society for Technology in Education (ISTE) completed its initial review of the Thinking with Technology Course on October 20, 2005, and has determined that it clearly supports implementation of the ISTE National Educational Technology Standards (NETS) for Teachers in specific, carefully reviewed and documented ways and substantially prepares participants in the following manner:

#### NETS-T Alignment



- Meets: I.A., II.A., II.B., II.D., II.E., III.A., III.C.
- Supports significant growth for: II.C., III.B., III.D., IV.A., IV.C., V.B., V.C., V.D.

*All material, unless otherwise stated, are the property of the Intel® Corporation and are subject to copyright. Unless explicitly authorized, reproduction is not permitted except for use with one's own K-12 students. Unauthorized modification, copying, transmission, and broadcasting is prohibited. This curriculum and its companion CD may not be sold or otherwise distributed for profit.*

Copyright © 2008 Intel Corporation. All rights reserved.  
Intel, the Intel logo, Intel Education Initiative, and the Intel Teach Program are trademarks of Intel Corporation in the U.S. and other countries.. \*Other names and brands may be claimed as the property of others.

---

**Targeting Thinking in the Classroom****Activities****Activity 1: Introducing Yourself ..... 1.01**

**Introduce:** Yourself.

**Activity 2: Introducing the Thinking Tools ..... 1.02**

**View:** Intel® Education Web Site.

**Try out:** The Thinking Tools.

**Activity 3: Applying Models of Thinking ..... 1.06**

**Apply:** Bloom’s Revised Taxonomy of Thinking Skills.

**Apply:** Marzano’s Dimensions of Learning.

**Apply:** Costa and Kallick’s 16 Habits of Mind.

**Activity 4: Creating Your Own “Habits of Learning Taxonomy” ..... 1.23**

**Create:** A list of thinking skills and habits for your students to target in your classroom.

**Activity 5: Reviewing the Unit Plan Template ..... 1.25**

**Discuss:** The Unit Plan template and the unit design process.

**Activity 6: Supporting Thinking ..... 1.31**

**Explore:** The *Seeing Reason Tool* and deeper thinking.

**Extension Activity: Thinking in the Classroom ..... 1.34****References ..... 1.36****Module Summary ..... 1.37**



## Module 1

# Targeting Thinking in the Classroom

**Description:** Effective integration of technology cannot occur without important instructional components in place. Technology best supports and enhances learning when higher-order thinking skills are required. In this module, you discuss essential skills for your students' future, and review different models of thinking in order to apply key ideas to your own classroom. You also build upon your knowledge of what affects and supports deeper thinking in the classroom.

## Activity 1: Introducing Yourself



During this time, you will have the opportunity to introduce yourself and meet all of the course participants. On the lines below, you may want to list the key points you want to share about yourself, such as the grade level and subject you teach.

Key points to share:

---

---

---

---

---

---

---

---



### Targeting Thinking in the Classroom

## Activity 2: Introducing the Thinking Tools

### Step 1: Previewing the Intel Education Web Site

Browse the Intel Education Web site to preview its resources that you can use in this course and beyond.



#### Intel Education Web Site

[www.intel.com/education](http://www.intel.com/education)

The Intel Education Web site provides resources, tools, and strategies that support effective practices in technology integration. It is a free resource for educators developed by an extended team with expertise in education, technology, and innovation.

The free teaching tools that are used in this course are available on the Intel Education Web site, along with technical instructions and best practices for using these tools. Additional K-12 teaching resources reside on the Web site, most notably Designing Effective Projects ([www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)), which includes a collection of exemplary Unit Plans that effectively integrate technology, strategies for developing your own exemplary technology-supported learning, and resources to support higher-order thinking skills.

Also of interest is Technology Literacy ([www.intel.com/education/tools/technologyliteracy](http://www.intel.com/education/tools/technologyliteracy)), a three-year curriculum for middle students that embeds technology literacy skill development in core content courses. Aligned to address the NET-S standards, Technology Literacy projects that cumulatively provide students with opportunities to become fully technologically literate and provide opportunities for authentic research, writing, and communication.

#### Using the Intel® Education Help Guide

Use the Help Guide to introduce yourself to the Thinking Tools.



Throughout this course, you will be looking to other resources to help you find answers to your questions. Often, you can search online or ask a peer when you are looking for help. When you are looking for technical help on how to use the thinking tools, the *Assessing Projects* application, Microsoft Office applications, and other Web or productivity resources, you can use the Intel Education *Help Guide*. In this digital resource, you find step-by-step directions for how to complete technical skills. You can use the *Help Guide* on the Web or on your Curriculum Resource CD to quickly learn how to do certain tasks on the computer as they are needed. Preview this valuable resource that is available to you while you are enrolled in this course and in the future.

Refer to the following skills in the Help Guide for this section:

- Help Guide 1: Finding Technology Skills
- Help Guide 2: Viewing Skills While You Work



#### Intel Education Help Guide

[www.intel.com/education/tools](http://www.intel.com/education/tools)

Note the variety of tools available on the Intel Education Web site. Select **Help Guide** from the list of tools. (See Help Guide Skills 1 and 2.)

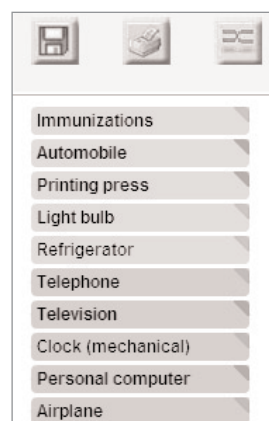
## Targeting Thinking in the Classroom

## Step 2: Previewing the Thinking Tools

To prepare for this course and begin thinking about how you might integrate the thinking tools into your classroom, use this time to become familiar with how these tools work and their intended purpose. Use the *Help Guide* as necessary to help you explore these tools.

Preview the tools used in this course:

**Visual Ranking** is an online tool for prioritizing and ordering items in a list. Using *Visual Ranking*, students identify and refine criteria as they assign order or ranking to a list. They must explain their reasoning and can compare their work with each other in a visual diagram. This tool supports activities where students need to debate differences, reach consensus, and organize ideas.



1. Open: [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Review the home page. Note the sections of *Visual Ranking*. Each thinking tool is set up with the same categories:
  - *Overview and Benefits* — Features of the tool
  - *Try the Tool* — A practice project that you can manipulate as well as a full tutorial
  - *Project Examples* — Project ideas and unit plans
  - *Instructional Strategies* — Best practices for using the tool with students
  - *Workspace* — Password-protected space to set up projects for your students
3. Click **Project Examples**, and then **Project Ideas**.
4. With a partner, view and discuss the use of *Visual Ranking* within the project idea, **Impact of Inventions**.
5. Click the **Back** button and then click **Try the Tool**.
6. Read the description of the demo and then click **Demo**. (See Teaching Tools, Visual Ranking Tool Skill 1.1.1.)
7. Rank the list of inventions and mouse over the triangles to view comments. (See Teaching Tools, Visual Ranking Tool Skills 1.15 and 1.17.)
8. Compare your list with another team's and view team comments by mousing over the triangles. (See Teaching Tools, Visual Ranking Tool Skill 1.20.)

Refer to the following skills in the Help Guide for this section:

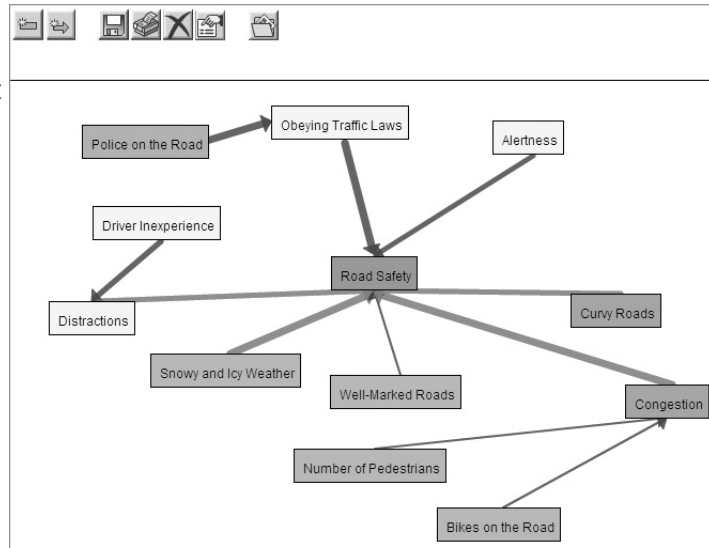
- Visual Ranking Tool Skill 1.1.1: Viewing a Visual Ranking demonstration
- Visual Ranking Tool Skill 1.15: Ranking items in a list
- Visual Ranking Tool Skill 1.17: Viewing a comment attached to an item
- Visual Ranking Tool Skill 1.20: Comparing lists

Review the scenario that focuses students' use of the *Visual Ranking Tool*. View a sample ranked list and its comments. View other teams' rankings and compare them with the current ranking. Note the use of different perspectives as student groups rank the list of possible community projects from the viewpoint of various community members.

## Module 1

### Targeting Thinking in the Classroom

The **Seeing Reason Tool** is an online tool for mapping cause-and-effect relationships. Students create visual representations of the factors and relationships in a cause-and-effect investigation. These maps make thinking visible and promote collaboration as students refine their understanding.



1. Open: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
2. View the overview page.
3. Click **Project Examples**, and then **Unit Plans**.
4. View and discuss the use of *Seeing Reason* within the unit plan, **Road Safety**.
5. Click the **Back** button and then click **Try the Tool**.
6. Read the description of the demo and then click **Demo**.
7. Practice reading the map and double-click existing factors and the relationship arrows to read their descriptions. (See Teaching Tools, Seeing Reason Tool Skills 2.21 and 2.17.)
8. Experiment with the map by adding factors and relationships. (See Teaching Tools, Seeing Reason Tool Skill 2.15 and 2.20.)

Review the unit summary that discusses the students' role as they analyze the complex factors that influence road safety. View the two *Seeing Reason* maps within the unit. Practice reading the maps by mousing over and reading the descriptions of the red and blue relationship lines. Double-click the factor boxes to view the explanations of the factors.

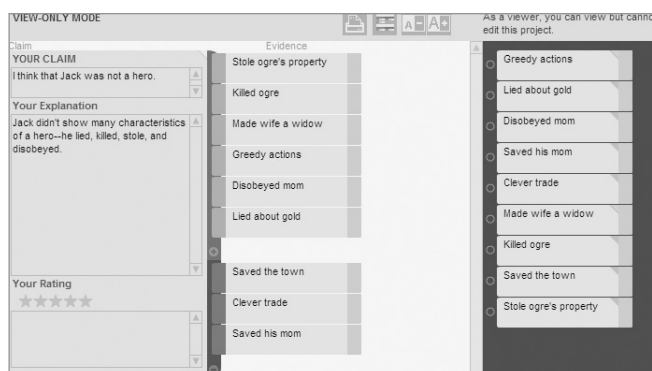


Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.17: Viewing a description of a factor
- Seeing Reason Tool Skill 2.20: Adding a relationship
- Seeing Reason Tool Skill 2.21: Viewing a description of a relationship

## Targeting Thinking in the Classroom

The **Showing Evidence Tool** is an online tool for constructing an argument or hypothesis and supporting it with evidence. Students learn how to prove their case, weigh the quality and strength of their evidence with the use of a visual framework.



1. Open: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
2. Review the overview page.
3. Click **Try the Tool**.
4. Read the description of the demos and then click **Elementary Demo** to view a sample case using the simplified version of the tool.
5. Review the claim and existing evidence.
6. Experiment with the case by creating new evidence and attaching evidence to the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.21 and 3.25.)
7. Click the **Back** button to return to the main **Try the Tool** page.
8. Click **Secondary Demo** to view another sample case using the full version of the tool.
9. Experiment with the case by rating the quality and support of the evidence, creating new evidence, and attaching evidence to the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.22 and 3.24.)
10. Click the **Back** button.
11. Click **Project Examples**, and then **Unit Plans**.
12. View and discuss the completed simplified *Showing Evidence* project within the Unit Plan, **Jack and the Beanstock**.
13. Click the **Back** button and then click the unit, **Mysterious Malady**, to view and discuss a completed project with the full version of the tool.



**Note:** Research behind the online thinking tools is available in the Thinking Tools folder on the Curriculum Resource CD.

Both the Elementary Demo and Secondary Demo are unfinished projects that provide you with the opportunity to practice adding evidence, comments, ratings (in the Secondary Demo), and attaching evidence to the claim.

Refer to the following skills in the Help Guide for this section:

- Showing Evidence Tool Skill 3.21: Creating evidence
- Showing Evidence Tool Skill 3.22: Rating the quality of evidence
- Showing Evidence Tool Skill 3.24: Rating the strength of evidence for a claim
- Showing Evidence Tool Skill 3.25: Linking evidence to a claim

### Targeting Thinking in the Classroom

#### Activity 3: Applying Models of Thinking

As society changes, the skills that students need to be successful in life also change. Basic literacy skills of reading, writing, and mathematics are no longer sufficient. Our students need to master those basic skills as well as read critically, write persuasively, think and reason logically, and solve complex problems. A successful 21st century student must also be adept at managing information—finding, evaluating, and applying new content understanding with great flexibility.

Below you will find a summary of one such list of essential 21st century skills (Partnership for 21st Century Skills, 2007). Consider which skills are actively taught or supported in your own classroom.

- **Core Subjects and 21st Century Themes** include English, reading, or language arts; world languages; arts; mathematics; economics; science; geography; history; government and civics, as well as global awareness; financial, economic, business and entrepreneurial literacy; civic literacy; and health literacy
- **Learning and Innovation Skills**
  - Creativity and Innovation Skills focuses on originality and inventiveness in work; developing, implementing and communicating new ideas to others; being open to new perspectives; acting on creative ideas
  - Critical Thinking and Problem Solving Skills requires exercising sound reasoning in understanding, making complex choices and decisions, understanding the interconnections among systems, identifying and asking significant questions that clarify various points of view and lead to better solutions, framing, analyzing and synthesizing information to solve problems and answer questions
  - Communication and Collaboration Skills includes articulating thoughts and ideas clearly and effectively through speaking and writing, demonstrating ability to work effectively with diverse teams, exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal, assuming shared responsibility for collaborative work
- **Information, Media and Technology Skills**
  - Information Literacy requires accessing information efficiently and effectively, evaluating information critically and competently, using information accurately and creatively for the issue or problem at hand, possessing a fundamental understanding of the ethical/legal issues surrounding the access and use of information
  - Media Literacy requires an understanding of how media messages are constructed, for what purposes and using which tools, characteristics and conventions; examining how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence

---

## Targeting Thinking in the Classroom

beliefs and behaviors; a fundamental understanding of the ethical/legal issues surrounding the access and use of information

- ICT Literacy includes using digital technology, communication tools and/or networks appropriately to access, manage, integrate, evaluate, and create information in order to function in a knowledge economy; using technology as a tool to research, organize, evaluate and communicate information, and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information
- **Life and Career Skills**
  - Flexibility & Adaptability includes adapting to varied roles and responsibilities, and working effectively in a climate of ambiguity and changing priorities
  - Initiative & Self-Direction includes monitoring one's own understanding and learning needs; going beyond basic mastery of skills and/or curriculum to gain expertise; demonstrating initiative to advance skill levels towards a professional level; defining, prioritizing and completing tasks without direct oversight; utilizing time efficiently and managing workload; demonstrating commitment to learning as a lifelong process
  - Social & Cross-Cultural Skills requires working appropriately and productively with others, leveraging the collective intelligence of groups when appropriate, and bridging cultural differences and using differing perspectives to increase innovation and the quality of work
  - Productivity & Accountability requires setting and meeting high standards and goals for delivering quality work on time and demonstrating diligence and a positive work ethic
  - Leadership & Responsibility includes using interpersonal and problem-solving skills to influence and guide others toward a goal, leveraging strengths of others to accomplish a common goal, demonstrating integrity and ethical behavior, and acting responsibly with the interests of the larger community in mind

Thinking beyond the level of knowledge acquisition is considered complex thinking—that which requires effort and produces outcomes that may differ from one student to another. These outcomes are not predictable because the process of higher-order thinking is not mechanical. Central to higher-order thinking is the ability to work through new challenges with understanding and empathy and rise to meet those challenges.

## Module 1

---

### Targeting Thinking in the Classroom

In the review of current research on higher-order thinking, the conclusion is clear. Instruction that builds upon and encourages the use of higher-order thinking skills yields greater levels of student learning. Gains on learning and intelligence measures have been tied to instruction that use a variety of specific techniques (Cotton, 1991), including:

- CREATIVE AND CRITICAL THINKING SKILLS, such as decision making, problem solving, fluency, observation, exploration, classification, and generating hypotheses (Crump, Schlichter, and Palk 1988; Herrnstein, et al. 1986; Horton and Ryba 1986; Kagan 1988; Matthews 1989; MCREL 1985; Ristow 1988; Robinson 1987; Tenenbaum 1986).
- METACOGNITION, including awareness, self-monitoring, and self-regulating (Bransford, et al. 1986; Freseman 1990; Haller, Child, and Walberg 1988; Pearson 1982; Pogrow 1988; Robinson 1987; Wong 1985).

Many models exist to help educators and researchers identify and categorize thinking skills. Benjamin Bloom's Taxonomy of Thinking Skills is perhaps the most familiar to educators. Others have revisited thinking skills since Bloom in an attempt to broaden the taxonomy to show complex processes like decision making or problem solving—areas that are not specifically addressed within Bloom's framework.

Even if you are familiar with the thinking skills categorized by Bloom, Marzano, and Costa and Kallick, these activities are designed as a quick review in order to have a common vocabulary. You will be drawing from these models to create a list of thinking skills you want to target in your own classroom.



In order to build a framework for organizing thinking skills that will best suit your students' learning needs and to focus on classroom practices that promote deeper thinking, we will review three models of thinking: Bloom's Revised Taxonomy (Anderson and Krathwohl, 2001), Marzano's Dimensions of Learning, and Costa and Kallick's 16 Habits of Mind. You will use these models to help build your own "Habits of Learning Taxonomy" for your classroom.

**Note:** A summary of another model of thinking skills, Wiggins and McTighe's Six Facets of Understanding, is provided in the *Thinking Skills* folder on the Curriculum Resource CD as an additional resource.

## Targeting Thinking in the Classroom

**Step 1: Applying Bloom's Taxonomy of Thinking Skills**

The following activity is designed to help you analyze—using Bloom's Revised Taxonomy—the thinking processes that are involved in problem solving. Read the following scenario and predict the answer.

**The Glass is Half Full Problem**

Two glasses are each filled half-way with soda—one with cola, the other with lemon-lime. A small amount of the lemon-lime is removed from the glass and put into the cola glass. The glass is stirred thoroughly so that the lemon-lime is completely mixed into the cola. Then the same amount of the mixture is removed from the cola glass and put back into the glass with the lemon-lime.

Question:

After the soda has been exchanged, is there more cola in the lemon-lime glass or more lemon-lime in the cola glass?

Look over the problem and predict which of the following is most likely to be correct:

- More cola in the lemon-lime.
- More lemon-lime in the cola.
- The same in both glasses.



Join a group that has the same prediction as yours. An observer will be assigned to your group who will

- Observe the group solving the problem and record in the checklist on the next page what is observed about the strategies and processes your group uses as they work.
- Make check marks or brief comments when observing any of the behaviors listed in the chart.



Discuss your individual strategies for determining your answer and then, as a group, come to a final decision on the answer. If at any time during your group's discussion you change your mind as to what you believe is the correct answer, you may change groups.

Three observers will be chosen by the facilitator at the beginning of this activity and one will be assigned to each group. (Observers should be familiar with Bloom's Taxonomy.) While teachers are individually trying to determine the answer, observers will be watching for the types of methods participants use to come up with the solution.



# Module 1

## Targeting Thinking in the Classroom

Participants should not view or use this list at the beginning of the activity so that it will not unduly influence the methods they use to solve the problem. Although finding the “right” answer is not actually the point of this activity (analyzing the higher-order thinking skills used in problem solving is), you can find a description of various methods of solving this problem and answers at: [www.geocities.com/CapitolHill/lobby/7049/wine.htm](http://www.geocities.com/CapitolHill/lobby/7049/wine.htm)

Demonstrated Thinking Skill	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Remembering</b> Defines terms Lists elements of the problem Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Understanding</b> Accesses prior knowledge Restates problem in different words Identifies all of the key elements of the problem Simplifies problem Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Applying Uses math/equations to calculate</b> Contrasts possibilities with a simpler problem Demonstrates knowledge of math or science principles Tests ideas Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Analyzing Sketches or uses pictures to analyze the problem</b> Makes tables and diagrams Discusses options/considers multiple hypotheses Makes generalizations to other cases Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Evaluating</b> Assesses the validity of methods and answers Supports a conjecture with a logical or mathematical argument Tests and accepts or rejects a conjecture based on well-thought-out rationale Checks answer with second method Other: _____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>Creating</b> Works backwards Builds models Proposes a completely new way to look at the problem Other: _____

**Note:** A table of Bloom’s Revised Taxonomy is on page 1.12 for reference.

Targeting Thinking in the Classroom



After discussing the problem in your small group, individually check those skills you think you and your colleagues used during the activity. Compare your list with your observer.

As a whole group, discuss the following questions:

- Which levels of Bloom’s Revised Taxonomy did you use? What could you have done differently to come up with your answer?
- By applying Bloom’s Revised Taxonomy in this way, how did it affect your reflection about your problem-solving process and the thinking skills employed?
- What was it like being observed? What was it like observing? What issues about assessment of thinking did your experiences generate?
- What kind of information could you get from a checklist like this one? How might teachers and students use this information?

---



---



---



---



---



---

Consider how Bloom’s Revised Taxonomy can be used in project planning and the assessment of students’ thinking skills. The table on the next page helps to define the categories of Bloom’s Revised Taxonomy and the actions that often surround and encompass the use of these skills—by both teacher and student. You will reflect back on this list as you build your own “Habits of Learning Taxonomy” in the next activity.

Targeting Thinking in the Classroom

Bloom's Revised Taxonomy of Thinking Skills

Level	Definition	What a Teacher Does	What a Student Does	Cues
Remembering	Identifying and recalling information	tells, shows, directs, questions	accesses prior knowledge, describes, lists, names, recognizes, remembers	cite, define, describe, enumerate, find, identify, list, label, locate, match, memorize, name, recall, recite, recognize, record, recount, repeat, report, retrieve, specify, state, tabulate
Understanding	Explaining ideas or concepts; stating a problem in one's own words	compares, contrasts, demonstrates	demonstrates, explains, interprets, paraphrases, summarizes	clarify, confirm, defend, discuss, distinguish, duplicate, exemplify, explain, express, extend, illustrate, infer, interpret, locate, paraphrase, predict, relate, report, reproduce, restate, retell, review, rewrite, select, translate, understand
Applying	Using concepts in new situations	observes, facilitates, critiques	solves problems, demonstrates knowledge, implements, executes	apply, calculate, carry out, compute, demonstrate, dramatize, employ, estimate, execute, exhibit, experiment, illustrate, implement, make, model, modify, operate, perform, practice, simulate, sketch, solve, use
Analyzing	Breaking information into parts to explore understandings and relationships	guides, probes, serves as a resource	compares, deconstructs, discusses, dissects, organizes, uncovers	analyze, appraise, categorize, compare, connect, contrast, deconstruct, determine, diagram, discriminate, examine, generalize, hypothesize, imagine, organize, outline, probe, question, test
Evaluating	Judging value based on criteria; justifying a decision/course of action	clarifies, accepts, guides, harmonizes	checks, critiques, disputes, experiments, judges	appraise, argue, assess, check, conclude, convince, criticize, critique, deduce, defend, evaluate, hypothesize, judge, rank, rate, recommend, revise, scrutinize, support, value, weigh
Creating	Generating new ideas, products, or ways of viewing things	extends, evaluates, facilitates, reflects	designs, constructs, plans, produces, invents	actualize, combine, compose, concoct, construct, contrive, create, design, develop, devise, formulate, generate, incorporate, integrate, invent, make, modify, originate, plan, produce, propose, rearrange, transform

This table is based on the Bloom's Revised Taxonomy by Anderson and Krathwohl (2001).

## Targeting Thinking in the Classroom

**At a Glance: Bloom's Revised Taxonomy**

Bloom's Revised Taxonomy is distinguished by the way it categorizes thinking skills from the simplest learning behavior to the most complex. He and his team created a hierarchical system of thinking skills where the higher thinking levels include all of the cognitive skills from the lower levels. Anderson and Krathwohl revised the taxonomy categories into verb forms and created a two dimensional table: The Knowledge Dimension (or the kind of knowledge to be learned, identified above) and The Cognitive Process Dimension (or the process used to learn: factual, conceptual, procedural, and meta-cognitive).

**Step 2: Applying Marzano's Dimensions of Learning**

Dimensions of Learning is an instructional framework developed by Robert J. Marzano (1988, 1992). This model is based on the idea that all successful learning is based upon five dimensions of thinking. Marzano's Dimensions 1 and 5 recognize the importance of social and emotional factors in learning. Dimension 2 focuses on knowledge, which is the basis or foundation that Dimensions 3 and 4 build upon.

Each of these dimensions of thinking occupies an equal place in successful learning. "The five dimensions do not exist in 'isolation' from each other and they do not show a progressive linear pattern of accomplishment. They do describe different cognitive processes, each valuable in its own right and each worthy of teacher attention during a unit of study" (Marzano, 1992).

Review the Dimensions of Learning and consider which elements emerge as being important in your own classroom.

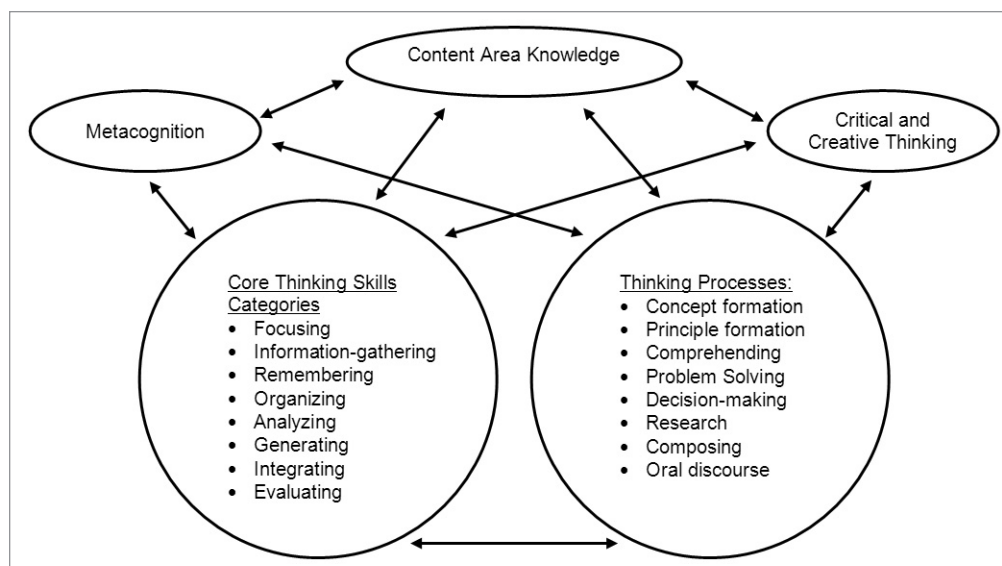
	Title	Example
Dimension 1	Positive Attitudes and Perceptions About Learning	<ul style="list-style-type: none"> <li>▪ Classroom Climate</li> <li>▪ Feeling accepted by teacher and peers</li> <li>▪ Perceiving order</li> </ul>
Dimension 2	Acquisition and Integration of Knowledge	<ul style="list-style-type: none"> <li>▪ Students must be guided in relating new knowledge to what they know, organizing it, and making it part of long-term memory</li> <li>▪ Two types of knowledge:               <ul style="list-style-type: none"> <li>▪ Declarative Knowledge</li> <li>▪ Facts, concepts, generalizations, and principles</li> <li>▪ Procedural Knowledge</li> <li>▪ Skills, procedures, and processes</li> </ul> </li> </ul>

## Module 1

### Targeting Thinking in the Classroom

	Title	Example
Dimension 3	Extension and Refinement of Knowledge	<ul style="list-style-type: none"><li>▪ Learners must develop in-depth understanding and apply and refine that knowledge</li><li>▪ Common reasoning processes are:<ul style="list-style-type: none"><li>▪ Comparing — How are these things alike?</li><li>▪ Classifying — How can these be organized?</li><li>▪ Inductive Reasoning — Based on these facts, what is your conclusion?</li><li>▪ Deductive Reasoning — Based on this rule, what conclusions can you draw that must be true?</li><li>▪ Analyzing Errors — How is this information misleading?</li><li>▪ Constructing Support — What is an argument that would support this claim?</li><li>▪ Abstracting — To what other situations can this apply?</li><li>▪ Analyzing Perspectives — What is the reasoning behind this perspective?</li></ul></li></ul>
Dimension 4	Meaningful Use of Knowledge	<ul style="list-style-type: none"><li>▪ Students learn best when they need knowledge to accomplish a goal that is meaningful to them<ul style="list-style-type: none"><li>▪ Decision Making</li><li>▪ Investigation</li><li>▪ Experimental Inquiry</li><li>▪ Problem Solving</li><li>▪ Systems Analysis</li></ul></li></ul>
Dimension 5	Productive Habits of Mind	<ul style="list-style-type: none"><li>▪ Mental habits that students develop that will enable them to learn on their own<ul style="list-style-type: none"><li>▪ Critical Thinking</li><li>▪ Creative Thinking</li><li>▪ Self-Regulation—Metacognition</li></ul></li></ul>

## Targeting Thinking in the Classroom



This is one group's model of a thinking skills framework they entitled "Dimensions of Thinking." It was created by Public Schools of North Carolina and adapted from Marzano's *Dimensions of Learning* (1988). Used with permission.

#### At a Glance: Marzano's Dimensions of Learning

Marzano's categories of how people think is different from Bloom's in that the categories do not build upon each other in a hierarchical fashion. Each cognitive category is just as important as the others. The Dimensions of Learning represent elements that Marzano believes are all worthy of focus and inclusion within a unit of study.

Apply the Dimensions of Learning as you review a project on the Intel® Education Web site. Use the *Help Guide* if you need assistance in completing any technology skills identified below.



1. Open: [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Add this page to your Bookmarks, Favorites, or online bookmarking site. (See Web Technologies Skill 1.5 or 3.5.)
3. Click **Project Examples**, and then click **Project Ideas**.
4. Click **River City Water** and note the sections of the project and the live *Visual Ranking* project embedded in the project idea. (Use the *Help Guide's* Visual Ranking skills, if needed.)

**Note:** A printed copy of this unit plan is also available in Appendix E.01.

Refer to the following skills in the Help Guide for this section:

- Web Technologies Skill 1.5: Mozilla Firefox, To bookmark a favorite page on the Web
- Web Technologies Skill 3.5: Internet Explorer, To bookmark a favorite page on the Web

## Module 1

---

### Targeting Thinking in the Classroom

5. Read the project idea. Pick a few of the thinking skills below from Marzano's Dimensions 3 and 4 that students would employ during this unit. Theorize and explain what students would be doing within that dimension during the unit. What might occur to promote thinking at each dimension, extrapolating from the description? How would that thinking process be carried out? The first one is completed as an example.

**Note:** Not all skills listed below may be evident in the unit plan, nor do they all need to be present.

- a. Comparing — "How are these things alike?"

Students group and compare critical environmental concerns.

Students compare their ranking list with other teams' ranking.

- b. Inductive Reasoning — "Based on these facts, what is your conclusion?"

---

---

---

- c. Analyzing Errors — "How is this information misleading?"

---

---

---

- d. Constructing Support — "What is an argument that would support this claim?"

---

---

---

- e. Analyzing Perspectives — "What is the reasoning behind this perspective?"

---

---

---

- f. Experimental Inquiry — "What if...?" "How would you determine...?"

---

---

Targeting Thinking in the Classroom

g. Problem solving — “What solutions will you try?”

---



---



---

h. Systems Analysis — “What happens if a key part of this system...?”

---



---



---



6. Share your ideas of what you saw in this unit with a partner. Discuss how this new categorization of thinking skills and classroom learning provides a different way of looking at thinking skills. How is this analysis of thinking skills different than if you used Bloom’s Taxonomy?

---



---



---



---



---



---

**Step 3: Applying Costa and Kallick’s 16 Habits of Mind**

*Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.*

Aristotle

Art Costa and Bena Kallick have identified 16 Habits of Mind that are used by effective thinkers when confronted with a challenging problem. Art Costa says a habit of mind “is knowing how to behave when you don’t know the answer” (Costa & Kallick, 2000–2001). Employing a habit of mind requires many skills, attitudes, and learned behaviors. These behaviors are not performed in isolation, but in clusters. The 16 Habits of Mind is not a complete list, but a beginning point for discussion on how people display their intelligence. Read through each of the habits below and on the next page. Circle the top three habits of mind that you consider important for your own classroom, and then complete the survey on page 1.20 to begin thinking about how effective your students are in employing the Habits of Mind.



## Module 1

### Targeting Thinking in the Classroom

16 Habits of Mind	Description
1. Persisting	Ability to sustain a problem solving process over time
2. Managing Impulsivity	Ability to think before acting, intentionally forming a plan before beginning a task
3. Listening to Others—With Understanding and Empathy	Ability to listen to another person, to empathize with and to understand their point of view
4. Thinking Flexibly	Capacity to change one's mind as additional data is received; ability to approach a problem from a new angle using a novel approach
5. Thinking About Our Thinking (Metacognition)	Ability to develop a plan of action, maintain that plan in mind over a period of time, and then reflect back on and evaluate the plan upon its completion. Aware of one's actions and the effect of those actions on others and on the environment. Ability to explain one's strategies of decision making.
6. Striving for Accuracy and Precision	Valuing of accuracy, precision, and craftsmanship
7. Questioning and Posing Problems	Knowing how to ask questions to fill in the gaps between what is known and unknown. Ability to recognize discrepancies and phenomena in one's environment and probe into their causes.
8. Applying Past Knowledge to New Situations	Ability to abstract meaning from one experience, carry it forth, and apply it in a new and novel situation
9. Thinking and Communicating with Clarity and Precision	Striving to communicate accurately in both written and oral form taking care to use precise language, define terms, and use correct names, universal labels, and analogies
10. Gathering Data Through All Senses	Deriving information from the environment by observing or taking it in through the senses
11. Creating, Imagining, and Innovating	Trying to conceive problem solutions differently, examining alternative possibilities from many angles, using analogies, starting with a vision and working backward, taking risks, and pushing the boundaries of one's perceived limits
12. Responding with Wonderment and Awe	Maintaining curiosity, enthusiasm, and passion about learning, inquiring, and mastering
13. Taking Responsible Risks	Accepting confusion, uncertainty, and the higher risks of failure as part of the normal process. Learning to view setbacks as interesting, challenging, and growth producing

---

**Targeting Thinking in the Classroom**

16 Habits of Mind	Description
14. Finding Humor	Using humor and laughter to liberate creativity and provoke such higher-level thinking skills as anticipation, finding novel relationships, visual imagery, and making analogies. Having a whimsical frame of mind, finding incongruity and perceiving absurdities, ironies, and satire
15. Thinking Interdependently	Heightened ability to think in concert with others. Ability to justify ideas and to test the feasibility of solution strategies on others. Willingness and openness to accept the feedback from a critical friend
16. Learning Continuously	Constantly searching for new and better ways, always striving for improvement, always growing, always learning, and always modifying and improving themselves

Summarized from: Costa & Kallick's "Describing 16 Habits of Mind."

**At a Glance: Costa and Kallick's 16 Habits of Mind**

Rather than trying to categorize all areas of thinking (like Bloom) or how knowledge is used within the context of a social and personal environment (like Marzano), Costa and Kallick define habits that are required to meet "challenging conditions"—ones that demand "strategic reasoning, insightfulness, perseverance, creativity, and craftsmanship to resolve a complex problem."

Targeting Thinking in the Classroom

**Do Your Students Behave Intelligently?**

As you complete this survey, think about the students in your classroom and how they approach difficult or new problems. Rate their behaviors that correspond to the 16 Habits of Mind.

- 1. In general, my students are persistent when dealing with a new problem. If they don't succeed on the first try, they keep trying until they do succeed.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

- 2. My students manage their impulses and think before they act. They formulate a plan before attempting a difficult task.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

- 3. My students listen to my and other students' ideas empathetically. They try to understand points of view that differ from their own.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

- 4. My students are open-minded, capable of changing their mind when new data is provided. They can easily change their approach to a problem if the first is not working.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

- 5. My students are aware of how they learn. They consciously reflect on what process works for them and what doesn't and adjust their plan accordingly. They are aware of how their actions affect others.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

- 6. My students proofread and check the quality of their work. They understand the importance of—as well as value—accuracy and precision.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

## Targeting Thinking in the Classroom

7. My students are not afraid to ask questions or to probe deeper into an issue or problem.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
8. My students apply what they have learned previously to solve new problems.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
9. My students work hard to communicate accurately in writing and speaking.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
10. My students observe their environment and use all their senses to gather information.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
11. My students are creative when solving a new problem, trying to imagine different solutions. They are innovative visionaries.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
12. My students allow themselves to see and respond to the beauty in the world. They maintain their sense of curiosity, enthusiasm, and passion about learning.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
13. My students are willing to venture into the unknown and take responsible risks. They view setbacks as challenges that help them grow, rather than seeing them as failures.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree
14. My students use humor to creatively view situations and the odd or funny coincidences or relationships. They can see and appreciate the absurdities, ironies, and satire in life—as well as the whimsical side of themselves and others.
- 
- Strongly Disagree                      Disagree                      Agree                      Strongly Agree

(continued)

## Module 1

---

### Targeting Thinking in the Classroom

15. My students work really well together and are able to talk through and try out different solutions. They are open and receptive to the feedback from others.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

16. My students always work to improve themselves and endeavor to grow and learn from every experience. Learning is very important to them.

Strongly Disagree                      Disagree                      Agree                      Strongly Agree

Adapted from the Habits of Mind Survey by Steve Huffman, Sacred Hearts Academy, Hawaii (2004)

Review your survey results and compare them with the habits you identified as important for students in your classroom. Identify one or two habits that you are particularly interested in supporting in your classroom. Form a small group of like-minded colleagues to discuss that habit (or those habits) and its application in the classroom.



In your small group, use the following questions to help guide your discussion and, optionally, record your ideas in a wiki:

- When do you see that habit—or a glimmer of that habit—being employed right now by your students? What triggers or helps to encourage that habit?
- How can we structure our classrooms to help support that habit? What scaffolds, environment, or strategies can we employ to encourage the ongoing development of that habit?
- What changes could we make to our student projects or classwork to promote that habit?
- What conversations could you have with your students to discuss the Habits of Mind?

---

---

---

---

---

---

---

---

---

---

## Activity 4: Creating Your Own “Habits of Learning Taxonomy”

When you think about what your students need to be successful, which skills and habits do you think are most important to support in your curriculum and classroom environment?

1. Consider all three models of categorizing/skills needed for students to learn most successfully. Which ideas from any of these models are you most interested in developing (or continuing to develop) in your classroom?
2. Develop your own “Habits of Learning Taxonomy” using a visual organizer that meets your needs. Use the table below, the Venn diagram on the next page, or an organizer of your own choosing to define and organize the thinking skills and/or habits you would like your students to develop in your classroom.



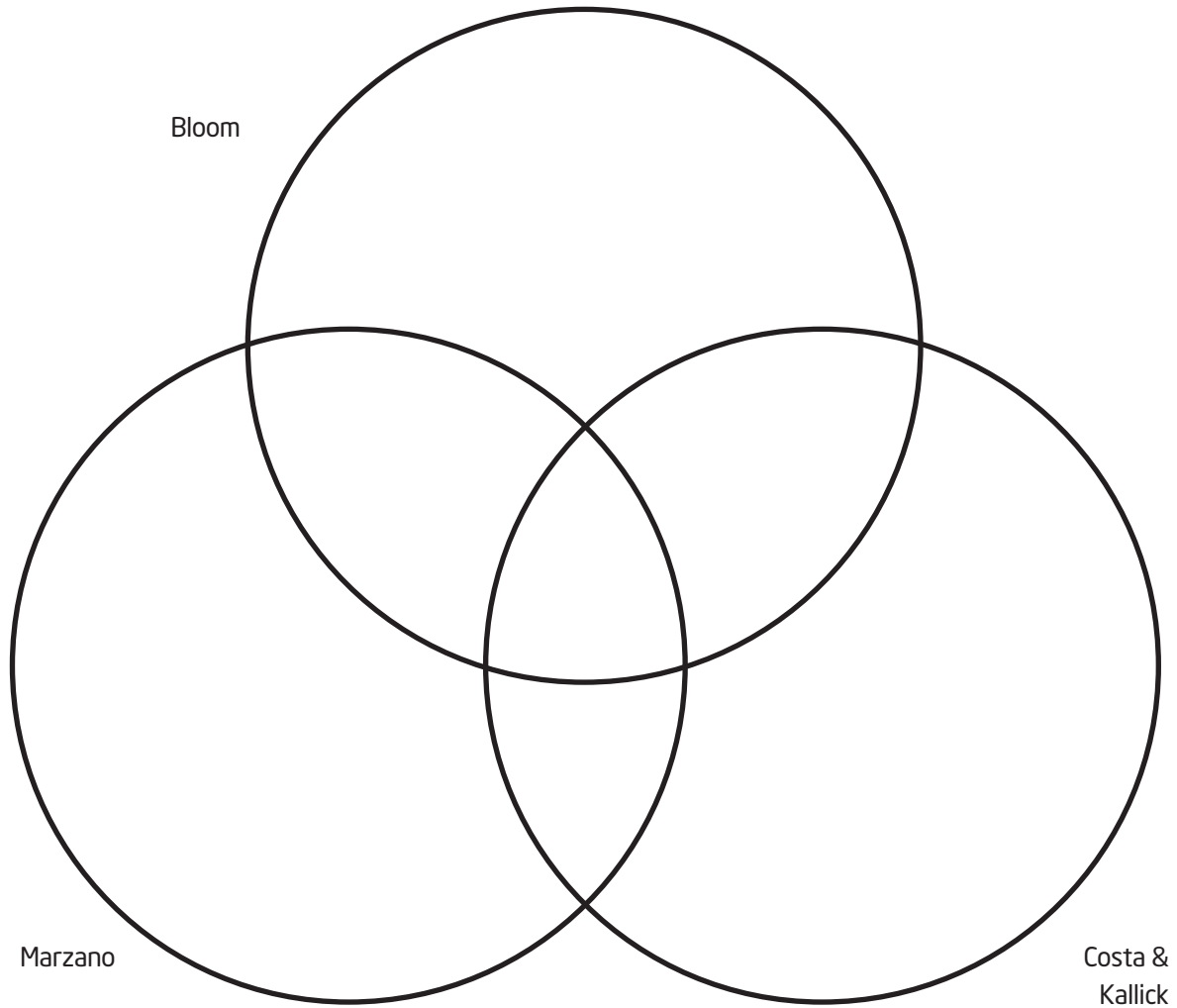
**Note:** A summary of Wiggins and McTighe’s Six Facets of Understanding is available in the Thinking Skills folder on the Curriculum Resource CD as an additional thinking model to consider, if desired. You may also want to review the thinking skill resources available at: [www.intel.com/education/designprojects](http://www.intel.com/education/designprojects) — Click **Thinking Skills**.

### Visual Organizer Option 1: Table

Bloom’s Taxonomy	Marzano’s Dimensions of Learning	Costa & Kallick’s 16 Habits of Mind

Targeting Thinking in the Classroom

Visual Organizer Option 2: Venn Diagram



Visual Organizer Option 3: Create Your Own

## Activity 5: Reviewing the Unit Plan Template

Throughout the following modules, you will:

- Build the foundation of your unit (by determining your targeted thinking skills, standards, priorities for project design, Curriculum-Framing Questions, and Assessment Plan)
- Try out the thinking tools to see how well they fit and support your unit’s goals and objectives
- Finalize your plans for tool use, unit activities, and implementation

Modules 1 through 4 provide the opportunity to build a strong, pedagogically sound foundation for your unit. In Modules 5 through 10, you test out the ideas for using the thinking tools that may work in your unit. In Module 11, you finalize your Unit Plan, plan for assessment, assessment instrument(s), and then showcase your unit.

During this unit-building process, you choose the best tool or tools for the job. Throughout the modules, you will evaluate your ideas for using the tools in your unit—determining their suitability for your students’ needs—and then choose the appropriate tools to integrate into your Unit Plan. At any time during these modules, or if you know from the outset that a specific tool will not work for your unit, you can try out an idea for another unit or project that may fit the purpose of the tool better.

In this activity, you view the Unit Plan Template in preparation for future activities. You also use this time to type your “Habits of Learning Taxonomy” into the Unit Plan Template as the first layer in the foundation of your unit. To get started, you need to create a location to save your unit materials. Use the Help Guide if you need assistance in completing any technology skills identified below.



1. Create a folder on your desktop (or the location indicated by your instructor) and name the folder *[your name] Project Folder*. Save all files from this course in this folder. (See Operating Environment Skill 2.1.)



2. For easier access to the Curriculum Resource CD, create a shortcut to the “Start Here” file located at the top level of the CD. (See the CD Instructions on the Curriculum Resource CD.)



**Note:** The Curriculum Resource CD works best with Microsoft Internet Explorer 6.0\* and later. However, if you are using Mozilla Firefox\* or Netscape Navigator\* as your Internet browser, create a shortcut to the “Thinking\_w\_Tech.htm” file within the Curriculum\_Resource\_CD folder instead.

3. Start the Curriculum Resource CD and navigate to the *Unit Development* folder on the CD. (See the CD Instructions on the Curriculum Resource CD.)

It is important that you do not force a fit for the use of technology or to simply use the thinking tools for superfluous activities. Modules 5 through 10 will help you identify the best tools to use in your unit.

Refer to the following skills in the Help Guide for this section:

- Operating Environment Skill 2.1: To create a new folder on the desktop



## Module 1

### Targeting Thinking in the Classroom

4. View the following Unit Plan Template, briefly review the various sections, and note the descriptions in the fields that you are required to complete. The callouts explain in which module you complete different sections of the Unit Plan Template.
5. Save the Unit Plan Template into your Project Folder. (See Web Technologies, Mozilla Firefox Skill 2.1 or Web Technologies, Internet Explorer Skill 4.1.)
6. Open the Unit Plan Template from your Project Folder.
7. Consider refining your "Habits of Learning Taxonomy" to a manageable number of thinking skills, and then type them into the *Habits of Learning Taxonomy* section of your Unit Plan and save. You will continue to refer to these thinking skills as you build your unit throughout the following modules.



Refer to the following skills in the Help Guide for this section:

- Web Technologies, Mozilla Firefox 2.1: To download a document from a Web site
- Web Technologies, Internet Explorer 4.1: To download a document from a Web site

**Module 1:** Think of topic and possible project for unit.

**Modules 6, 8, 10:** Revise ideas for unit after trying out your ideas for incorporating the thinking tool(s).

**Module 11:** Summarize unit and the incorporation of one or more thinking tools

### Unit Plan Template

Unit Author	
First and Last Name	
School District	
School Name	
School City, State	
Unit Overview	
Unit Plan Title	
<i>A descriptive or creative name for your unit</i>	
Unit Summary	
<i>A concise overview of your unit that includes the topics within your subject that are covered, a description of the main concepts learned, a brief explanation for how the activities help students answer the Curriculum-Framing Questions, and how the thinking tool(s) will be integrated into the unit to meet important learning goals.</i>	
Subject Area	
<i>The subject area you are specifically targeting for the unit (addressed in the standards, objectives, and instructional procedures)</i>	
Grade Level	
<i>The targeted grade level(s) for the unit</i>	
Approximate Time Needed	
<i>Example: 8 50-minute class periods, 6 weeks, 3 months, and so forth</i>	

(continued)

Targeting Thinking in the Classroom

Unit Foundation		
<b>Habits of Learning Taxonomy</b>		
<i>A list of higher-order thinking skills and/or habits that are targeted for your classroom</i>		
<b>Targeted Content Standards and Benchmarks</b>		
<i>Paste your standards here. After refining and reducing the list of standards for this specific unit, the resulting standards in this section should include prioritized, targeted standards that your students are expected to meet (not just lightly address) and which you will assess by the end of this unit.</i>		
<b>Student Objectives/Learning Outcomes</b>		
<i>A prioritized list of content objectives that students will master by the end of unit</i>		
<b>Curriculum-Framing Questions</b>		
<b>Essential Question</b>	<i>A broad, overarching question that can bridge several units/subject areas</i>	
<b>Unit Questions</b>	<i>Guiding, open-ended, unit-specific question(s) that help build understanding of the Essential Question</i>	
<b>Content Questions</b>	<i>Fact-oriented, closed questions that are required in order to begin answering the larger questions of the unit. Often these questions are content area or definitional questions that directly support the unit's targeted standards.</i>	
Assessment Plan		
<b>Assessment Timeline</b>		
<b>Before project work begins</b>	<b>Students work on projects and complete tasks</b>	<b>After project work is completed</b>
<ul style="list-style-type: none"> <li>Enter assessments that help determine a student's background, skills, attitude, and misconceptions</li> </ul>	<ul style="list-style-type: none"> <li>Enter assessments that gauge student needs, monitor progress, check for understanding, and encourage metacognition, self-direction, and collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Enter assessments that assess students' understanding and skills, encourage metacognition, and gauge student needs for future instruction</li> </ul>
<b>Assessment Summary</b>		
<i>Describe the assessments that you and your students use to gauge needs, set goals, monitor progress, provide feedback, assess thinking and processes, and reflect on learning throughout the learning cycle. These might include graphic organizers, journal prompts, anecdotal notes, checklists, conferences, questioning, and rubrics. Also describe the artifacts of student learning that you assess, such as products, presentations, written documents, or performances and the assessments you use. Describe in the Instructional Procedures section who uses the assessments, how they are used, and where they occur.</i>		

**Module 1:** Create your own "Habits of Learning Taxonomy"

**Module 3:** Develop Curriculum-Framing Questions for unit

**Module 4:** Draft Assessment Timeline

**Modules 6, 8, 10:** Revise Assessment Plan after trying out your ideas for incorporating the thinking tool(s).  
**Module 11:** Write Assessment Summary and create an assessment for student project

(continued)

## Module 1

### Targeting Thinking in the Classroom

Modules 5 & 6: Try out a Visual Ranking project

<b>Visual Ranking Elements</b> (Complete this section if this tool will be used in the unit)	
<b>Visual Ranking Project Name</b> (For the <i>Visual Ranking</i> workspace)	
<i>A descriptive title for your Visual Ranking project. This name could specifically reference the purpose or use of the Visual Ranking Tool in your unit. This title will appear in the Student Workspace as well as above your students' Visual Ranking lists.</i>	
<b>Project Description</b> (For the <i>Visual Ranking</i> workspace)	
<i>A focused, short paragraph that describes the project to your students and explains how they will use the Visual Ranking Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.</i>	
<b>Prompt</b> (For the <i>Visual Ranking</i> workspace)	
<i>Instructions on what criteria students should consider as they rank the list. Word the prompt so that students know that they should sort all items and not just pick out the best. This question or statement will appear on the top of the students' list to rank.</i>	
<b>Sorting List</b> (For the <i>Visual Ranking</i> workspace)	
<i>Items to rank. Maximum of 16 short-length items or 12 long-length items. Optimal number to sort is 7–12 items. Ensure there is no unintentional bias in the order of your list; you may want to alphabetize it.</i>	
<b>Practice Ranking</b> (For your future quick reference)	
Teacher ID:	Password:
Practice Team ID 1:	Password:
Practice Team ID 2:	Password:

Modules 7 & 8: Try out a Seeing Reason project

<b>Seeing Reason Elements</b> (Complete this section if this tool will be used in the unit)	
<b>Seeing Reason Project Name</b> (For the <i>Seeing Reason</i> workspace)	
<i>A descriptive title for your project. This name could specifically reference the purpose or use of the Seeing Reason Tool in your unit. This title will appear in the Student Workspace as well as above your students' Seeing Reason maps.</i>	
<b>Project Description</b> (For the <i>Seeing Reason</i> workspace)	
<i>A focused, short paragraph that describes the project to your students and explains how they will use the Seeing Reason Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.</i>	
<b>Research Question</b> (For the <i>Seeing Reason</i> workspace)	
<i>The direct question that students will respond to in their maps, which requires the building of a cause-and-effect map of a complex system or issue</i>	

(continued)

Targeting Thinking in the Classroom

Seeing Reason Elements (continued)	
Practice Map (For your future quick reference)	
Practice Team ID:	Password:
<i>Copy an image of the practice map here. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)</i>	
Showing Evidence Elements (Complete this section if this tool will be used in the unit)	
Showing Evidence Project Name (For the <i>Showing Evidence</i> workspace)	
<i>A descriptive title for your project. This name could specifically reference the purpose or use of the Showing Evidence Tool in your unit. This title will appear in the Student Workspace as well as above your students' Showing Evidence cases.</i>	
Project Description (For the <i>Showing Evidence</i> workspace)	
<i>A focused, short paragraph that describes the project to your students and explains how they will use the Showing Evidence Tool to help them answer the questions of the unit. It explains why this is a project or problem that is worthy of study as well as defines what your students will try to solve, produce, respond to, test, recommend, or find out.</i>	
Prompt (For the <i>Showing Evidence</i> workspace)	
<i>The direct question that students will respond to in their argument case, which requires the investigation and gathering of evidence to validate a claim</i>	
Practice Case (For your future quick reference)	
Practice Team ID:	Password:
Reviewing Team ID:	Password:
Claims	
<i>If you are pre-populating the claims for your students, enter those claims here.</i>	
Evidence	
<i>If you are pre-populating the evidence bins for your students, describe the evidence you will use and/or the source for those evidence items here.</i>	
Unit Details	
Prerequisite Skills	
<i>Conceptual knowledge and technical skills that students must have to begin this unit</i>	
Instructional Procedures	
<i>A clear picture of the instructional cycle—a description of the scope and sequence of student activities and an explanation for how students are involved in planning their own learning. Learning activities can be described in phases or activity-by-activity. Describe methods of assessment as they occur and note how the Curriculum-Framing Questions will be used and answered throughout the unit.</i>	

**Modules 9 & 10:** Try out a Showing Evidence project

**Module 2:** Identify a project approach for unit

**Modules 6, 8, 10:** Revise Instructional Procedures after trying out your ideas for incorporating the thinking tool(s)

**Module 11:** Finalize Instructional Procedures for unit

## Module 1

### Targeting Thinking in the Classroom

**Module 11:** Create accommodations to support all learners

**Module 11:** Identify resources for project

<b>Unit Details (continued)</b>	
<b>Accommodations for Differentiated Instruction</b>	
<b>Resource Student</b>	<i>Describe accommodations and support for students, such as extra time for study, adjusted learning objectives, modified assignments, grouping, assignment calendars, adaptive technologies, and support from specialists. Also describe modifications in how students express their learning (for example, oral interview instead of a written test).</i>
<b>Nonnative English Speaker</b>	<i>Describe language support, such as English Language Learner (ELL) instruction and tutoring from more able bilingual students or community volunteers. Describe adaptive materials, such as first-language texts, graphic organizers, illustrated texts, dual-language dictionaries, and translation tools. Describe modifications in how students express their learning, such as first language rather than English or an oral interview instead of a written test.</i>
<b>Gifted Student</b>	<i>Describe the various ways students may explore curriculum content, including independent study, and various options through which students can demonstrate or exhibit what they have learned, such as more challenging tasks, extensions that require in-depth coverage, extended investigation in related topics of the learner's choice, and open-ended tasks or projects.</i>
<b>Materials and Resources Required for Unit</b>	
<b>Printed Materials</b>	<i>Textbooks, curriculum guides, story books, lab manuals, reference materials, and so forth</i>
<b>Supplies</b>	<i>Essential items that have to be ordered or gathered to implement your unit and are specific to the course of study. Do not include everyday items that are common to all classrooms.</i>
<b>Technology - Hardware</b>	<i>Technology devices needed to carry out the plan. These may include: cameras, computer(s), DVD player, handheld devices, printer, projection system, scanner, television, VCR, video camera, video conferencing equipment, and so forth</i>
<b>Technology - Software</b>	<i>Software programs and applications needed to carry out the plan. These may include: database/spreadsheet, desktop publishing, Web page development, word processing software, multimedia, specific software programs, email, Internet browser, and so forth</i>
<b>Internet Resources</b>	<i>Web addresses (URLs) that support the implementation of your unit or Web sites that students will use as a starting point for gathering information and evidence</i>
<b>Other Resources</b>	<i>Field trips, experiments, guest speakers, mentors, other students/classrooms, community members, parents, and so forth</i>

## Activity 6: Supporting Thinking

To prepare for the unit planning process that occurs throughout this course, it will be useful to identify and analyze what affects the way we think. Over the next few modules, you will explore this topic from different perspectives: a 21st century world citizen, a teacher, and a student in your classroom. During this activity, consider this topic from the perspective of a productive and successful 21st century world citizen. Refer to your own “Habits of Learning Taxonomy” on the previous pages and the 21st century skills beginning on page 1.06 as you consider what impacts thinking in the 21st century. Use the *Seeing Reason Tool* to explore answers to the question,

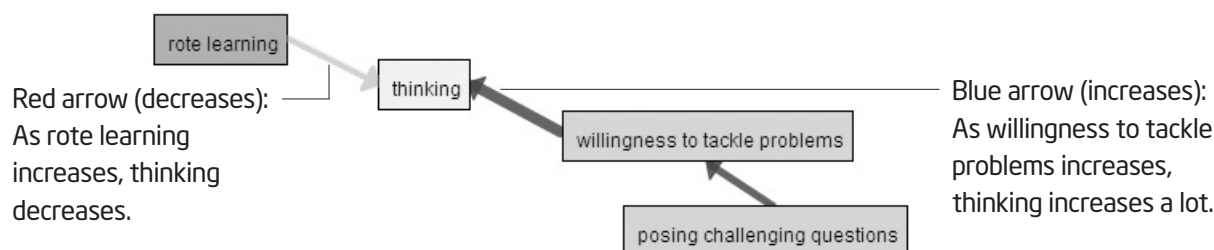
### *What makes you really think?*

#### Step 1: Understanding the Seeing Reason Tool

During this and future activities, we will be using the *Seeing Reason Tool* to explore what affects our ability and interest in thinking deeply. The following provides a quick review of the tool space.

Factors involved in cause-and-effect relationships are represented by a square box. The relationships between the factors are represented by arrows of a specific thickness and color:

- Thicker arrows show a stronger relationship.
- Thinner arrows show a weaker one.
- Blue arrows indicate positive relationships (as X increases, Y increases).
- Red arrows indicate negative relationships (as X increases, Y decreases).



By moving your mouse over a relationship arrow, the description of that relationship will appear at the top of the map. By double-clicking an arrow or a factor, you can view the full relationship description that explains or provides evidence for the causality of the relationship.

## Module 1

### Targeting Thinking in the Classroom

Although you will be working in teams for this activity, you will be assigned your own team ID and password so that you can use the same log-in information for the other thinking tool



projects in future modules. When you are working in a team, simply decide among your team members which log-in to use. You

may find a sticky note on your computer with the log-in information. Since you have already experienced *Seeing Reason* before, the Help Guide steps are provided in case you need some additional assistance.



#### Step 2: Exploring Thinking with the Seeing Reason Tool

Use the *Help Guide* if you need assistance in completing any technology skills identified below.

1. With a partner, go to: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
2. Add this page to your Favorites or online bookmarking site.
3. Click **Student Log-In**.
4. Your facilitator will give your team the teacher ID, team ID, and password. Write them on Overview page vi as you will need these later in the course.
5. The student homepage will open. Under *Project Name*, click on the project **Thinking**.
6. Working with a partner, add factors and relationships to your map that answer the question, *What makes you really think?* from the perspective of a 21st century world citizen. Use the *Help Guide* if you need assistance in:



Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.20: Adding a relationship
- Seeing Reason Tool Skill 2.22: Saving a project
- Seeing Reason Tool Skill 2.23: Saving a map to a portfolio



Be sure to save your map into your portfolio at the end of this activity.



Don't forget to view other teams' maps.



7. Walk around to view and discuss other teams' maps. Double-click factors and relationship arrows to see the details in order to better understand the thinking of each team.

- a. Creating factors from the viewpoint of a 21st century world citizen. Provide concrete examples in the factors' description area. (See Teaching Tools, Seeing Reason Tool Skill 2.15.)

**Note:** For this activity, assign the same color to all the factors to designate that these factors are from the 21st century point of view. Be sure to include those factors that negatively affect thinking.

- b. Adding relationships between the factors. (See Teaching Tools, Seeing Reason Tool Skill 2.20.)

**Note:** The first factor must always "increase" in order to be able to visually interpret the map. You may need to re-word a factor so that the "sentence structure" and meaning of the map is correct.

- c. Saving your project periodically. (See Teaching Tools, Seeing Reason Tool Skill 2.22.)

- d. Saving your project to your portfolio. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)

**Note:** You will revisit your map in later activities to add more factors and relationships. The Portfolio button allows a team to save important stages of their map so each stage of the learning process can be reviewed by the teacher.

**Step 3: Reflecting on Map-Building**

After the mapping activity, discuss with the group the following questions:

- Did you and your partner immediately agree on what to map? Did you talk about your ideas and compromise? Or did you add ideas from both of you to the map?
- What did you talk about as you created your map?
- Did viewing other teams' maps give you other ideas?
- In what ways do you think the *Seeing Reason Tool* would be beneficial to students who are studying a system or issue that involves cause and effect?

---

---

---

---

---

---

---

---

---

---



## Targeting Thinking in the Classroom

### Extension Activity: Thinking in the Classroom

The following resources are available to you for self-study or as an optional extension within your course.

#### Step 1: Taking a Look into Two Classrooms

The intent of this activity is to see how thinking skills are embedded into instruction. Two sets of vignettes—one on mathematics and one on nutrition—are available on the Curriculum Resource CD. The classrooms described include a wide range and variety of levels of thinking skills as well as different contexts for students' learning. Read both sets of vignettes and then choose one to reflect upon. Both sets reflect different teachers teaching the same topic.



1. Start the Curriculum Resource CD and open the *Extensions* folder.
2. Open "Module 1 Taking a Look into Two Classrooms."
3. Read both vignettes and choose one to reflect upon. Think about the differences between the two classrooms.
4. Which set of vignettes did you choose to reflect upon?  
 Mathematics     Nutrition
5. What kinds of thinking skills did students demonstrate in each classroom?

Classroom 1: \_\_\_\_\_  
\_\_\_\_\_

Classroom 2: \_\_\_\_\_  
\_\_\_\_\_

6. Which teacher's classroom do you think was more successful at fostering, supporting, and encouraging students' higher-order thinking skills?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

---

**Targeting Thinking in the Classroom**

7. Considering the classroom that you felt was more successful, reflect upon the following questions:

What did the teacher do? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What did the students do? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. In which classroom do you think students were more engaged? Why?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Step 2: Reflecting on Your Own Classroom

In the previous step, you had the opportunity to take a peak into a few classrooms and consider the thinking skills that were supported in each. Now reflect on your own teaching. Think about a specific lesson/unit you recently taught or one you will be teaching in the future. Consider the classroom environment, your methods of modeling and coaching, and your students' active engagement in the learning process as you answer the questions on the reflection survey.



1. Start the Curriculum Resource CD and open the *Extensions* folder.
2. Open "Module 1 Reflecting on Your Own Classroom."
3. Answer the questions in the survey to reflect on your own teaching.

### Targeting Thinking in the Classroom

#### References

- Anderson, L., & Krathwohl (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.
- Costa, A., & Kallick, B. (2000-2001). *Describing 16 habits of mind*. Retrieved from [www.habits-of-mind.net/pdf/16HOM2.pdf](http://www.habits-of-mind.net/pdf/16HOM2.pdf)
- Cotton, K. (1991). *Teaching thinking skills*. (Close-up #11 in School improvement research series). Portland, OR: Northwest Regional Educational Laboratory. Retrieved from [www.nwrel.org/scpd/sirs/6/cu11.html](http://www.nwrel.org/scpd/sirs/6/cu11.html)
- Forehand, M. (2005). *Bloom's taxonomy: Original and revised*. In M. Orey (Ed.), *Emerging perspectives on learning, teaching, and technology*. Retrieved from <http://projects.coe.uga.edu/epltt>
- Huffman, S. (2004). *An honest evaluation of yourself: How often do you behave intelligently?* Retrieved from [www.habits-of-mind.net/pdf/IntelligentBehaviorsSurveyMay05.pdf](http://www.habits-of-mind.net/pdf/IntelligentBehaviorsSurveyMay05.pdf)
- Marzano, R. J. (1992). *A different kind of classroom: Teaching with dimensions of learning*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R. J., Brandt, R.S., Hughes, C.S., Jones, B.F., Presseisen, B.Z., Rankin, S.C., & Suhor, C. (1988). *Dimensions of thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Partnership for 21st Century Skills. (2007). *Framework for 21st Century Learning*. Washington, DC: Author. Retrieved from [www.21stcenturyskills.org/documents/frameworkflyer\\_072307.pdf](http://www.21stcenturyskills.org/documents/frameworkflyer_072307.pdf)
- Public Schools of North Carolina. (1999, Summer). *Understanding North Carolina Tests: Thinking Skill Level*. *Assessment Brief*, 6(4).
- Tarlinton, D. (2003). *Bloom's Revised Taxonomy*. Petrie, Queensland, Australia: Kurwongbah State School. Retrieved from [www.kurwongbss.eq.edu.au/thinking/Bloom/blooms.htm](http://www.kurwongbss.eq.edu.au/thinking/Bloom/blooms.htm)

---

## Targeting Thinking in the Classroom

### Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

**Module 1 Key Points:**

- The essential skills needed to be successful in the future go beyond basic literacy. Students must also be able to read critically, write persuasively, think and reason logically, solve complex problems, and other such skills, such as those defined by the Partnership for 21st Century Skills.
- Research is clear that instruction that builds upon and encourages higher-order thinking skills results in greater levels of student learning.

**Accomplishments:**

- Created a personalized list of higher-order thinking skills to target in instruction using three models for defining and categorizing thinking—Bloom's Revised Taxonomy, Marzano's Dimensions of Learning, and Costa and Kallick's 16 Habits of Mind
- Identified positive and negative influences that can affect thinking—from the viewpoint of a 21st century world citizen

In the following modules, we build upon these concepts as we discuss ways we can support and encourage higher-order thinking skills in the classroom.



---

 Designing Standards-Based Projects

## Activities

### Activity 1: Identifying Standards and Learning Objectives ..... 2.01

- View:** Steps for project planning  
**Identify:** Standards that target higher-order thinking skills  
**Identify:** Standards that are supported by the thinking tools  
**Create:** Learning objectives  
**Choose:** Unit topic

### Activity 2: Exploring Project Design ..... 2.09

- View:** Characteristics of well-designed projects  
**Create:** A teacher account for the Intel® Education online teaching tools  
**View:** Project ideas  
**Expand:** A unit to include a project approach

### Activity 3: Considering a Project Idea for Your Unit ..... 2.17

- Discuss:** Project Rubric  
**Identify:** Your project priorities

### Activity 4: Sharing Project Ideas for Your Unit ..... 2.23

- Brainstorm:** Possible project ideas

### Activity 5: Supporting Thinking ..... 2.24

- Revise:** Your *Seeing Reason* map

### Extension Activity: Harnessing the Power of Project-Based Learning ..... 2.25

### References ..... 2.26

### Summary ..... 2.27



## MODULE 2

# Designing Standards-Based Projects

**Description:** One way of engaging students in higher-order thinking is through the use of projects. Projects provide an authentic and real-world context for connecting learning activities and incorporating higher-order thinking around big ideas. In this module, you identify standards, explore how technology-supported projects can be used in the classroom, determine the type of planning that is required, and begin planning your own unit.

## Activity 1: Identifying Standards and Learning Objectives

*To begin with the end in mind means to start with a clear understanding of your destination. It means to know where you're going so that you better understand where you are now so that the steps you take are always in the right direction.*

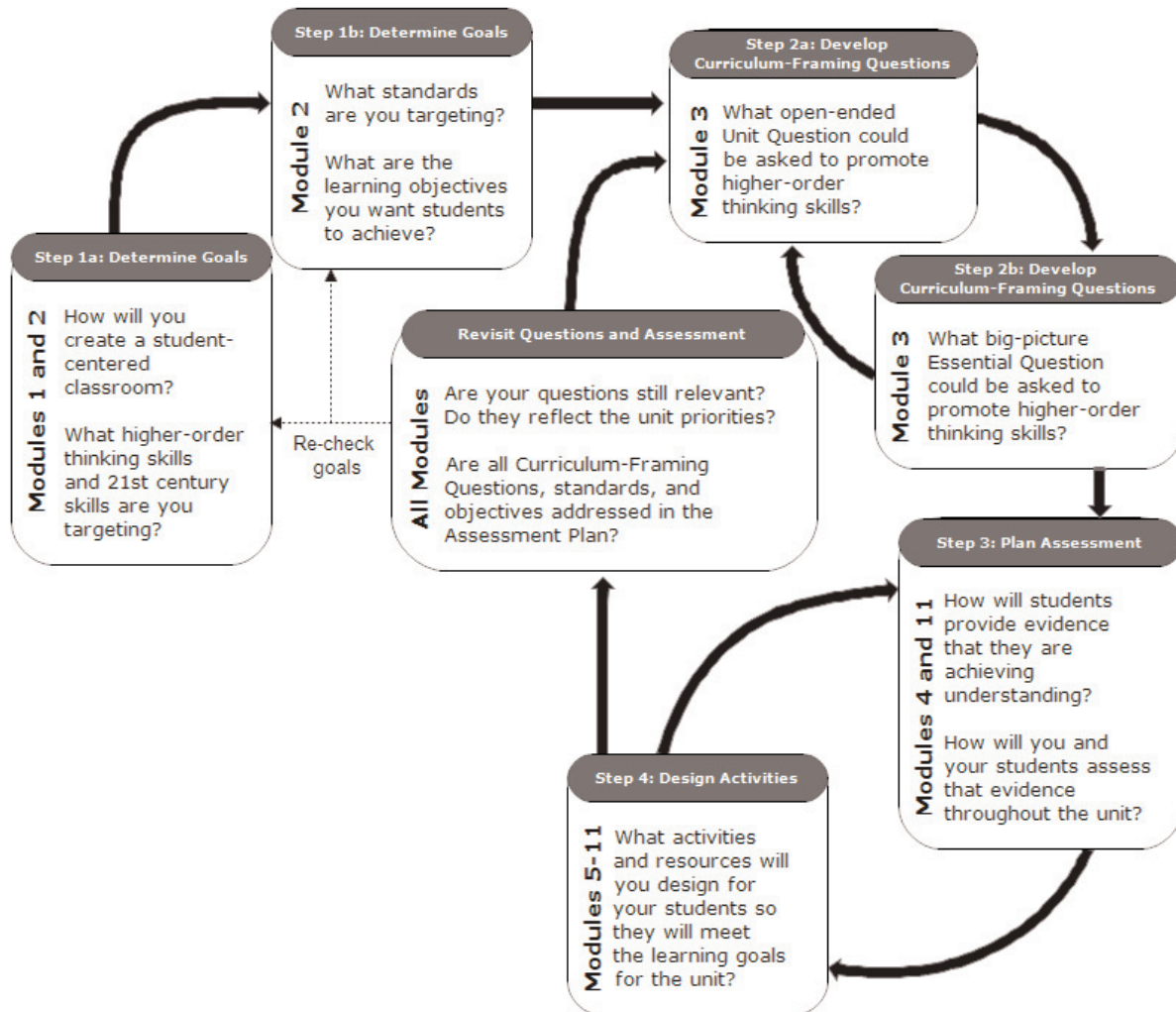
Stephen R. Covey, *The 7 Habits of Highly Effective People*

### Step 1: Considering the Steps for Project Planning

To be successful, projects need to be designed with the end in mind. Without closely focused learning goals, the purpose of the project can become unclear and expectations for student learning outcomes can be miscommunicated. When designing projects, always ensure that the activities planned will help your students meet the intended learning objectives. At a very basic level, project planning involves four steps.



Designing Standards-Based Projects



1. **Determine specific learning goals** by using content standards and the desired higher-order thinking skills.
  - a. From your standards and your own high expectations, what is it that you want your students to be able to know, do, or understand?
  - b. What higher-order thinking skills do you want to target?
2. **Develop Curriculum-Framing Questions.**
  - a. What is the big idea in those targeted standards?
  - b. What Essential, Unit, and Content Questions will you use to help focus the learning for your students?

**3. Make an assessment plan.**

- a. How will you know your students have met the learning goals?
- b. By what criteria will students be assessed?
- c. What methods of assessment will you use throughout the project in order to inform you and your students about their learning progress?
- d. What reporting and monitoring methods will you use to encourage student self-management and progress during independent and group work?

**4. Design activities.**

- a. What real-world scenarios will you develop to provide authentic roles and tasks to help students meet the learning goals?
- b. How can you involve students in problem solving investigations or other meaningful tasks that will help answer the Curriculum-Framing Questions and establish connections to life outside the classroom and address real-world concerns?
- c. How can technology be used to enhance learning? How will you manage your students' use of technology?
- d. What tools will be provided to help students manage project tasks, timelines, and group work?

This simple four-step process is deceiving. Project planning is not linear; it always involves circling back to the previous steps to ensure alignment. The use of Curriculum-Framing Questions (the focus of Module 3) and a project approach should all work together to support the learning goals and targeted standards of the unit. Throughout the unit, there should be multiple opportunities for assessment and monitoring to measure your students' progress.



**Note:** You may also want to review the project planning resources available at: [www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)  
Click **Project Design**, and then click **Planning Projects**.

# Module 2

## Designing Standards-Based Projects

Your facilitator may provide the direct URL to your state/local standards.

### Step 2: Identifying Standards

To lay the foundation for good project planning, take a look at your standards and identify those that need additional support in your classroom. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified below.



1. Go to the Web site that contains your state standards. Links to each state's standards are available at: <http://edstandards.org/standards.html>



2. Save the page for your state's standards in your Favorites, or, if the standards are available in PDF or text files, save the file to your *Project Folder*. (See Web Technologies Skills 2.1 or 4.1.)

3. Scan your subject area and grade level standards for higher-order thinking words. What are some common patterns that you find? What do you notice?

**Note:** An online resource that can assist in the review of your standards is the Verbinator at [www.studenthub.org/verbinator/default.php](http://www.studenthub.org/verbinator/default.php). When you copy some text (like a section of your standards) into this interactive tool, it highlights and identifies the verbs with a particular level of Bloom's Taxonomy.

4. In your review of the standards, are there any potential areas that you would like to cover better or more in-depth? Are there any areas that students have a particularly difficult time understanding or that you have difficulty supporting? Are there any key sections that are currently just touched upon in your curriculum but need more support? If so, note them here.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Refer to the following skills in the Help Guide for this section:

- Web Technologies Skills 2.1 and 4.1: To download a document from a Web site

### Step 3: Targeting Standards that May Be Supported by the Thinking Tools

**?** Use the *Help Guide* if you need assistance in completing any of the following technology skills.

1. Considering the standards you have identified in the previous step, what standards are best served by one or more of the thinking tools? Could the thinking tools be used to help students in any of the following areas?

Visual Ranking	Seeing Reason	Showing Evidence
<p>Would these standards require or be supported if students:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Compare</li> <li><input type="checkbox"/> Consider perspective</li> <li><input type="checkbox"/> Contrast</li> <li><input type="checkbox"/> Differentiate</li> <li><input type="checkbox"/> Prioritize</li> <li><input type="checkbox"/> Rank</li> <li><input type="checkbox"/> Other: _____</li> </ul>	<p>Would these standards require or be supported if students investigate:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cause-and-effect relationships</li> <li><input type="checkbox"/> Consequences</li> <li><input type="checkbox"/> Impacts</li> <li><input type="checkbox"/> Influences</li> <li><input type="checkbox"/> Outcomes</li> <li><input type="checkbox"/> Systems</li> <li><input type="checkbox"/> Other: _____</li> </ul>	<p>Would these standards require or be supported if students:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Analyze</li> <li><input type="checkbox"/> Argue</li> <li><input type="checkbox"/> Debate</li> <li><input type="checkbox"/> Evaluate</li> <li><input type="checkbox"/> Hypothesize</li> <li><input type="checkbox"/> Investigate</li> <li><input type="checkbox"/> Persuade</li> <li><input type="checkbox"/> Theorize</li> <li><input type="checkbox"/> Other: _____</li> </ul>



**Note:** In your search of the standards, do not be limited by these key words. You may need to look for the hidden opportunities for higher-order thinking, especially if your state's standards focus mainly on very specific knowledge-based tasks or under standing.

2. Open your Unit Plan from your Project Folder.

**?** 3. Copy the standards that relate to any of the elements above—ones you may use in your unit—into your Unit Plan. You will be narrowing the actual standards that you will use in the following steps. (See Word Processing Skills 2.6 and 2.8.)

Refer to the following skills in the *Help Guide* for this section:

- Word Processing Skill 2.6: To copy words or text
- Word Processing Skill 2.8: To paste words or text in a new place

## Module 2

### Designing Standards-Based Projects

Refer to the following skills in the Help Guide for this section:

- Word Processing Skill 1.6:  
To customize toolbars and menu
- Word Processing Skill 2.3:  
To erase or delete words or text
- Word Processing Skill 11.4:  
To use highlighting to review a document



4. Use the highlight tool in your word processor to note key words in your standards that may indicate a good match between your targeted standards and the strengths and intended uses of each tool. Highlight any of the following words that you find in your standards. You may want to consider using a different color for each thinking tool, which will help you identify the specific areas for the thinking tools at a later time. (See Word Processing Skill 11.4.)

**Note:** If the Highlight button does not appear on the Formatting toolbar, change your settings so that all buttons appear (See Word Processing Skill 1.6.)

- a. Key words for the *Visual Ranking Tool*—compare, contrast, differentiate, order, organize, perspective, placement, point of view, rank, sort
- b. Key words for the *Seeing Reason Tool*—affect, cause, effect, impact, influence, inspire, produce, result, system
- c. Key words for the *Showing Evidence Tool*—analyze, argument, conjecture, debate, evaluate, evidence, hypothesis, investigate, persuade, position, premise, social issue, thesis

5. Considering the wide range of standards you may have initially selected and the smaller subset that would match well with one or more of the online thinking tools, which standards will you choose to target in this unit? Delete those standards in your Unit Plan that you will not be targeting in this particular unit. (See Word Processing Skill 2.3.)



6. **Save** your Unit Plan, but keep it open for the next step.

**Step 4: Creating Learning Objectives**

From the standards you selected in the previous step, create learning objectives for your unit. These objectives should outline what you want your students to understand or demonstrate. You should prepare well-focused objectives, rather than covering all concepts that might be addressed in your unit. Create objectives that focus on learning concepts with higher-order thinking, not on technology usage skills. For instance, rather than covering all concepts that might be addressed in your unit. Create objectives that focus on learning concepts with higher-order thinking, not on technology usage skills. For instance, rather than “students will create multimedia presentations,” identify the learning outcome, such as “students will create a persuasive presentation appropriate for the targeted audience.”

From your standards and your own high expectations, what do you want your students to be able to know, do, or understand? As you create these objectives, keep in mind the higher-order thinking skills you want to target.

You may use the lines below to draft your ideas, but then type your initial set of objectives into your Unit Plan.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---


Designing Standards-Based Projects

Step 5: Choosing a Unit Topic

From your standards and learning objectives, what could be the topic for your unit? Consider choosing a unit that could potentially use any of the thinking tools, so that you can try out each of those ideas in the following modules—although not all tools may end up in your final unit plan. However, you will still have the opportunity to change your mind and select a different unit in the upcoming modules as you develop your ideas.

The table below provides a few examples to help get you started in the brainstorming process.

Subject	Content Topic That Could Benefit from Thinking Tools
The Arts	Inspiration, influence, or impact of artists or musicians
Economics	Investments
Geology	Significant elements in a geological event
Health	Health threats, diseases
Industrial Arts	Design elements
Language Arts	Plot and character development
Math	Market trends, statistics
Physical Education	Greatest athletes, impacts on physical fitness
Science	Environmental impact, ecology
Social Studies	Factors in war, important events in history

 **Note:** Additional examples are available in Appendix D.01.

Unit Topic: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Activity 2: Exploring Project Design

Well-designed projects encourage active inquiry and higher-order thinking (Thomas, 1998), and address curriculum standards through relevant tasks that ensure that students understand the essential concepts. Brain research underscores the value of these learning activities. Students' abilities to acquire new understanding are enhanced when they are "connected to meaningful problem-solving activities, and when students are helped to understand why, when, and how those facts and skills are relevant" (Bransford, Brown, & Conking, 2000, p. 23).

### Step 1: Understanding the Characteristics of Well-Designed Projects

While there are many definitions and degrees of project-based approaches, most definitions have a common set of characteristics. Nine of these characteristics are described below.

- **Students are at the center of the learning process.**

Projects empower students to direct their own learning because projects allow students to build on their interests. Projects put students in an active role—problem solver, decision maker, investigator, documentarian. Students monitor decisions about how they will approach project tasks.

- **Project work aligns with standards and is central to the curriculum.**

A project is developed around core curricular concepts that address national or local standards. The project has clear objectives that focus on what students should know as a result of their learning.

- **Projects are driven by Curriculum-Framing Questions.**

Projects help students explore Curriculum-Framing Questions in a meaningful and authentic way. These questions help to immerse students in complex, real-world problems and investigations. The questions encompass Essential, Unit, and Content Questions.

- **Projects involve ongoing and multiple types of assessment.**

Clear expectations are set for all students and are articulated throughout the project with varied types of assessment and multiple checkpoints. Models and guidelines for high-quality work are made available so that students know what is expected of them. Opportunities for reflection and feedback are embedded in the project.



### Designing Standards-Based Projects

- **The project has real-world connections.**

Projects are relevant to students' lives and the world outside the classroom, providing a context for learning. This means that students explore authentic problems and issues and may present their learning to an authentic audience, connect with community resources, tap into experts in the field of study, or communicate through technology. A project is not simply a set of thematic activities, but has a guiding purpose. Often students take on real-world roles—such as biologist, journalist, senator—and have a task to complete or a problem to solve.

- **Students demonstrate knowledge through a product or performance.**

Projects typically culminate with students demonstrating their learning through products or presentations. These final products allow for student expression and ownership of learning.

- **Technology supports and enhances student learning.**

Technology is used to support the development of thinking skills as well as content expertise. Students can reach beyond the walls of the classroom by collaborating with distant classes, sharing information on Web sites, or conducting presentations outside of the classroom for an authentic purpose.

- **Thinking skills are integral to project work.**

The project supports the development of both metacognitive and cognitive thinking skills, such as self-monitoring, problem solving, and decision making.

- **Instructional strategies are varied and support multiple learning styles.**

A range of instructional strategies ensures that the curricular material is accessible to all students and provides opportunities for every student to succeed. Instruction may include the use of different cooperative grouping strategies, graphic organizers, teacher and peer feedback, and others.

A teacher's role changes in a project that uses student-centered learning. Characteristics of the teacher's role are:

- "Guide on the side," no longer "sage on the stage"
- More coaching and modeling, less telling
- More finding out with the students, less being the expert
- More cross disciplinary thinking, less specialization
- More performance-based assessment; less paper-and-pencil, fact-recall assessment

---

## Designing Standards-Based Projects

The student's role changes as well. Characteristics of the student's role are:

- More choices and decisions in learning activities
- More opportunities
- More responsibilities to manage project tasks and timelines
- More interdependence with other students in group work

When working on projects, students develop real-world skills—many of the same skills desired by today's employers, such as the ability to:

- Work well with others
- Make thoughtful decisions
- Take initiative
- Solve complex problems
- Self-manage
- Communicate effectively

### Step 2: Understanding the Teacher Workspace

Before looking at sample projects that incorporate thinking tools, you should create a teacher account so you can save projects of interest to your Teacher Workspace that you may want to adapt later for your own use. Your password-protected Teacher Workspace is where you create assessments, set up thinking tool projects, create student teams, and assign teams to one or more projects. All students log in through your account with a team ID and password that you create. Students or student teams do not register themselves and no personally identifying information is collected about your students. You are able to view and comment on the work that your student teams produce since it is stored in your Teacher Workspace. All work is saved on Intel's servers and will be available indefinitely—until you delete the projects. Both students and teachers can log in from any Internet-connected computer. Only teachers have access to the assessments created with *Assessing Projects* application.

### Designing Standards-Based Projects

#### Step 3: Registering or Logging In



1. Go to the Teaching Tools Teacher Workspace at:  
[www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Click **Teacher Workspace**.
3. If you already have an account, enter your **Login ID** and **Password** and click **Login**. Proceed to number 7 on the following page. If you have never registered before, select the **click here to register** link above the login box.

**Note:** In order to have full access to the *Assessing Projects* application and use any of the thinking tools with your class, you must register so that your project information is saved and protected with a password. As a registered teacher, you may set up as many projects as you like and as many student team accounts that are needed for each project. Your email and other account information will be secure; if interested in Intel's privacy policy, click the **Privacy Policy** link.

4. Complete all of the required fields. When done, click the **Submit** button.




**Note:** Keep in mind that your students will use your login ID (called teacher ID on the student login page), along with their own identifying information, to log into their projects. Your password must be at least one character long and no more than 14 characters.

5. A confirmation page will appear to notify you of successful registration.
6. Write down the login ID and password on Overview page vi or use the Login Information form in the *Unit Development* folder on the Curriculum Resource CD and save it in your Project Folder for easy access in the future. You will use the same login to set up and access all Teaching Tool projects.
7. Click **Continue to set up projects** to open and view the Teacher Workspace. You can manage your assessments, thinking tool projects, and student teams from the Teacher Workspace. This is where you can create assessments, set up new thinking tool projects, delete existing projects, and manage student teams and passwords.
8. Keep the Teacher Workspace page open and continue to Step 4.


### Step 4: Viewing Project Ideas Online

You will have additional time to view sample units and project ideas in tool-specific modules ahead. Use this time to simply get a sense of the project-approach to learning that can be enhanced and supported by these tools. If you see a project that you might like to modify for your own use in the future, you can use the Project Wizard to copy the project details into the Teacher Workspace you just created.

1. From the Teacher Workspace, click the **Project Examples** tab.
2. Click **Unit Plans**.
3. Review the short description under each unit's title and note the project approach used in many of the units. Click any unit titles of interest for more detail.
-  4. If you see any projects that you may want to use in your own classroom in the future, use the Project Wizard to add them to your Teacher Workspace. (See Teaching Tools, Visual Ranking Tool Skill 1.6, Seeing Reason Tool Skill 2.5, Showing Evidence Tool Skill 3.6.)

**Note:** If you click the link directly above the *Visual Ranking* list, **Click here to set up this project in your workspace**, a new window opens to your Teacher Workspace. A pop-up window also appears to notify you that the project has been added to your workspace. Close both windows to return to viewing additional unit plans. If you have a pop-up blocker, you may need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps.

**Macintosh\* users:** You may be able to override a pop-up blocker by holding down the **Command** key as you click the link.

-  5. Open *Seeing Reason*: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
  6. Click **Project Examples**.
  7. Click **Unit Plans**.
  8. Review the short description under each unit's title and note the project approach used in many of the units. Click any unit titles of interest for more detail.
- Note:** Not all units are project-based.
9. If you see any projects that you may want to use in your own classroom in the future, add them to your Teacher Workspace.

-  10. Open *Showing Evidence*: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
11. Click **Project Examples**.

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.6: Creating a Visual Ranking project from an existing project
- Seeing Reason Tool Skill 2.5: Creating a Seeing Reason project from an existing project
- Showing Evidence Tool Skill 3.6: Creating a Showing Evidence project from an existing project

## Designing Standards-Based Projects

12. Click **Project Ideas**.

**Note:** The difference between *Unit Plans* and *Project Ideas* is that *Unit Plans* have a complete Unit Plan (with detailed procedures, standards, assessment plan, and so on) and some of the associated materials needed to implement the unit (such as assessments; student thinking tool project sample, presentations, publications, and/or Web sites; teacher resources to facilitate the unit; and so on). *Project Ideas* provide a summary of the unit and a sample of a student team's project.

13. Review the short description under each project idea's title and note the project approach used in many of the projects. Click any project titles of interest for more detail.

**Note:** Not all units are project-based.

14. If you see any projects that you may want to use in your own classroom in the future, add them to your Teacher Workspace.

15. Use any remaining time to review **Unit Plans** and **Project Ideas** for any of the thinking tools.

16. Identify and note any interesting project ideas in the samples you review:

---

---

---

---

### Step 5: Viewing Additional Project Ideas

1. View Sample Project Descriptions, Questions, and Prompts in Appendix C.03.
2. Read through the descriptions and tool prompts.
3. Identify and note any interesting uses of the thinking tools in the samples you review and share with a partner:

---

---

---

---

---

 Designing Standards-Based Projects

**Step 6: Expanding a Unit to Use a Project-Approach to Learning**


In this activity, you read a scenario of a short unit about the moon for a 6th grade classroom. In small groups, expand the teacher-centered unit into a student-centered, project-based unit.

For this step, you will be grouped into teams of three to four teachers each.

**Classroom #1**

In this unit, students learn about moon exploration. They compare the characteristics of the moon to those of the Earth.

**Standards:**

- Students will understand basic concepts about the Earth and space.

**Target:**

- Relate the features of the Earth-moon system

**Target Indicators:**

- Compare the surface features of the Earth to those of the moon
- List some major events in the exploration of the moon

**Classroom Activities:**

1. The teacher will show students pictures of the Earth's moon. A discussion will occur about what the students know about moon exploration. The teacher will write the events up on the board. The students will use the textbook and other library books to find other events and the dates they occurred to put up on the board and complete a timeline of moon exploration.
2. Students will read Chapter 3 of their Science textbook together as a class. At critical points during the reading, the teacher will stop and have the students write down different characteristics they find about the moon. When they are finished reading, the teacher will have the students compare and contrast the characteristics of the moon and the Earth in a Venn diagram.
3. The students will be given a quiz to determine what they learned about moon exploration and the characteristics of the moon.

**Classroom #2**

1. What is the real-world role of the students? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Module 2

### Designing Standards-Based Projects

Be prepared to share your space project ideas with the whole group

2. What is the project scenario? \_\_\_\_\_

---

---

---

---

---

---

---

---

---

---



3. Besides the current unit you are considering to develop in this course, what are some other units that could benefit from a project approach? How would you turn them into a project-based unit? Share your ideas with a partner.

Unit	Project Approach Idea

### Activity 3: Considering a Project Idea for Your Unit

Well-designed projects tie content goals, real-world contexts, and enduring ideas together. Projects that incorporate authentic tasks help students find answers to important questions in meaningful ways.

*Learners of all ages are more motivated when they can see the usefulness of what they are learning and when they can use that information to do something that has an impact on others—especially their local community (McCombs, 1996; Pintrich and Schunk, 1996).*

National Research Council, *How People Learn*

Projects can vary widely in subject matter and scope, and can be delivered at a wide range of grade levels. Projects grow out of challenging questions that cannot be answered by rote learning. Projects serve specific, significant educational goals; they are not diversions or add-ons to the “real” curriculum.

Classrooms that use projects encompass varied instructional strategies to engage all students, regardless of their learning style. Often students collaborate with outside experts and community members to answer questions and gain deeper meaning of the content. Technology supports learning, and throughout project work, multiple types of assessment are embedded to ensure that students produce high-quality work.

#### Step 1: Reviewing the Project Rubric

Refer to the rubric on the following page as you develop your unit in the following modules. Highlight unit characteristics that are important to you and especially consider the highest rated column for the *Project-Approach to Learning* row as you consider your project priorities in the next step.



**Note:** A copy of the Project Rubric is available in the *Assessment* folder on the Curriculum Resource CD.



## Module 2

### Designing Standards-Based Projects

4	3	2	1
<b>Instructional design addresses standards and objectives.</b>			
My Unit Plan clearly shows how the work my students do will help them meet the standards and objectives.	My Unit Plan shows how the work my students do will help them meet the standards and objectives.	My Unit Plan shows that some of the work students do addresses standards and objectives.	My Unit Plan shows that very little of the work students do addresses standards and objectives.
<b>Instructional design addresses 21st century skills.</b>			
In my Unit Plan, I provide instruction, modeling, and multiple opportunities for students to refine and develop relevant 21st century skills.	In my Unit Plan, I provide instruction and modeling to help students refine and develop relevant 21st century skills.	Students practice 21st century skills during the unit, but they receive little instruction to support their development of these skills.	Students rarely use 21st century skills during the unit.
<b>Instructional design incorporates Curriculum-Framing Questions (CFQs).</b>			
My unit integrates CFQs to focus student learning on important concepts and big ideas throughout the unit.	My unit uses CFQs to focus student learning on important concepts and big ideas multiple times in the unit.	The use of CFQs in my unit is superficial because they are not used to focus student learning.	My unit does not address CFQs.
<b>Instructional design uses project approaches.</b>			
In my unit, students have many choices about how they demonstrate their learning. They create authentic products and performances developed through connected tasks and activities.	In my unit, students have some choices about how they demonstrate their learning. They create products and performances developed through connected tasks and activities.	In my unit, students have few choices about how they demonstrate their learning. They complete discrete activities that do not connect to final products or performances.	My students do not demonstrate their learning through products or performances.
<b>Instructional design addresses student differences.</b>			
My unit provides well-defined and thoughtful accommodations to support diverse learners.	My unit provides accommodations to support diverse learners.	My unit provides minimal accommodations to support diverse learners.	My unit does not provide any accommodations to support diverse learners.
<b>Technology integration supports content learning.</b>			
In my unit, students use technology to enhance conceptual understanding and develop content specific skills and strategies.	In my unit, my students use technology to understand important content concepts and develop content specific skills.	In my unit, my students use technology to explore content concepts.	In my unit, my students' use of technology is superficially related to content.

You will be delving deeply into Curriculum-Framing Questions in the next module. The main focus of the third trait above—*Instructional design incorporates Curriculum-Framing Questions*—is that you will use open-ended questions to target important, enduring ideas in their discipline.

Designing Standards-Based Projects

4	3	2	1
<b>Thinking Tools support 21st century skills.</b>			
The use of thinking tool(s) creatively develops students' research, higher-order thinking, collaboration, and communication skills.	The use of thinking tool(s) develops students' research, higher-order thinking, and/or communication skills.	The use of the thinking tool(s) only moderately develops students' research, higher-order thinking, collaboration, or communication skills.	The use of the thinking tool(s) does not develop students' research, higher-order thinking, collaboration, or communication skills.
<b>Technology integration meets student and classroom needs.</b>			
In my unit, my students use technology that is appropriate for all ability levels and interests, providing challenging experiences that build technology proficiency.	In my unit, my students usually use technology that is age appropriate and meets the needs of diverse learners.	In my unit, my students occasionally use technology that is age appropriate.	In my unit, my students seldom use technology, and when they do use it, the technology is often inappropriate for their ability levels or interests.
The technology used in my unit is reasonable and feasible given the specific circumstances of my teaching situation.	The technology used in my unit is reasonable although somewhat difficult given the specific circumstances of my teaching.	The technology used in my unit takes a great deal of effort on my part.	Given the specific circumstances of my teaching situation, the technology used in my unit is not feasible.
<b>Assessment strategies address standards and objectives.</b>			
My assessments clearly and thoroughly address all targeted standards and learning objectives, emphasizing content and processes over traits such as organization and appearance.	My assessments address all targeted standards and learning objectives and emphasize content learning.	My assessments address some targeted standards and learning objectives.	My assessments address few targeted standards and learning objectives.
<b>Assessment strategies are student-centered.</b>			
In my unit, students contribute to the creation of assessments and frequently assess themselves and peers.	In my unit, students may contribute to the creation of assessments and assess themselves and peers.	In my unit, students may assess themselves and peers.	In my unit, students have little or no involvement in their assessment process.
The assessments in my unit have specific criteria that define quality. My assessments make it easy for students to measure their work against expectations.	The assessments in my unit have criteria that define quality. Students can use my assessments to measure their work against expectations.	The assessments in my unit lack clear criteria for my students to measure their work.	Students cannot use my assessments to measure their work.
<b>Assessment strategies are varied and ongoing.</b>			
In my unit, a variety of informal and formal methods are used throughout the instructional cycle to meet all five assessment purposes.	In my unit, informal and formal methods are used throughout the instructional cycle to meet most of the five assessment purposes.	In my unit students are assessed infrequently and in traditional ways to meet some assessment purposes.	Students are assessed in traditional ways at the end of the unit.

Designing Standards-Based Projects

**Step 2: Identifying Your Project Priorities**

Now that you have identified the thinking skills and standards you want to target in your classroom, as well as looked at a variety of projects for ideas, identify the project characteristics you also want to target. From the list of project characteristics on pages 2.09 and 2.10, what are the priorities you want to focus on in your unit? What elements of project design do you want to include in your unit? Brainstorm some ideas using the following checklist. This is just an initial look at the big picture for your unit.



**Note:** If you prefer to type your answers, open **Project Characteristics** in the *Unit Assessment* folder on the Curriculum Resource CD.

Project Characteristics	Ideas for How to Include This Characteristic in My Project
Students are at the center of the learning process. I am interested in including: <input type="checkbox"/> Open-ended, authentic tasks <input type="checkbox"/> Decisions that can be made by students <input type="checkbox"/> Flexibility in order to apply students' interests <input type="checkbox"/> Provisions for students to have some control over decisions about how they complete project tasks <input type="checkbox"/> Collaborative groups for at least a portion of the unit	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Project work aligns with standards and is central to the curriculum. I am interested in targeting: <input type="checkbox"/> A core area of my curriculum <input type="checkbox"/> National and/or local standards <input type="checkbox"/> Multiple methods of assessment and appropriate demonstrations of learning	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Projects are driven by Curriculum-Framing Questions. I am interested in using: <input type="checkbox"/> An Essential Question that will include big and enduring ideas that cross many disciplines <input type="checkbox"/> An Essential Question that will cross multiple units or my whole year <input type="checkbox"/> Open-ended questions to help focus my unit on important concepts	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Designing Standards-Based Projects

Project Characteristics	Ideas for How to Include This Characteristic in My Project
<p>Projects involve ongoing and multiple types of assessment.</p> <p>I am interested in including:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Multiple checks for understanding using varied assessment methods throughout the unit</li> <li><input type="checkbox"/> Models and guidelines for students to know what is high-quality work, using resources such as rubrics, checklists, and/or samples of student work</li> <li><input type="checkbox"/> Opportunities for reflection, feedback, and adjustment</li> </ul>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The project has real-world connections.</p> <p>I am interested in involving:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Relevancy to students' lives</li> <li><input type="checkbox"/> Community or outside experts who provide a context for learning</li> <li><input type="checkbox"/> Problem solving of real-world issues (community, national, or world)</li> <li><input type="checkbox"/> An authentic audience for student work</li> <li><input type="checkbox"/> Community resources, experts in the field of study, or communication through technology</li> </ul>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Students demonstrate knowledge through a product or performance.</p> <p>I am interested in having the project culminate with students demonstrating their learning through:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Presentations</li> <li><input type="checkbox"/> Proposals</li> <li><input type="checkbox"/> Written documents</li> <li><input type="checkbox"/> Constructed displays</li> <li><input type="checkbox"/> Demonstrations or performances</li> <li><input type="checkbox"/> Simulated events, such as a mock trial</li> <li><input type="checkbox"/> Other: _____</li> </ul>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

## Module 2

### Designing Standards-Based Projects

Project Characteristics	Ideas for How to Include This Characteristic in My Project
<p>Technology supports and enhances student learning.</p> <p>I am interested in having my students use technology for:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Research</li> <li><input type="checkbox"/> Creation of final products</li> <li><input type="checkbox"/> Simulations</li> <li><input type="checkbox"/> Conceptual development</li> <li><input type="checkbox"/> Communication</li> <li><input type="checkbox"/> Critical thinking</li> <li><input type="checkbox"/> Problem solving</li> <li><input type="checkbox"/> Other: _____</li> </ul>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Thinking skills are integral to project work.</p> <p>I would like my students to use metacognitive and cognitive thinking skills, such as:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Analysis of data</li> <li><input type="checkbox"/> Collaboration</li> <li><input type="checkbox"/> Evaluation of information</li> <li><input type="checkbox"/> Self-monitoring</li> </ul>	<hr/> <hr/> <hr/> <hr/>
<p>Instructional strategies are varied and support multiple learning styles.</p> <p>I am interested in including:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> A range of instructional strategies</li> <li><input type="checkbox"/> Curricular material that is accessible to all students and provides opportunities for every student to succeed</li> <li><input type="checkbox"/> Instruction that will include such strategies as: <ul style="list-style-type: none"> <li><input type="checkbox"/> Cooperative grouping</li> <li><input type="checkbox"/> Teacher feedback</li> <li><input type="checkbox"/> Graphic organizers</li> <li><input type="checkbox"/> Peer feedback</li> </ul> </li> </ul>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

## Activity 4: Sharing Project Ideas for Your Unit

During the course, the option of using a wiki is available so that you can see the evolution of your ideas throughout the unit development process. Outline in a wiki, or discuss in small groups, your ideas for a project that incorporates the use of one or more thinking tools. Refine the brainstormed list that you identified in the previous checklist. Don't worry if your unit ideas are still somewhat foggy at this point. You will refine your ideas throughout the following modules. Use the questions below as a starting point for thinking through your ideas.

- What real-world connections are you considering?
- What would be the role of the students?
- What project scenario are you considering?



Working in small groups, discuss each other's ideas. If using a wiki, share your wiki pages and provide feedback on the ideas. Use this time to see if you would like to partner with another teacher in the creation of a unit.



1. Open the wiki site URL for this course and save it in your favorites.
2. Create a new account and write the URL and login information on Overview page vi.
3. Create a wiki page with your name in the title.
4. Type a brief summary of your ideas for an overall project. Include:
  - Your subject and grade level
  - The topic of the unit
  - The project idea—the real-world connections, role of the student, and a general idea of the overall project
  - Concerns, questions, and desired feedback



5. Save your wiki page.



6. Share your wiki page in a small group and, if needed, note any feedback directly on your page.

## Module 2

---

### Designing Standards-Based Projects

Refer to the following skills in the Help Guide for this section:

- Teaching Tools, Seeing Reason Tool Group 2



#### Activity 5: Supporting Thinking

Considering your work with standards and standards-based projects, think about any additional factors you might want to add to your map. What makes you really think—coming from a teacher’s perspective? Use the *Help Guide* for technical assistance, if necessary.

1. With your partner, open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Log on to the Student Workspace with the student login used in Module 1.  
**Note:** Your login information may be written on Overview vi.
3. Add more factors to your map, but this time from the perspective of a teacher.
4. Assign a different color to these factors than the color used in Module 1.
5. Add the causal relationships between the factors.

Remember to save your map into your portfolio at the end of the activity.



6. When you are done adding your factors and relationships, save the current version into your Portfolio.



7. Discuss with the class how your understanding of standards-based project planning has changed in this module.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

### Extension Activity: Harnessing the Power of Project-Based Learning

The following resources are available to you for self-study or as an optional extension within your course.

For additional information about project-based learning, read *Harnessing the Power of Project-Based Learning* and *Planning Projects*, which are available on the Curriculum Resource CD.



1. Start the Curriculum Resource CD and open the *Project-Based Learning* folder.
2. Open and read **Harnessing the Power of Project-Based Learning** for an overview and look at the benefits and challenges of project-based learning.
3. Open and read **Planning Projects** to clarify misconceptions around projects and view some project ideas.
4. What ideas did these two articles provide that could help projects be more successful in your classroom?

---

---

---

---

---

---

---

---

---

---

---

---

---



#### References

Bransford, J., Brown, A., & Cocking, R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school* (Expanded edition). Washington, DC: National Research Council, National Academy Press.

Covey, S. (1990). *The 7 habits of highly effective people: Powerful lessons in personal change* (1st edition). New York: Simon & Schuster.

Thomas, J. W. (1998). *Project-based learning: Overview*. Novato, CA: Buck Institute for Education.

---

## Designing Standards-Based Projects

### Module 2 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

**Module 2 Key Points:**

- Projects concentrate on scenarios that provide rich learning opportunities. They involve students in problem solving investigations and other meaningful tasks. Projects establish connections to life outside the classroom and address real world concerns.
- The steps for designing projects include:
  - Determining specific learning goals (from standards and higher-order thinking skills)
  - Developing Curriculum-Framing Questions
  - Making an assessment plan
  - Designing activities

**Accomplishments:**

- Identified standards for my unit
- Set up my Teacher Workspace at the Intel® Education Web site
- Explore a possible project-approach for my unit and determined the priorities for my project
- Considered additional positive and negative influences that affect thinking— from the perspective of a teacher

In the following modules, we build on these concepts as we discuss ways we can support and encourage higher-order thinking skills through the use of standards-based projects.

### Designing Standards-Based Projects

#### Notes

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Copyright © 2008 Intel Corporation. All rights reserved.  
Intel, the Intel logo, Intel Education Initiative, and the  
Intel Teach Program are trademarks of Intel Corporation  
in the U.S. and other countries. \*Other names and  
brands may be claimed as the property of others.

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Activities

#### Activity 1: Ranking Questions..... 3.01

**Rank:** Questions according to their potential for generating deeper thinking in the classroom

**Discuss:** Different types of questions

#### Activity 2: Asking Questions in the Classroom ..... 3.04

**Review:** Closed and open questions

**Reflect:** On your use of questions in your classroom

#### Activity 3: Developing Curriculum-Framing Questions..... 3.07

**Review:** Components of Curriculum-Framing Questions

**Create:** Practice Curriculum-Framing Questions

#### Activity 4: Supporting Higher-Order Thinking Skills with Curriculum-Framing Questions ..... 3.17

**Explore:** Curriculum-Framing Questions within a unit

**Plan:** Your Unit.

#### Activity 5: Writing Your Own Curriculum-Framing Questions..... 3.19

**Create:** Curriculum-Framing Questions for your classroom

#### Activity 6: Sharing Your Curriculum-Framing Questions ..... 3.22

**Share:** Your Curriculum-Framing Questions

#### Activity 7: Supporting Thinking ..... 3.23

**Revise:** Your *Seeing Reason* map

**Discuss:** Use of Curriculum-Framing Questions in the classroom

#### Extension Activity: Focusing on Essential Questions ..... 3.24

#### References..... 3.25

#### Module Summary..... 3.26



## MODULE 3

# Creating Curriculum-Framing Questions to Support Thinking Skills

**Description:** Curriculum-Framing Questions help students find deeper meaning as they work on projects. In this module, you discuss the general types of questions used in the classroom, practice with and create Curriculum-Framing Questions for your own classroom, and reflect on how these questions can affect and support deeper thinking.

## Activity 1: Ranking Questions

### Step 1: Ranking Questions

Different types of questions elicit different types of thinking. With a partner, use the *Visual Ranking Tool* to rank questions (based on the *River City Water* project idea from Module 1) according to their potential for generating deeper thinking in the classroom.



Use the Intel® Education Help Guide for technical assistance, if necessary.



1. Open *Visual Ranking* from your Favorites. ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))
2. Click **Student Log-In**.
3. Log in to the **Student Workspace** with the student login created for the *Seeing Reason* "Thinking" project used in Modules 1 and 2.



**Note:** Your login information may be located on Overview page vi.

4. The student workspace will open. Under *Project Name*, click the project, **Ranking Questions**, and the *Visual Ranking* workspace will open.



5. Working with your partner, decide on the appropriate locations for the various questions. Click and drag an item up or down to the location where you think it belongs in relation to the other items. (See Teaching Tools, Visual Ranking Tool Skill 1.15.)

Participants should work in pairs and log in using only one partner's login information.

Refer to the following skill in the Help Guide for this section:

- Visual Ranking Tool Skill 1.15: Ranking items in a list

## Module 3

---

### Creating Curriculum-Framing Questions to Support Thinking Skills

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.16: Commenting on an item
- Visual Ranking Tool Skill 1.17: Opening and closing a comment attached to an item
- Visual Ranking Tool Skill 1.18: Editing a comment attached to an item
- Visual Ranking Tool Skill 1.20: Comparing lists
- Visual Ranking Tool Skill 1.21: Understanding results
- Visual Ranking Tool Skill 1.22: Understanding correlations



6. Add a comment to any of the items to explain your ranking choice. Your comment should reflect the criteria for ranking (that is, defend the item’s location in the list and why it is higher or lower than the others). (See Teaching Tools, Visual Ranking Tool Skill 1.16.)

**Note:** The amount of text in the comment box is not limited since it is scrollable. An item with a red triangle in the upper right-hand corner means a comment has been added. (See Teaching Tools, Visual Ranking Tool Skill 1.17.)

7. When you finish ranking, **Compare** the currently viewed list to another group’s list. (See Teaching Tools, Visual Ranking Tool Skill 1.20.)

**Note:** You cannot edit or add to another team’s comments. You can only edit comments that you created. (See Teaching Tools, Visual Ranking Tool Skill 1.18.)

8. Note the correlation number as another way to determine two lists’ similarities. (See Teaching Tools, Visual Ranking Tool Skills 1.21 and 1.22.)

**Note:** Additional information about correlation is available in Understanding Correlation in the *Thinking Tools, Visual Ranking* folder on the Curriculum Resource CD.

#### Step 2: Discuss Your Ranking



After you complete your ranking and view comparisons with other teams, discuss any significant variations of the rankings with your partner.

---

---

---

---

---

---

---

---

---

---

---

---

---

## Creating Curriculum-Framing Questions to Support Thinking Skills



As a whole group, discuss your experience ranking the questions from the *River City Water* project idea.

- What did you and your partner discuss as you decided on the order of the list?
- How did your ranking differ from other teams? Did their comments help you understand other ways of thinking about the items?
- What was your highest ranked item and why?

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



## Activity 2: Asking Questions in the Classroom

### Step 1: Understanding Open and Closed Questions

Questions are what we often use to help our students think through a problem or issue. If our questions are not designed carefully, we most likely will not get the results we intend from our students. As we saw in the previous activity, different types of questions accomplish different tasks. Fact-finding, interpretive, and reflective questions, for example, all serve different purposes and require different thinking skills. We can organize these questions into two basic categories: closed questions and open questions.

#### Closed questions:

- Test factual knowledge
- Contain a limited range of possible correct responses
  - Example: What lives in the rainforest?
- Guide learner thought
  - Provide learners with the knowledge base to answer other questions

#### Open questions:

- Build on factual knowledge
- Require research, investigation, and reflection prior to answering completely
- Have many different answers, promoting student discussion, debate, and inquiry
- Necessitate learners to go deeper into a topic—expand their thinking
- Call for learners to construct their knowledge as they answer the questions
- Often start with key words such as *why* and *how*.
  - *Why* questions often require looking at relationships among variables and analyzing information
  - *How* questions could lead to problem solving and synthesizing information
  - Other key words can also be used in open questions, but with less frequency
  - *Which* questions may lead to thoughtful decision making, and *what* questions could lead to reflection
  - Example: Why is the rainforest important to us?

## Creating Curriculum-Framing Questions to Support Thinking Skills

Closed questions that ask students to understand facts and procedures are important, but if students do not have a larger concept to connect those facts, the importance of those facts will not be understood and the facts will not be retained or used in a meaningful way.

*The new science of learning does not deny that facts are important for thinking and problem solving. Research on expertise...demonstrate that experts' abilities to think and solve problems depend strongly on a rich body of knowledge about subject matter (e.g., Chase and Simon, 1973; Chi et al., 1981; deGroot, 1965). However, the research also shows clearly that 'usable knowledge' is not the same as a mere list of disconnected facts. Experts' knowledge is connected and organized around important concepts...*

Bransford, Brown, & Cocking, *How People Learn*, p. 9

Effective open-ended questions are especially important when using technology in learning. Instead of using computers to copy and paste information, students should use higher-order thinking skills to dig deep, analyze facts, make well-founded conclusions, and see the big picture.



**Note:** You may also want to review the resources on questioning available at:

[www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)

Click **Project Design**, click **Instructional Strategies**, and then click **Questioning**.

### Quick Reflection

Discuss the following with a partner:



1. What is the "right" balance between closed and open questions for your classroom?

---



---



---

2. How can you make sure that students are really thinking more deeply when using open questions?

---



---



---

---

Creating Curriculum-Framing Questions to Support Thinking Skills

**Step 2: Reflecting on Questions Used in Your Classroom**

Think about the questions you ask in a typical day in your classroom as you consider these questions.

1. The questions I ask during classroom discussions can usually be answered with a "yes" or a "no" or a very limited answer.

Strongly Disagree      Disagree      Agree      Strongly Agree

2. My questions are primarily used to check for basic understanding of the facts.

Strongly Disagree      Disagree      Agree      Strongly Agree

3. My questions encourage students to thoughtfully delve into a topic or think at higher levels about the subject matter.

Strongly Disagree      Disagree      Agree      Strongly Agree

4. My students are taught how to express their opinions and ideas, as well as how to appropriately respond to others' opinions and ideas.

Strongly Disagree      Disagree      Agree      Strongly Agree

5. Debates and open-ended discussions are often a part of my class.

Strongly Disagree      Disagree      Agree      Strongly Agree

Other thoughts:

---

---

---

---

---

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Activity 3: Developing Curriculum-Framing Questions

#### Step 1: Defining Curriculum-Framing Questions

Students are more likely to become self-directed learners if they are interested in the answers. Students who see the connections between the subjects being taught and their own world can build on their knowledge to gain a deeper understanding. Curriculum-Framing Questions promote interest, relevance, and understanding.

Curriculum-Framing Questions guide a unit of study and include:

- **Essential Questions**
  - The overarching, foundational, “big idea” question (open-ended questions)
  - Can help focus several units or be used over the course of a year
  - Example: What does it take to change the world?
- **Unit Questions**
  - Unit-specific, open-ended questions that help build understanding for the Essential Question
  - Examples:
    - Unit 1: Why leave one’s home to make a new life in a strange land?
    - Unit 2: How did the \_\_\_\_\_ Revolution change their world and ours?
    - Unit 3: Why do we still read Shakespeare?
- **Content Questions**
  - Supporting, fact-based questions (closed questions)
  - Rich subject matter content to help strengthen and develop students’ understanding of the larger questions
  - Examples:
    - Unit 1: What route did the early explorers take? What were they looking for?
    - Unit 2: Who were the key figures in the \_\_\_\_\_ Revolution?
    - Unit 3: What is a tragedy?

This activity may be a review for some, but new for others. Laying a basic, foundation ensures that all participants have the same understanding of Curriculum-Framing Questions before delving deeper. These activities should also help to strengthen and develop your current knowledge of Curriculum-Framing Questions. If you are familiar with these types of questions, please share your expertise in this activity’s discussions.

Creating Curriculum-Framing Questions to Support Thinking Skills

	Essential Questions	Unit Questions	Content Questions
<b>Definition</b>	<p>Essential Questions are the most abstract question in a chain of questions. An Essential Question serves as an overarching conceptual framework for a group of curricula or even a whole year’s worth of study.</p> <p>Essential Questions:</p> <ul style="list-style-type: none"> <li>▪ Are open-ended questions</li> <li>▪ Can provide a bridge between disciplines and/or units of study</li> <li>▪ Focus on a core message or theme in the curriculum</li> <li>▪ Are engaging and meaningful</li> <li>▪ Help students to understand facts and ideas in a conceptual framework</li> <li>▪ Require higher-order thinking skills to                             <ul style="list-style-type: none"> <li>- Evaluate</li> <li>- Synthesize</li> <li>- Analyze</li> </ul> </li> </ul>	<p>Unit Questions asked in one course of study can explore different facets of a single Essential Question. Teams of teachers from different disciplines can use their own unique Unit Questions to support one common, unifying Essential Question.</p> <p>Unit Questions:</p> <ul style="list-style-type: none"> <li>▪ Are open-ended questions</li> <li>▪ Invite an exploration of ideas within a topic</li> <li>▪ Are specific to a unit of study</li> <li>▪ Support the exploration of one part of the Essential Question</li> <li>▪ Help students to understand facts and ideas in a conceptual framework</li> <li>▪ Require higher-order thinking skills to                             <ul style="list-style-type: none"> <li>- Evaluate</li> <li>- Synthesize</li> <li>- Analyze</li> </ul> </li> </ul>	<p>Content Questions differ from Unit and Essential Questions as Content Questions deal mostly with facts, rather than the interpretation of those facts.</p> <p>Content Questions:</p> <ul style="list-style-type: none"> <li>▪ Typically have clear-cut answers or specific “right” answers</li> <li>▪ Are categorized as closed questions</li> <li>▪ Directly support content standards and learning objectives</li> <li>▪ Require knowledge and comprehension skills to answer</li> </ul>

(Continued)

## Creating Curriculum-Framing Questions to Support Thinking Skills

	Essential Questions	Unit Questions	Content Questions
<b>How are they different?</b>	<p>An Essential Question:</p> <ul style="list-style-type: none"> <li>▪ Requires time—several units—to fully understand and answer the question</li> <li>▪ Contains a broader topic or concept than is referenced in the Unit Question</li> <li>▪ May be a question studied by scientists, philosophers, or poets</li> </ul>	<p>A Unit Question:</p> <ul style="list-style-type: none"> <li>▪ Can be answered within one unit of study</li> <li>▪ Is broad enough to cover most of the ideas within the unit so that it can provide a unifying focus</li> <li>▪ Often connects to the students' own world or includes a personal reflection</li> </ul>	<p>A Content Question:</p> <ul style="list-style-type: none"> <li>▪ Is often the kind of question you would find on a multiple-choice or short-answer test</li> </ul>
<b>Example</b>	<ul style="list-style-type: none"> <li>▪ Why do we need others?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Which of our community helpers is the most important?</li> <li>▪ Which community helper would you most like to be?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Who are some community helpers?</li> <li>▪ What do community helpers do?</li> </ul>

Creating Curriculum-Framing Questions to Support Thinking Skills

Step 2: Practicing with Questions

Think about the characteristics of Essential Questions from the previous pages and the examples from Appendix C. Use these characteristics and models to help determine which of the following are Essential Questions. Check "Yes," "No," or "Maybe" after each one.



Some of the questions could be used in a variety of ways—a question is defined as Essential, Unit, or Content in large part by how it is used in the classroom. Discuss in a small group any questions that could go multiple ways—and why.

Essential Question or Not?	Yes	No	Maybe
How does literature help us to better understand ourselves?			
What is a national deficit?			
How do we decide what claims to believe?			
Is being bad for a good reason ever OK?			
What technological improvements have resulted from space exploration?			
What are the elements of a fairy tale?			
How are different rocks formed?			
What does the past tell us about the future?			

Notes:

---

---

---

---

---

---

---

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

The questions in the left column below are a mix of Essential, Unit, and Content Questions. Determine which questions are Essential, Unit, and Content. Place a checkmark in the column that best identifies each question: "EQ" for Essential, "UQ" for Unit, or "CQ" for Content. Discuss your answers with your small group.



Mixed Questions — Unit 1	EQ	UQ	CQ
Where did early explorers go?			
How did early explorers change the world?			
Who are some of the early explorers?			
What does it take to change the world?			
What impact did explorers have on their home country?			

Mixed Questions — Unit 2	EQ	UQ	CQ
How do the endings of Cinderella differ across cultures?			
Are we really so different from our neighbors?			
What are common themes among fairy tales?			
What can we learn about ourselves and other people by reading fairy tales?			
How do fairy tales reflect one's culture?			
What is the basic plot of almost all Cinderella stories?			
What are the definitions of plot, conflict, climax, and resolution?			

**Notes:**

---



---



---



## Module 3

---

### Creating Curriculum-Framing Questions to Support Thinking Skills

In order to develop an Essential Question, identify the “big idea”—or the overarching concept—that you will be teaching. This concept should serve as the focus of the unit, including curriculum, instruction, and assessment. These ideas provide the framework in which students will connect specific knowledge and skills to see the purpose and relevance of the topic they are studying. Often, these concepts are found in your content standards. Listed below are some big idea concepts.

Abundance	Diversity	Journey	Relationship
Acceptance	Energy	Justice	Repetition
Accommodation	Environment	Law	Responsibility
Adaptation	Equality	Leadership	Rhythm
Aging	Equilibrium	Liberty	Rights
Balance	Ethics	Life	Risk
Beauty	Evil	Limits	Rule
Belief	Evolution	Loyalty	Scale
Change	Excellence	Matter	Scarcity
Chaos	Exploration	Maturity	Strength
Character	Fairness	Migration	Stress
Choice	Family	Mood	Structure
Citizenship	Fate	Motivation	Survival
Civilization	Force	Need	Symbol
Communication	Form	Order	System
Community	Freedom	Ownership	Temptation
Competition	Friendship	Patriotism	Time
Conflict	Future	Pattern	Tranquility
Connection	Geography	Perspective	Truth
Continuity	Goodness	Pollution	Tyranny
Cooperation	Happiness	Power	Universe
Courage	Harmony	Production	Value
Creativity	Hate	Progress	Variable
Cycle	Honor	Proof	Variance
Death	Identity	Proportion	Virtue
Defense	Individuality	Protection	Wealth
Democracy	Integrity	Purpose	Wellness
Destruction	Interaction	Reason	Wonder
Dignity	Interdependence	Reflection	
Discovery	Invention	Rejection	

## Creating Curriculum-Framing Questions to Support Thinking Skills

**Note any other big idea words that are not listed:**

---



---

You do not need to revise all of the questions in the tables on the following pages. As a team, choose one question in a topic area that you are comfortable revising. If time allows, you can revise a second Essential Question.

### Revising Essential Questions Using “Big Ideas”



With a partner, pick one or more of the Essential Questions in the following tables. Brainstorm some big ideas that could relate to each Essential Question. The questions in the left column should be considered “first draft” and still needing improvement. After identifying one or more big ideas for the question(s) you want to improve, work together to revise at least one of the Essential Questions based on one or more of the big ideas. You may want to refer to the information on page 3.07.

Original Essential Question	Big Idea	Revised Essential Question
What are the physical characteristics of a country and how do they affect humans?		
How is my health affected by my actions?		
How can strangers tell <i>my</i> story?		

(Continued)

## Module 3

### Creating Curriculum-Framing Questions to Support Thinking Skills

Original Essential Question	Big Idea	Revised Essential Question
Why are the stages of a frog's life important?		
How do forensic scientists use the scientific procedures to solve a crime?		
Why is gathering accurate facts important when compiling information?		
How and why did people explore the world?		
Why is my animal important to the rainforest and the world?		

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Step 3: Writing Essential and Unit Questions



Divide into small groups and review the Curriculum-Framing Questions Rubric available in the *Curriculum-Framing Questions* folder on the Curriculum Resource CD.

Think about the Content Questions listed below and how the questions could be used in a unit of study. Think about some of the larger concepts to which the Content Questions relate.

Create Essential and Unit Questions that will motivate students and target higher-order thinking. Remember that both types of questions should be open-ended questions. A Unit Question is tied more directly to the specific unit; whereas, an Essential Question often can encompass a number of units. Remember to write questions in student-appropriate language. Use the Curriculum-Framing Questions Rubric as you draft your questions.



**Note:** You may want to review the sample Curriculum-Framing Questions starting on Appendix C.01.

Content Questions	Unit Questions	Essential Question
<p><b>Example:</b></p> <p><b>Who are some community helpers?</b></p> <p><b>What do they do?</b></p> <p><b>(Primary Level)</b></p>	<p><b>Which of our community helpers is the most important?</b></p> <p><b>Which community helper would you most like to be</b></p>	<p><b>Why do we need others?</b></p>
<p>What lives in a rainforest?</p> <p>Where are the rainforests?</p> <p>(Elementary)</p>		
<p>What are some important inventions of the last 100 years?</p> <p>(Upper Elementary–Lower High School)</p>		

(Continued)

## Module 3

### Creating Curriculum-Framing Questions to Support Thinking Skills

Content Questions	Unit Questions	Essential Question
What are the qualities of a Greek hero? Who are some famous heroes of the 20th century? (Middle School)		
What is debt? What is a national deficit? How much is a billion? How much is a trillion? (Middle School)		
What is Impressionism? Who were some Impressionist painters? (Middle–High School)		
What are some communicable diseases? How do antibiotics work? How do doctors and scientists identify and treat new strains of viruses? (High School)		

What thinking skills could be employed from your “Habits of Learning Taxonomy” (pages 1.23–1.24 or in your Unit Plan) to answer the question(s) you created above?

---

---

---

---

---

---

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Activity 4: Supporting Higher-Order Thinking Skills with Curriculum-Framing Questions

#### Step 1: Looking Deeper into a Unit

After you generate questions, using them effectively throughout a unit is important. Curriculum-Framing Questions can be used to generate discussions, focus reflections, guide research, and refocus student work, for example. Below are the Curriculum-Framing Questions from the *Grow a Business* unit plan. With a partner, review and discuss these questions and the unit's procedural section, which can be found in Appendix E.05.



#### Curriculum-Framing Questions for *Grow a Business* Unit Plan

Essential Question	Why take the risk?
Unit Questions	How do we grow a business? How do you convince others?
Content Questions	What is the difference between a producer and a consumer? In what ways can surveys help us to make decisions? What is marketing? What is profit?



1. Open *Visual Ranking* from your Favorites. ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))
2. Click **Project Examples**, and then click **Unit Plans**.
3. Click **Grow a Business**.
4. How are Curriculum-Framing Questions used in this unit? How do the Curriculum-Framing Questions help to focus the unit?

---



---



---

5. How do the Curriculum-Framing Questions help to target higher-order thinking skills?

---



---



---

---

Creating Curriculum-Framing Questions to Support Thinking Skills

**Step 2: Focusing on Curriculum-Framing Questions Used in Units**



1. Open: [www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)
2. Add this page to your Favorites.
3. Click **Unit Plan Index**.
4. Click any of the desired links to search for plans specific to a grade level or subject area.
5. Click the title of any unit or project of interest to view the full set of Curriculum-Framing Questions.
6. When viewing the unit procedures, focus on how the Curriculum-Framing Questions are infused throughout the lessons.
7. What ideas did you find for your classroom?

---

---

---

---

---

---

---

9. Write any ideas for Curriculum-Framing Question that you might be able to use in your own classroom.

---

---

---

---

---

---

---



**Note:** You may also want to review the Curriculum-Framing Question resources in the *Curriculum-Framing Question* folder on the Curriculum



Resource CD or available at: [www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)

Click **Project Design**, and then click **Curriculum-Framing Questions**.

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Activity 5: Writing Your Own Curriculum-Framing Questions

#### Step 1: Creating a First Draft of Questions

Writing Curriculum-Framing Questions often takes time and practice, and usually requires many revisions. Some teachers find the process easier if they start with a big idea, draft an Essential Question, and then work on Unit and Content Questions. Other teachers find the process easier if they look at the specific units they teach to see how they fit into a bigger idea and then develop an Essential Question.


No matter which method or process you choose, below are some tips for writing an Essential Question:

- Think about why you are studying this material. Why do we care about this? What is the value of studying this?
- What is the big concept you are trying to uncover? What is the long-term understanding that you want students to gain?
- Do your standards have any “big concept” words that you could work from and build on?
- Do not worry about the mechanics and language. Focus on brainstorming.
- Stay away from questions asking for definitions or an understanding of a simple process.
- Ask yourself if the question has basically only one, or one narrow group, of correct answers—if it does, it is not an Essential or Unit Question.
- You may want to write the questions in adult language to capture the essential understandings, and then rewrite in student language.



Creating Curriculum-Framing Questions to Support Thinking Skills

A Process for Writing Your Own Questions

1. View the sample Essential and Unit Questions in Appendix C for ideas.
-  2. If you would like some guidance as you create your Curriculum-Framing Questions, open "Writing Curriculum-Framing Questions" in the *Curriculum-Framing Questions* folder on the Curriculum Resource CD. If not, skip this step.
3. Using the guidelines on the previous pages, draft your Curriculum-Framing Questions in the table below.

Essential Question	
Unit Question(s)	
Content Questions	

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Step 2: Targeting Thinking Skills When Revising Questions

1. Open your Unit Plan and review the thinking skills listed in your “Habits of Learning Taxonomy.”
2. What thinking skills are necessary to answer your current draft of Curriculum-Framing Questions? Consider whether any of your questions should be revised to better target those thinking skills.
3. Type this second draft of Curriculum-Framing Questions in your Unit Plan.



4. Save your Unit Plan.

### Second Draft of Curriculum-Framing Questions

Essential Question	
Unit Question(s)	
Content Questions	

---

Creating Curriculum-Framing Questions to Support Thinking Skills

**Activity 6: Sharing Your Curriculum-Framing Questions**



Share your Curriculum-Framing Questions with a small group and request ideas for improvement. Write any feedback or revision ideas on the lines below and/or update your Curriculum-Framing Questions in your Unit Plan.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### Activity 7: Supporting Thinking

Similar to how the *Seeing Reason Tool* could be used in the classroom, you now return to the *Seeing Reason* workspace to clarify and document new insights and knowledge. Considering your work with Curriculum-Framing Questions, think about any additional factors you might want to add to your map from the perspective of a student. How would your students answer the question, *What makes you really think?* Use the Help Guide for technical assistance, if necessary.



your students answer the question, *What makes you really think?* Use the Help Guide for technical assistance, if necessary.

Refer to the following skills in the Help Guide for this section:

- Teaching Tools, Seeing Reason Tool Group 2

#### Step 1: Updating Your Map



1. With your partner, open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))

2. Log in to the Student Workspace.



**Note:** Your login information may be located on Overview vi.

3. Add more factors to your map from the perspective of a student in your classroom.

4. Assign a different color to these factors than the color used in Modules 1 and 2.

5. Add the causal relationships between the factors.



6. When you are done adding your factors and relationships, add this current version of the map into your portfolio.

Remember to add your map to your portfolio at the end of the activity.

#### Step 2: Reflecting on Curriculum-Framing Questions to Support Thinking Skills



As a whole group, discuss your thoughts about using Curriculum-Framing Questions in your classroom and how using these questions might impact student learning and higher-order thinking skills.

---

---

---

---

---

---

---

---

### Creating Curriculum-Framing Questions to Support Thinking Skills

#### Extension Activity Focusing on Essential Questions

The following resources are available to you for self-study or as an optional extension within your course.

For a different perspective on Essential Questions, read “The Blue Blood is Bad, Right?” on the Curriculum Resource CD.



1. Start the Curriculum Resource CD and open the *Curriculum-Framing Questions* folder.
2. Open and read “The Blue Blood Is Bad, Right?”
3. Review the Curriculum-Framing Questions Rubric located in the *Curriculum-Framing Questions* folder on the Curriculum Resource CD.
4. Review the definitions of Curriculum-Framing Questions on page 3.07.



- Note:** For additional resources on Curriculum-Framing Questions, see the *Curriculum-Framing Questions* folder on the Curriculum Resource CD.
5. Revise your Curriculum-Framing Questions before you share them in the next module.

---

## Creating Curriculum-Framing Questions to Support Thinking Skills

### References

Bransford, J., Brown, A., & Cocking, R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school* (Expanded edition). Washington, DC: National Research Council, National Academy Press.

Simon, K. G. (2001). *Moral questions in the classroom: How to get kids to think deeply about real life and their schoolwork* (pp. 240–241). New Haven and London: Yale University Press.

## Module 3

---

### Creating Curriculum-Framing Questions to Support Thinking Skills

Use this summary to review this module's main points and check for understanding.

#### Module 3 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

##### Module 3 Key Points:

- Closed questions that ask students to understand facts and procedures are important, but if students do not frame facts in a conceptual understanding, the interconnectedness and patterns of ideas are often lost. Curriculum-Framing Questions help to provide a conceptual understanding.
- Curriculum-Framing Questions can be created from the bottom up (content-specific ideas to the big idea) or the top down (big idea to the content-specific ideas). They consist of:
  - Essential Questions, the overarching big idea questions that help students see the big picture across units or disciplines
  - Unit Questions, the open-ended questions that support the exploration of one part of the Essential Question
  - Content Questions, the supporting, fact-focused questions required to understand and begin to answer the Essential and Unit Questions
- Curriculum-Framing Questions are used throughout a unit to focus learning on important concepts and to promote higher-order thinking.

##### Accomplishments:

- Gained a greater understanding of Curriculum-Framing Questions through examples, discussion, and practice
- Created a set of Curriculum-Framing Questions for my classroom

In the following modules, we build on these concepts as we discuss ways we can support and assess higher-order thinking skills in classroom projects.

## Activities

### Activity 1: Exploring an Assessment Plan ..... 4.01

**Discuss:** Methods of assessment

**Identify:** Assessment methods for your classroom

### Activity 2: Using the Showing Evidence Tool to Analyze

#### Assessment Plan Ideas ..... 4.16

**Evaluate:** Assessment plan methods

### Activity 3: Drafting an Outline for Your Assessment Plan ..... 4.20

**Create:** A draft assessment timeline

### Extension Activity: Browsing Assessments ..... 4.22

**View:** Assessments in the Intel® Education Assessing Projects Web site

### Module Summary ..... 4.24





## MODULE 4

# Planning Student-Centered Assessment

**Description:** Assessment plays an important role throughout project-based units. In this module, you explore a variety of assessment strategies that guide student learning and inform your teaching. You also begin thinking about assessment in your unit and create a draft Assessment Plan.

## Activity : Exploring an Assessment Plan

### Step 1: Discussing Methods of Assessment

What are some typical ways that you have your students demonstrate learning?

---

---

---

---

Throughout this course, you are asked to match your student tasks to your learning targets. An assessment plan ensures a project stays focused on intended learning goals, and it should be developed along with project activities and tasks. Because project tasks allow for broader expression of individual learning, assessment strategies need to be open enough to accommodate a range of student work yet focused on expected results. This balance is best achieved by planning multiple assessment strategies for both ongoing monitoring of learning progress as well as assessment of culminating products and performances.

An assessment plan outlines methods and tools that define clear expectations and standards for quality in products and performances. It also defines project monitoring checkpoints and methods to inform the teacher and keep students on track. The plan should involve students in reviewing and managing their learning progress during the project.

### Planning Student-Centered Assessment

Many assessment methods and tools are available; each provides information to both the teacher and students. Similar assessment methods and tools may be used for different purposes depending on how they are structured and what is done with the results.

#### Purposes of Assessment Methods

The tables on the following pages organize assessment methods, purposes, and tools into five categories:

- **Strategies for Gauging Student Needs**

Strategies that gauge student needs prior to instruction help determine a student's background experiences, skills, attitudes, and misconceptions. These strategies help to assess each student's learning needs and assist students in making connections between what they already know (prior knowledge) and what they will be learning.

- **Strategies for Encouraging Self-Direction and Collaboration**

Strategies that encourage self-direction and collaboration help students take ownership of their learning, demonstrate interpersonal skills, produce higher-quality work, understand feedback, and assess classmates' work.

- **Strategies for Monitoring Progress**

Strategies that monitor progress help students and teachers stay on track during a project. These methods help students be more self-managing as they complete open-ended tasks. They help teachers know when and where students need extra help or additional instruction. Many of these methods document learning growth over time.

- **Strategies for Checking for Understanding and Encouraging Metacognition**

Strategies that check for understanding and encourage metacognition help teachers check for understanding and help students think about their own learning. The same method can be used for both purposes, but teachers must use explicit questions and prompts to help students think about what and how they are learning.

- **Strategies for Demonstrating Understanding and Skill**

Strategies that demonstrate understanding and skill encompass only two methods—products and performances—but many examples exist for each method. Products are things, or artifacts, that students create. Performances are outcomes that students do.

Planning Student-Centered Assessment

Identify Assessment Methods

1. Scan through the tables of assessment methods, purposes, and instruments on pages 4.03–4.10.
2. As you review the methods in each category, indicate your interest in or experiences with each using the following symbols:
  - ✓ I already use this method
  - + I am interested in this method and want to try or use this more
  - I am not interested in this method
  - ? I do not understand this method

Assessment Methods and Instruments




Strategies for Gauging Student Needs

Assessment Method	Purpose	When Used	Instrument
Examining Student Work <input type="checkbox"/>	Examining student work reveals the nature and extent of student understanding, clarifies learning expectations for students, and provides opportunities to assess the quality of a previously taught task or plan and the implications for instructional practice.	Before planning the project, look at student work and ask, What skills, knowledge, and understandings do the students demonstrate?  What is the evidence?  What are the misconceptions?  What patterns or trends are evident?	Samples of work and assessments from multiple students  Samples from one student over time  Data from tests
Graphic Organizers <input type="checkbox"/>	Graphic organizers provide a visual representation of students' current conceptual understanding and thinking processes, and illuminate preconceptions.	At the beginning of a project, elicit information from students by creating a graphic organizer on a chart to get an accurate idea of students' prior knowledge. Provide organizers for individual student use throughout the project.	Concept Maps Sequencing activities Classification Charts Prioritized lists

## Module 4

### Planning Student-Centered Assessment

#### *Strategies for Gauging Student Needs* (Continued)

Assessment Method	Purpose	When Used	Instrument
Know-Wonder-Learn (K-W-L) Charts 	K-W-L charts provide a structure for students to think about what they know about a topic, note what they want to know, and record what has been learned and is yet to be learned. K-W-L charts allow students to make personal connections before the content is deeply explored.	Use at the beginning of a project, during a class discussion, or individually in journals.	Topic on chart paper or electronic whiteboard Journal
Think-Pair-Share 	Think-Pair-Share asks students to first think about a question, then to pair with someone and verbally share their responses. Students then summarize their ideas for the benefit of the entire class. This helps students organize prior knowledge and brainstorm questions.	Use at the beginning of a project and during class discussions.	Question or prompt Form for recording summaries and questions
Brainstorming 	When brainstorming, students recall what they know about a topic by generating terms and ideas related to it, and stretching what they know by forming creative connections between prior knowledge and new possibilities.	Use at the beginning of a project, during a class discussion, individually, or in small groups.	Topic on chart paper or electronic whiteboard

## Planning Student-Centered Assessment

### Strategies for Encouraging Self-Direction and Collaboration

Assessment Method	Purpose	When Used	Instrument
Project Plans <input type="checkbox"/>	Project plans assist students in planning, identifying specific goals, designing strategies to work toward them, and helping to set criteria for assessment, thereby demonstrating the ability to take ownership of their own learning.	Use at the beginning of a project in conferences with students. Help students develop plans and review the plans for feasibility and specificity.	Checklists Prompts Forms
Self-Assessments and Reflections <input type="checkbox"/>	Self-assessments and reflections provide students opportunities to assess progress, thinking, and learning, and reflect on methods for improvement.	Use throughout the project either orally, through conferences, or in written form.	Checklists Prompts
Peer Feedback <input type="checkbox"/>	Peer feedback helps students internalize the characteristics of quality work by assessing the work of peers.	Use throughout the project during group discussions, after rough drafts, and for final products or performances.	Checklists Rubrics Scoring guides Prompts Forms
Observation of Cooperative Groups <input type="checkbox"/>	Observation of cooperative groups allows for the assessment of group collaboration skills, such as leadership and decision making; communication skills; interpersonal and small group strategies; self-esteem and self-efficacy; and the commitment to producing quality work.	Use throughout a project by taking notes, using checklists, and providing prompts while groups work together to complete tasks. Students also assess their own skills throughout the project using checklists and reflections.	Checklists Questions Reflections

## Module 4

### Planning Student-Centered Assessment

#### *Strategies for Monitoring Progress*

Assessment Method	Purpose	When Used	Instrument
Informal Observations and Anecdotal Notes <input type="checkbox"/>	Notes from observations provide objective feedback, clarify misunderstandings, and support teaching adjustments.	Use throughout the unit during group and individual work time.	Comments on sticky notes or computer labels collected in individual or group folders  Checklists to help focus expected behaviors
Learning Logs <input type="checkbox"/>	Learning logs consist of short regular entries in project notebooks or journals, or on a short form, written in response to structured prompts (such as, <i>Today I accomplished..., I need to...,</i> and so on). Students record data or milestones, review progress, reflect, and adjust their work.	Review during progress checks, in project meetings, or in conferences.	Forms Prompts
Progress Checklists <input type="checkbox"/>	Progress checklists are necessary when projects require students to meet specific requirements in sequence and on a schedule. The checklists can be very detailed with specific tasks, subtasks, recommended processes, suggested time allotments, and due dates.	Use during team meetings or in conferences. Allow students to use and customize to monitor progress and meet specific needs.	Checklist with milestones, due dates, and approval stages
Progress Reports <input type="checkbox"/>	Progress reports help students to document progress or explain something new in their understanding. A report might be a rough draft, storyboard, or data summary.	Use during key stages of a project, such as at outline or midpoint of the first draft.	Forms Prompts

---

 Planning Student-Centered Assessment
**Strategies for Monitoring Progress** (Continued)

Assessment Method	Purpose	When Used	Instrument
Project Meetings and Conferences <input type="checkbox"/>	Project meetings allow for approval or signing off on students' readiness to advance to the next stage or milestone of a project. Use to check progress, maintain commitments in group work, and plan next steps.	Conduct brief regular team and individual meetings throughout the project.	Agenda, goals, and process form

**Strategies for Checking for Understanding and Encouraging Metacognition**




Assessment Method	Purpose	When Used	Instrument
Written Journals <input type="checkbox"/>	Journals are extended written reflections on learning or entries in reaction to prompts. In addition to reflections, prompts elicit specific thinking skills at key points in a project. For example, <i>How has what you investigated or learned, changed or confirmed your viewpoint on this issue?</i>	Use throughout a project, at key points, and at the end of the project.	Prompts for entries Journal review plan
Video and Photo Journals <input type="checkbox"/>	Video and photo journals capture visual documentation of progress, reactions, and reflections, or demonstrate skill development.	Use throughout the project, but possibly integrate into final products or performances.	Outline of photo sequence and topic (shot list) Schedule for video scenes



## Module 4

### Planning Student-Centered Assessment

#### *Strategies for Checking for Understanding and Encouraging Metacognition (Cont.)*

Assessment Method	Purpose	When Used	Instrument
Structured Interviews and Observations 	Formal oral interviews are scheduled with individuals or teams to probe for understanding. Interview questions (protocol) ask students to explain and give reasons for their current understanding. Structured observations are similar but are used for skill, process, and performance assessment and can be done by students as well.	Use throughout a project.	Conference questions Observation by students Observation by teacher
Informal Questioning 	Questioning allows students to openly express ideas and thoughts, reflect on other students' explanations, and make connections. Questioning can be used to provide challenges, assess student understanding, and revise lessons as necessary.	Use throughout a project, often during group work or class discussions.	Questions
Written and Oral Tests and Quizzes 	Tests and quizzes offer direct evidence of knowledge acquisition and comprehension.	Use at key points during a project and at the end of the project.	Test and quiz questions

---

 Planning Student-Centered Assessment
*Strategies for Demonstrating Understanding and Skill*

Assessment Method	Purpose	When Used	Instrument
Products <input type="checkbox"/>	Products are things, or artifacts, that students create and build that show learning. (See the examples in the table on next page.)	Use at the end of a project, but may depend on the product and the length of the project.	Rubrics Scoring guides
Performances <input type="checkbox"/>	Performances are demonstrations, productions, and events that students design and conduct to show learning. (See the examples in the table on next page.)	Use at the end of a project, but may depend on the product and length of the project.	Rubrics Scoring guides
Portfolios <input type="checkbox"/>	Portfolios allow for the assessment of students' progress, processes, and performance over time.	Use to show accumulated work and reflections over the course of a project, semester, class, or year.	Checklists Rubrics Scoring guides Reflection questions
Student-Led Conferences <input type="checkbox"/>	Student-led conferences require students to organize and communicate learning by sharing goals, work, self assessments, and reflections, usually with parents.	Schedule at the beginning of the year to help set goals and inform parents of expectations, and at the end of a project or the year to reflect on growth.	Forms Prompts

Planning Student-Centered Assessment

*Strategies for Demonstrating Understanding and Skill* (Continued)

Products and Performance Tasks	
<input type="checkbox"/> Reports	Historical research, scientific research, journal articles for publication, policy recommendations
<input type="checkbox"/> Designs	Product designs, home designs, building or school design blueprints, transportation alternatives
<input type="checkbox"/> Constructions	Models, machines, exhibits, dioramas
<input type="checkbox"/> Essays	Letters-to-the editor, guest columns for local newspapers or community publications, book and movie reviews, story writing
<input type="checkbox"/> Artistic expressions	Pottery, sculptures, poetry, fine art, posters, cartoons, murals, collages, paintings, songwriting, movie scripts
<input type="checkbox"/> Print media: Books, pamphlets, brochures	Nature trail guides, self-guided walks through community history, public service announcements, historical scrapbooks, photo timelines, investigative documentaries, commercials, training manuals, animations/cartoons
<input type="checkbox"/> Multimedia: Informational kiosk, video, photo journal, slideshow, digital book	
<input type="checkbox"/> Presentations	Persuasive proposals, inspiring speeches, debates, informative lectures, research analyses and conclusions, newscasts
<input type="checkbox"/> Skill demonstrations	Science laboratory processes, constructions, specific sports skills, teaching or mentoring younger students, on-demand tasks
<input type="checkbox"/> Artistic/creative performances	Interpretive dances, plays, skits, character studies, docudramas, readers' theaters, radio plays
<input type="checkbox"/> Simulations	Mock trial, reenactment of historical event, role play



**Note:** You may also want to review the assessment resources available at: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)  
Click **Assessment Strategies**, and then select a category of interest.

**Notes:**

---



---

## Planning Student-Centered Assessment

### Step 2: Taking a Look at Project Assessment Plans in Action

Review the assessment strategies in one of the following classroom scenarios:

Elementary Example	Secondary Example
<p>An elementary school teacher is designing a unit on rainforests. As part of their Life Science standards, students are expected to understand the interdependence of diverse life forms in ecosystems. Focusing on this standard and others, such as communication skills, the teacher develops Curriculum-Framing Questions (CFQs). Her Essential Question is, <i>What is the price of life?</i> The unit begins with activities to bring forward prior knowledge about rainforests and to introduce the Essential Question. The teacher describes the scope and sequence of the unit with an in-depth description of the final project to the students, which concludes with a puppet show performance. At this point, students have an opportunity to ask questions, and the teacher can check for understanding. The students review and revise a rubric that defines quality and scoring criteria with the teacher. Each student receives a copy. Because students are required to complete many tasks, the teacher builds a timeline and checklist tool to help with prioritizing and managing tasks. Each student then researches a particular animal from the rainforest, using books and online resources. The student collects information explaining the animal's place in the food chain, survival adaptations, place in the rainforest layers, and any other interesting facts. The student then builds a causal map with the <i>Seeing Reason Tool</i> that shows the animal's place in the ecosystem—and answers the prompt, <i>What depends on what in the rainforest?</i></p> <p>The student reviews two different printouts from the causal map portfolio and writes a short paper describing what would happen if the animal disappeared from the rain-forest. Each day wraps up with a short entry in a learning log. Before the final project, students take a short quiz that focuses on the interdependence of life. Students work in</p>	<p>A high school English teacher is developing a project-based study of <i>Romeo and Juliet</i>. He will focus on state reading standards related to character analysis and literary devices, along with other oral and written communication standards. The teacher designs project activities that integrate technology and address the Essential Question used throughout the course, <i>How does literature help us to better understand ourselves?</i> He plans several assessment strategies to ensure that students are given clear expectations and that he will be informed of student learning during the project. Students read and explore the themes in <i>Romeo and Juliet</i> and see how the themes apply to modern life and relationships. Students are assigned e-pals to discuss the differences between Shakespeare's time and their own and to share their impressions and reflections. A reading log, which is periodically handed in, structures e-mail communication with prompts that encourage analysis of characters and literary elements as the students read each act of the play. Students are introduced to the activity of a mock trial where they take on roles, such as prosecutor, witness, attorney, and jury, and are given the task of finding out who or what is guilty of murder. Through this trial, students demonstrate their analyses of character, plot, and universal themes. They are presented with a rubric that shows what will be scored during the performance. Students use the <i>Showing Evidence Tool</i> to prepare and present arguments for their day in court. They use their reading logs to provide "evidence" to support a case for who is guilty of murder. Using these arguments, students write a "jury statement" (an essay) discussing their findings and who they find guilty. The teacher uses an established English department essay rubric</p>

## Module 4

### Planning Student-Centered Assessment

Elementary Example	Secondary Example
<p>teams to create puppets and write a puppet show that shows each animal's place in the rainforest ecosystem and how its absence would change the ecosystem. During this team activity, students assess their progress and define next steps using a short report form. Student teams present their puppet shows to demonstrate learning. After the performances, the puppets are displayed on a classroom bulletin board depicting a rainforest ecosystem.</p>	<p>and grading system to assess students' analyses of the plot and characters in the jury statement essays. A final test is given on plot development, literary devices, and characters.</p>

#### Notes:

---

---

---

---

---

---

---

---

---

---

---

---

---

Planning Student-Centered Assessment



Think about the assessment plan in the scenario you chose to read. With a partner, discuss the following questions:

1. How is higher-order thinking promoted while ensuring students meet the targeted standards?

---

---

---

---

---

---

---

---

2. What methods of assessment are used to demonstrate student understanding?

---

---

---

---

---

---

---

---

3. How are students informed about the project expectations?

---

---

---

---

---

---

---

---

## Module 4

---

### Planning Student-Centered Assessment

4. List the assessment methods and documents used to monitor progress and check for understanding:

---

---

---

---

---

---

---

5. How did the assessment methods inform the teacher and encourage student self-management during independent and group work?

---

---

---

---

---

---

---

6. What additional methods and tools could be added to monitor progress and final learning in the assessment plan for this project?

---

---

---

---

---

---

---

Planning Student-Centered Assessment

**Step 3: Identifying Assessments for Your Classroom**

From your review of the tables on pages 4.03–4.10 (look for your “+” marks) and the assessments employed in the classroom scenarios, consider the types of assessment you think would be beneficial for your own students. Consider some new assessment methods that you have not implemented before. In the next activity, you use the *Showing Evidence Tool* to evaluate evidence to help you determine which assessment strategies you might want to include in your Assessment Plan.

Choose or modify one to three of the following strategies, or create your own. Clarify the specific use in the right column.

<b>Assessment Strategy</b>	<b>What It Would Look Like in My Classroom</b>
<input type="checkbox"/> Have students use journals or learning logs	_____
<input type="checkbox"/> Assess and build on students’ prior knowledge	_____
<input type="checkbox"/> Use student self- and peer-assessments	_____
<input type="checkbox"/> Provide multiple opportunities for oral feedback while the students are building their knowledge	_____
<input type="checkbox"/> Include an end-of-unit, multiple-choice test that maps to the standards	_____
<input type="checkbox"/> Incorporate the use of rubric and final products to help assess student learning	_____
<input type="checkbox"/> Have students use checklists, outlines, and rough drafts to help them stay on track	_____
<input type="checkbox"/> Arrange group work to assess and provide feedback	_____
<input type="checkbox"/> Include student role playing or simulations to demonstrate understanding	_____
<input type="checkbox"/> Provide opportunity for students to analyze their quizzes and create a plan for addressing the gaps	_____
<input type="checkbox"/> Other: _____	_____
<input type="checkbox"/> Other: _____	_____
<input type="checkbox"/> Other: _____	_____



## Activity 2: Using the Showing Evidence Tool to Analyze Assessment Plan Ideas

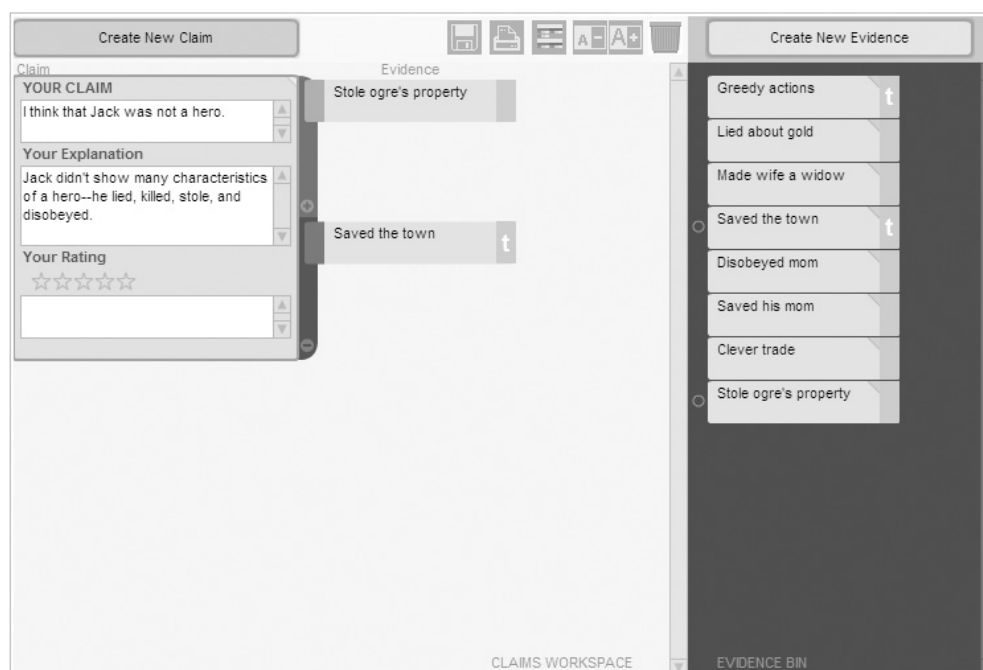
During this activity, you evaluate evidence to help you decide what assessment methods you may want to include in your Assessment Plan. You use the *Showing Evidence Tool*—an online tool for constructing well-reasoned arguments, debating differences, and facilitating discussions in the classroom—to help answer the question,

***What should I include in my Assessment Plan?***

To answer this question, you may work individually or with a colleague in the use of the *Showing Evidence Tool* to determine whether one or more of your assessment choices from the previous activity can be supported by evidence.

### ***Review of the Showing Evidence Case***

In its most basic form, the *Showing Evidence* case consists of two main parts—the Claims Workspace and the Evidence Bin. The Claims Workspace can contain one or more claims that a team is trying to prove (such as the statement(s) you selected in the previous activity). The Evidence Bin is where a team collects evidence that may support or oppose the claim(s). You can click, hold, and drag evidence to the claim, and attach the evidence to either the supporting (green) area or the opposing (red) area of the claim. As evidence becomes attached to a claim, the “pro” and “con” arguments begin to stack up—providing a visual indication as to whether the scales are tipping one way or another for or against a claim.



## Planning Student-Centered Assessment

### Step 1: Using the Showing Evidence Tool to Make a Case

The case you are about to open is pre-populated with pieces of evidence that can be used with a variety of claims. Select one or more of the assessment methods you identified in the previous activity as your claim(s) and use the evidence provided (and any additional evidence you choose to create) to support or oppose your claim. Identify concerns and questions you have about using the assessment method(s) you have chosen. Use research to help answer your concerns and questions. You can work individually or with a partner on this activity. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified below.



1. Go to a *Showing Evidence* project set up for you to explore assessment methods for your unit: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
2. Click **Student Log-In**.
3. Log on to the Student Workspace with the same student login that was used for the *Seeing Reason* “Thinking” project in Modules 1 through 3.

**Note:** Your login information may be located on Overview page vi.

4. The student homepage will open. Under *Project Name*, click the project *Assessment Methods*.
5. Create a new claim. (See Teaching Tools, Showing Evidence Tool Skill 3.20.)
6. In the *Your Claim* area, type the claim you will try to support (from page 4.15). You can leave the other areas of the claim blank until after you review the evidence.
7. Use the *Your Explanation* area to provide specific examples of the type or method of assessment or how it would specifically look in your classroom. You can also add the questions or concerns you have about using that type of assessment—questions that need to be answered by research.
8. Repeat directions 5 through 7 if you have more than one claim.
9. As a whole class, consider one of the existing pieces of evidence for any of the claims, rate it, and attach it to a claim as either supporting or refuting evidence. (See Teaching Tools, Showing Evidence Tool Skills 3.24 and 3.25.)

**Note:** A “t” on an evidence box means the piece of evidence is teacher-created. You cannot edit teacher-created evidence—only your own.

You can choose to work individually or in teams for this activity. This activity is designed to help you build your Assessment Plan. If you are working with another teacher on a unit, you should complete this activity as a team. However, even if you are not working on a unit with another teacher, you may still choose to partner with another teacher to discuss assessment methods that you are both interested in exploring.

Review the areas of the *Showing Evidence* case (Evidence Bin, Claims Workspace) and either your facilitator can demonstrate or you can use the *Help Guide* to assist you in:

- Creating a claim
- Opening and viewing existing evidence
- Viewing all existing evidence at once using the Show Report button
- Creating new evidence
- Attaching evidence to a claim
- Creating a comment
- Rating a claim and explaining reasoning

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Tool Skill 3.20: Creating a claim
- Showing Evidence Tool Skill 3.24: Linking evidence to a claim
- Showing Evidence Tool Skill 3.25: Rating the strength of evidence linked to a claim

### Planning Student-Centered Assessment

10. Review the rest of the evidence. For pieces of evidence that are applicable to your claim, rate their quality and attach them to your claim.



**Note:** Not all evidence will apply to your claim. Only use evidence that specifically supports or weakens your claim. An easy way to review all existing evidence is to use the Show Report feature. (See Teaching Tools, Showing Evidence Tool Skill 3.37.)

11. Use the Internet and any other resources you have to add additional research-based evidence or information on best practices. (See Teaching Tools, Showing Evidence Tool Skill 3.21.)



**Note:** A starting point of Web resources for additional research is available. Open Assessment Research in the *Web Resources* folder on the Curriculum Resource CD. Additional resources on assessment are available in the *Assessment Creation Resources* folder on the Curriculum Resource CD and at:



**[www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)**

12. Add comments to some of the evidence so you can include your thoughts as you consider how the evidence relates to your claim. You may also use the Comments feature to note any questions about the validity of the evidence, provide specific details on how you see the evidence applying to your claim, or note your questions or reactions. (See Teaching Tools, Showing Evidence Tool Skill 3.31.)
13. To view all the details of your evidence in one place, use the Show Report feature. (See Teaching Tools, Showing Evidence Tool Skill 3.37.)
14. After reviewing all the evidence, analyze the strength of the evidence and determine whether the body of evidence supports or opposes the claim.
  - a. Add more detail in the *Your Explanation* area to clarify the claim, if needed. Clarify the concerns you have about using a particular type of assessment.
  - b. On the claim, enter a rating for how well you believe the claim is supported. (See Teaching Tools, Showing Evidence Tool Skill 3.29.)
  - c. In the text box underneath the star rating, explain why you rated the claim the way you did. (See Teaching Tools, Showing Evidence Tool Skill 3.31.)
  - d. At the bottom of the workspace, type a conclusion. Explain whether you believe the claim is supported, refuted, or undetermined—and why. The claim and evidence do not answer the question of the case by themselves; you must identify your answer and explain your reasoning in the conclusion. Include in your conclusion whether you will include the method (or methods) you identified in your claim in your Assessment Plan. (See Teaching Tools, Showing Evidence Tool Skill 3.30.)

### Step 2: Reflecting on Your Thought Process



Discuss with the group the following questions to help you reflect on your experience with the tool:

- What kind of evidence was most convincing in its support of your claim?
- What did you learn from the evidence that opposed the claim? What valid points were raised?
- Did the Showing Evidence Tool help you (and your team member, if you worked with a colleague) discuss and evaluate your assessment ideas?
- What additional evidence did you add to the Evidence Bin?
- What did you conclude about the claim(s)?
- In what ways do you think the Showing Evidence Tool would be beneficial to students who are analyzing or developing an argument, hypothesis, experiment, or controversial issue?

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

### Activity 3: Drafting an Outline for Your Assessment Plan

An assessment plan ensures a project stays focused on intended learning goals and should be developed along with project activities and tasks. Because project tasks allow for broader expression of individual learning, assessment strategies need to be open enough to accommodate a range of student work, yet focused on expected results.

An assessment plan outlines methods and tools that define clear expectations and standards for quality in products and performances. It also defines project monitoring checkpoints and methods to both inform the teacher and keep students on track. The plan should involve students in reviewing and managing their learning progress during the project. A plan will answer the following key questions:

- How will you know your students have met the learning goals?
- By what criteria will students be assessed?
- What methods of assessment will you use throughout the project to inform you and your students about the students’ learning progress?
- What reporting and monitoring methods will you use to encourage student self-management and progress during independent and group work?

An assessment timeline is a simple way to show an assessment plan and check that a variety of assessment methods occur throughout the learning cycle. During this activity, you lay the groundwork for your assessment plan by drafting an assessment timeline.

The following page shows an example of a timeline that indicates how assessment can be embedded throughout a unit. Endless combinations of assessment methods can be woven into a unit plan.

Outline your initial ideas on the next page for an assessment timeline so that you can keep your ideas in mind as you plan your unit’s activities.

#### Assessment Timeline Example

Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ Set up scenario</li> <li>▪ T-chart</li> <li>▪ K-W-L chart</li> <li>▪ Questioning</li> <li>▪ Group Plan</li> <li>▪ Introduce and discuss rubric</li> </ul>	<ul style="list-style-type: none"> <li>▪ Plant log</li> <li>▪ Science journal</li> <li>▪ Teacher conference</li> <li>▪ Questioning</li> <li>▪ Newsletter checklist</li> <li>▪ K-W-L chart</li> <li>▪ Anecdotal notes</li> <li>▪ Peer feedback</li> </ul>	<ul style="list-style-type: none"> <li>▪ K-W-L chart</li> <li>▪ Questioning</li> <li>▪ Collaborative Assessment - Newsletter</li> <li>▪ Test</li> <li>▪ Self- evaluation and reflection</li> <li>▪ Science Content Rubric</li> </ul>

---

## Planning Student-Centered Assessment

**Note:** For additional samples of assessment timelines and summaries, see examples starting on Appendix D.01.

If desired, you may type the answers directly into your Unit Plan in the timeline portion of the *Assessment Plan section*. You will finalize your Assessment Plan and create one or more assessments in Module 11.

1. Open your Unit Plan and review your higher-order thinking skills (your “Habits of Learning Taxonomy”), standards, and objectives. You also may want to review your project priorities on pages 2.20-2.22.
2. What types of assessment methods and resources are you considering to use at the beginning of the unit before project work begins?

---

---

---

3. What types of assessment methods and resources are you considering to use during the project?

---

---

---

4. What types of assessment methods and resources are you considering to use at the end of the unit?

---

---

---

5. From your ideas above, type your draft ideas for ongoing assessment in the timeline section of your Assessment Plan.



6. Save your Unit Plan.

## Planning Student-Centered Assessment

### Extension Activity: Browsing Assessments

The following resources are available to you for self-study or as an optional extension in your course.

Complete Step 1 and/or Step 2 to view additional assessment samples to obtain ideas for various assessment types and content that would support your Assessment Plan.

#### Step 1: Viewing Assessments

Although you had an opportunity to view a few assessments in the Intel® Education Assessing Projects Web site earlier in this module, use this time to explore other assessment categories of interest.



1. Go to: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)
2. Click **Assessment Strategies**.
3. Click any of the categories on the left: **Gauging Student Needs, Encouraging Self-Direction And Collaboration, Monitoring Progress, Checking Understanding, or Demonstrating Understanding**.
4. Click any of the linked assessment instruments in the table that describes various assessment methods.
5. Note any additional assessments or strategies that you may want to add to your Assessment Plan.

---

---

---

---

---

---

---

---

---

---

---

## Planning Student-Centered Assessment

### Step 2: Viewing Assessments in the Assessing Projects Library

The *Assessing Projects* application contains a library of assessments that specifically focus on 21st century thinking skills. Browse the Assessment Library, noting the various categories, traits, and content of the assessments that would be helpful in the assessment you need to create for your unit. Use the *Help Guide* or view the online Tutorial (available on the *Try It* page) if you need assistance in completing any technology skills identified below.



1. Go to: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)
2. Click **Try it**.
3. Click **Demo**.
4. Browse the categories of the Assessment Library. (See Teaching Tools, Assessing Projects Application Skill 4.3.)
5. Open and view assessments of interest. (See Teaching Tools, Assessing Projects Application Skill 4.4.)
6. Note the type of content or categories you want to include in your assessments.

Refer to the following skills in the *Help Guide* for this section:

- Assessing Projects Application Skill 4.3: Browsing the Assessment Library
- Assessing Projects Application Skill 4.4: Viewing an assessment



## Module 4

---

### Planning Student-Centered Assessment

Use this summary to review this module's main points and check for understanding.

### Module 4 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

#### Module 4 Key Points:

- An assessment plan outlines methods and tools that define clear expectations and standards for quality in products and performances, as well as provides project monitoring checkpoints and methods. The plan should involve students in reviewing and managing their learning progress during the project.
- Assessment strategies, purposes, and tools can be organized into five categories:
  - Strategies for gauging student needs
  - Strategies for encouraging self-direction and collaboration
  - Strategies for monitoring progress
  - Strategies for checking for understanding and encouraging metacognition
  - Strategies for demonstrating understanding and skill

#### Accomplishments:

- Explored a variety of assessment strategies and scenarios
- Evaluated evidence to help determine which assessment methods I may want to include in my unit's Assessment Plan
- Created a draft Assessment Timeline for my unit

In the following modules, we build on these concepts as we discuss ways we can support and encourage higher-order thinking skills through the use of thinking tools.

Using the Visual Ranking Tool to Target Thinking Skills

**Activities**

**Activity 1: Looking at Visual Ranking in Action ..... 5.01**

**Discuss:** The benefits of the thinking tools

**Understand:** How to use list ranking and the *Visual Ranking Tool* in the classroom

**Activity 2: Viewing Project Ideas ..... 5.08**

**View:** Projects that incorporate the *Visual Ranking Tool*

**Consider:** Uses for *Visual Ranking* in your unit

**Activity 3: Thinking About Your Unit ..... 5.11**

**Brainstorm:** Ideas for using *Visual Ranking* in your unit

**Extension Activity: Understanding Best Practices  
with Visual Ranking ..... 5.12**

**View:** Strategies and project ideas for using the *Visual Ranking Tool*

**References ..... 5.13**

**Module Summary ..... 5.14**



## MODULE 5

# Using the Visual Ranking Tool to Target Thinking Skills

**Description:** In this module, you explore the advantages of using the *Visual Ranking Tool* and consider how you might integrate this thinking tool into your Unit Plan.

## Activity 1: Looking at Visual Ranking in Action

To begin thinking about how you might integrate the *Visual Ranking Tool* into your unit, review how thinking tools, and *Visual Ranking* in particular, may be used in the classroom.

### Step 1: Reviewing the Benefits of Thinking Tools

You now have experience using three online thinking tools. In each of these tools, you created and saved visual representations of your thinking. Projects enhanced by technology can be very powerful.

*Technology is most powerful when used as a tool for problem solving, conceptual development, and critical thinking. With technology, students can spend...more time creating strategies for solving complex problems and developing a deep understanding of the subject matter.*

*"The Learning Return on our Educational Technology Investment"*

Cathy Ringstaff and Loretta Kelley

Review the benefits of using online thinking tools in your classroom.



**Note:** Research behind the online thinking tools is available in the *Thinking Tools* folder on the Curriculum Resource CD.

### Using the Visual Ranking Tool to Target Thinking Skills

#### Benefits of the Online Thinking Tools

##### Students:

- Improve collaboration and higher-order thinking skills
- Engage in discussion and understand complex ideas
- Develop visual representation skills
- Use precise language
- Strengthen verbal argumentation skills through peer review
- Explain, justify, and generalize (mathematical reasoning across the curriculum)
- Examine other perspectives, such as peers, experts, or community members

##### Teachers:

- Shift to student-centered instructional practices
- View the progression of the students' thinking, ideas, and research
- Can quickly and easily set up and manage as many team projects as needed
- Can access projects anywhere and anytime using an Internet-connected computer and a free plug-in for Macromedia Flash\*

## Step 2: Introducing List Ranking in the Classroom

Students often brainstorm lists for a variety of reasons, such as ranking their favorite songs or planning which colleges to consider. When students rank one college higher than another, for instance, they do so by creating a personal set of criteria, narrowing the list of all schools to a few that meet their criteria, and then ordering the final list by evaluating how a particular college ranks relative to the others in the list.

Any project that has students prioritizing or choosing among options can benefit from the *Visual Ranking Tool*. Below are several prompts for *Visual Ranking* that students can use in a variety of subjects and grade levels:

- Rank the items in the supply list in order of usefulness when setting up a base camp and research station on the moon.
- Considering maintenance costs, size, temperament, and popularity, which animals would be good pets for the city? Put your choices in order.
- Based on the interests of the community stakeholder group your team represents, rank the importance of possible features for a new public park.

---

## Using the Visual Ranking Tool to Target Thinking Skills

- Which development choices have the least effect on the river environment and salmon population?
- Put the list of inventions in order of importance to modern life. After research and debate, rank again and compare your first ranking with your later ranking.
- What are the most important elements of a good mystery story?

The *Visual Ranking Tool* makes the ranking process easy. With a simple click and drag, students move items to any position in the list. Working in teams, they collaborate and negotiate their reasoning. The *Comment* feature of the tool gives students a place to record their rationales. When teams finish ranking their lists, they can compare results with their classmates' rankings and discuss differences and similarities.

The *Visual Ranking Tool* displays how closely the lists match and shows the correlation between two rankings.

Prompts for ranking lists can have multiple uses when students are asked to rank a list according to one set of criteria, and then again, using another set of criteria. This allows students to gain insight into various perspectives.

The *Visual Ranking Tool* helps students analyze and evaluate items in a list by:

- Identifying criteria for sorting
- Refining the criteria
- Prioritizing items in the list based on criteria
- Justifying priorities
- Making decisions by seeking consensus or negotiating new decisions

By comparing lists visually students are:

- Examining and comparing reasoning for priorities
- Negotiating and adjusting ranking to explore correlation
- Understanding multiple perspectives
- Learning from each other
- Seeking consensus

## Module 5

### Using the Visual Ranking Tool to Target Thinking Skills

When brainstorming the initial list with your students, consider opening a word processing document and using a projector to display the list. The list can be finalized by adding and deleting words. Using a word processing file has many benefits:

- It allows you to easily edit and refine your list.
- You do not need to show your students your Teacher Workspace.
- You do not need an Internet connection.
- You can view the entire list at once; whereas, if you enter the list directly into the tool, your full list may not be viewable. Although the text-entry box is scrollable, it is somewhat small.
- You can easily alphabetize the list. Alphabetizing the list is useful to ensure no unintentional bias in the initial sorting and, later, to see when a list has not been sorted. (See Word Processing Skill 7.19)

Once you have the final list, log in to the Teacher Workspace. You can have the project already set up with placeholder items in the List to Sort section. Copy and paste the final list from the word processing document into the preset project in the Teacher Workspace and click Submit after all items have been entered.

### Step 3: Brainstorming a List

Earlier, you looked at the design of the *Grow a Business* unit plan. (See page 3.17 and Appendix E.05.) During this activity, you experience how the *Visual Ranking Tool* is used in this elementary unit. This activity helps you understand how to:

- Incorporate a whole-class brainstorming session
- Use different perspectives in the ranking process
- Integrate the *Visual Ranking Tool* into a classroom project

Imagine you are a student in this classroom. As a part of the unit, your teacher asks you to use the *Visual Ranking Tool* to examine and rank a list of flowers that your class is considering selling.

1. In small groups, brainstorm a list of flowers that you think would make a good gift for Mother's Day based on your assigned perspective (mother, florist, or student). List them below.

---

---

---

2. Share your list with the whole group. As the lists of flowers are shared, collapse any items that are too similar. For example, *red roses* and *yellow roses* would be hard to distinguish when placing items in rank order, so you would select just roses.

**Note:** Although red roses and yellow roses symbolically have very different meanings, this ranking is currently concerned with simply ranking different flower species.

3. Once the list is finalized to a total of 7-12 items, the instructor enters the final list in the tool workspace to make it ready for sorting.

**Note:** When using the *Visual Ranking Tool*, try not to have too few or too many items. With too few items to rank, it may be difficult to see much of a variation when comparing lists. With too many items, teams may have difficulty ranking a large list and/or understanding the distinction between items. A list of 7-12 items works best.

## Using the Visual Ranking Tool to Target Thinking Skills

**Step 4: Logging in as a Student**

Practice ranking a list using the *Visual Ranking Tool*. The instructions below are the same instructions your students use to rank a project list.



1. Open *Visual Ranking* from your Favorites. ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))
2. Click the **Student Log-In** link.
3. Your instructor will give your team the teacher ID, team ID, and password. Write them on the lines below. Your Team ID indicates the perspective your team should take when ranking the list.

Teacher ID: \_\_\_\_\_

Team ID: \_\_\_\_\_

Password: \_\_\_\_\_

4. Enter your log-in information, then click **Sign In**.



**Note:** All of the teams in the class use the same teacher ID, so it can be written on the board. The instructor needs to let each team know their individual team ID and password. If teams forget their passwords, all passwords can be viewed in the *Teacher Workspace*. (See Teaching Tools, Visual Ranking Tool Skill 1.12.)

5. The *Student Workspace* page will open. Under *Project Name* in the *Visual Ranking Projects* section, open the project, **Ranking Flowers**. (See Teaching Tools, Visual Ranking Tool Skill 1.3)
6. The *Visual Ranking Tool* will open with the final brainstormed list of flowers.

Refer to the following skills in the Intel® Education Help Guide for this section:

- Visual Ranking Tool Skill 1.3: Opening a Visual Ranking project in the Student Workspace
- Visual Ranking Tool Skill 1.12: Viewing or editing team information



### Using the Visual Ranking Tool to Target Thinking Skills

Refer to the following skills in the Help Guide for the skills on page 5.xx:

- Visual Ranking Tool Skill 1.15: Ranking items in a list
- Visual Ranking Tool Skill 1.16: Commenting on an item
- Visual Ranking Tool Skill 1.20: Comparing lists
- Visual Ranking Tool Skill 1.21: Understanding results
- Visual Ranking Tool Skill 1.27: Printing a report
- Word Processing Skill 7.19: To sort or change the order of rows based on certain information

#### Step 5: Ranking and Comparing the List

Practice ranking the list using the *Visual Ranking Tool*. You are ranking the list according to what you think would sell best for Mother's Day flowers. Later in the unit, students are asked to rank the list according to the results of a flower popularity survey, the anticipated cost of each type of flower, and the projected profit.

Below are the same instructions your students would use to rank a project list. Use the *Help Guide* if you need assistance in completing any technology skills identified below.



1. Rank the list according to your team's assigned perspective as to what would sell best as Mother's Day flowers. As team members, you must agree on the position of each item in the list. (See Teaching Tools, Visual Ranking Tool Skill 1.15.)
2. Add rationales for your rankings in the items' *Comment* boxes. Enter ranking rationales for at least the top, bottom, and two middle items. (See Teaching Tools, Visual Ranking Tool Skill 1.16.)
3. Talk with another team and compare your lists. Discuss the differences between your rankings. Try to negotiate a common ranking.



**Note:** For information about correlation, view Understanding Correlation in the *Thinking Tools, Visual Ranking Tool* folder on the Curriculum Resource CD.

4. View the class average and discuss whether it reflects the viewpoint of any one team. Discuss the limitations and uses of class average and the types of discussions you could have with your students. (See Teaching Tools, Visual Ranking Tool Skills 1.20 and 1.21.)



**Note:** When creating your own teams, be sure to unassign any extra or unused teams so that the class average comparison is not skewed.

5. Click the **Show Report** button to view a report of your ranking and comments. (See Teaching Tools, Visual Ranking Tool Skill 1.27.)

**Note:** If you have a pop-up blocker, you need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps. **Macintosh\* users:** You may be able to override a pop-up blocker by holding down the **Command** key as you click the link.

## Using the Visual Ranking Tool to Target Thinking Skills

**Step 6: Reflecting on Your Use of the Tool**

After the sorting activity, reflect on your experience with the tool and discuss the following questions:

- How important were discussions and negotiations during the ranking activity?
- How did explaining and justifying your ranking in the items' *Comment* boxes help you establish the final ranked list?
- How did your ranking differ from other teams? Did their comments help you understand other ways of thinking about the items?
- What did you discuss with the other teams?
- Did reading other teams' comments and discussing the lists with them influence your team's thinking about how you ranked the items?

**Benefits of the Visual Ranking Tool****Students:**

- Learn the tool easily and can use it right away
- Represent their thinking visually using an interactive and dynamic tool
- Discuss, defend, debate ideas, and reach consensus
- Explain reasoning, analysis, and evaluation processes
- Understand perspectives of peers, experts, and community members
- Gain mathematical understanding of class average and the correlation coefficient
- Learn to organize ideas

**Teachers:**

- Provide students with unique perspectives by including outside participants
- Give teams individualized support by logging in to view and comment on each team's ranking and reasoning
- Can quickly set up and manage multiple projects at once



**Note:** View additional benefits of *Visual Ranking* in the *Thinking Tools, Visual Ranking* folder on the Curriculum Resource CD.

Using the Visual Ranking Tool to Target Thinking Skills

**Activity 2: Viewing Project Ideas**

**Step 1: Reviewing the Power of Visual Ranking**

In this activity, review how the *Visual Ranking Tool* can be used to target thinking at different levels. *Visual Ranking* has been designed to support the types of activities that cover a range of cognitive skills, such as those described by Bloom’s Revised Taxonomy.

This tool develops students’ higher-order thinking skills by:

- Requiring collaboration, cooperation, and persuasion
- Promoting classroom discussion, argumentation, and defense of individual or team choices
- Supporting students’ construction of understanding and their engagement in cognitive operations

Uses of Visual Ranking Classified by Bloom’s Revised Taxonomy	
Remembering	<ul style="list-style-type: none"> <li>▪ Recreate the order of items in a series (e.g., how a bill becomes a law)</li> <li>▪ Order objects along a scale (e.g., distance of planets from the sun)</li> </ul>
Understanding	<ul style="list-style-type: none"> <li>▪ Use the item’s Comment box to document student’s comprehension (e.g., place automobile models in environmental order by combining gas mileage and pollution output)</li> </ul>
Applying	<ul style="list-style-type: none"> <li>▪ Order items based on objective, calculated, or interpreted data</li> </ul>
Analyzing	<ul style="list-style-type: none"> <li>▪ Organize, differentiate, compare, and contrast items (e.g., compare the effectiveness of various fertilizers; sort the frequency of eye and hair color combinations in the class)</li> <li>▪ Compare one’s own ideas with other students’ results (e.g., rank the most essential components of a park, considering safety, cost, and popularity; after individual team rankings, the class must come to a consensus)</li> </ul>
Evaluating	<ul style="list-style-type: none"> <li>▪ Establish and apply criteria and value to each item and justify that placement (e.g., rank industries that should be pursued to open offices or factories in our town, considering the effects on community revitalization and the environment)</li> <li>▪ Persuade, educate, or convince others (e.g., compare various investment choices and make an expert recommendation to a prospective client)</li> </ul>
Creating	<ul style="list-style-type: none"> <li>▪ Construct new knowledge by ranking items, events, traits, etc., according to criteria they develop (e.g., rank the following world events according to their impact on your life today)</li> </ul>

---

## Using the Visual Ranking Tool to Target Thinking Skills

### Step 2: Considering How the Visual Ranking Tool Can be Integrated into a Classroom Project

The *Visual Ranking Tool* is open-ended and content free; therefore, it can be integrated into a variety of existing unit and project plans.

Strategies to consider:

- Use the *Visual Ranking Tool* throughout a project. As a pre-activity or pre-assessment, *Visual Ranking* helps students discuss prior knowledge and identify areas to research. As a mid-unit activity, the tool helps students sort and prioritize ideas or concepts. At the end of the unit, the tool helps students define final conclusions and may be used in assessment.
- Have students compare earlier lists with final lists. Students can examine how opinions change over time and reflect on what they learned.
- Sort a list from different perspectives. For example, in a literature activity, student teams can take on the role of different characters, and then sort according to those characters' points of view. After student teams have sorted their lists, they can discuss how and why their rankings differ.
- Extend the learning community by including outside experts, students in other classrooms or schools, parents, and others as team members. Including people from outside the classroom adds opportunities for deeper discussions about the concepts being studied. Because the tool is web-based, team members—even those outside of your classroom—can contribute their rankings and join the discussion from anywhere.
- Promote collaboration, negotiation, and communication skills by having students work in teams to rank lists.



## Using the Visual Ranking Tool to Target Thinking Skills

**Activity 3: Thinking About Your Unit**

In the next module, you will try out an idea for your unit that incorporates using the *Visual Ranking Tool*. Brainstorm some ideas for effective uses of *Visual Ranking*. You may also want to refer to the Project Rubric on page 2.18-2.19 to help clarify your ideas.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

You need to finalize the foundational details of your unit (curricular topic, targeted standards, and Curriculum-Framing Questions) before the next module. Although these details will continue to be refined in the upcoming modules, if you have not yet committed yourself to a specific unit topic, you should decide on one prior to Module 6.

## Using the Visual Ranking Tool to Target Thinking Skills

### Extension Activity: Understanding Best Practices with Visual Ranking

The following resources are available to you for self-study or as an optional extension in your course. Complete Step 1 and/or Step 2 to view strategies and project ideas for using *Visual Ranking* in the classroom.

#### Step 1: Viewing Instructional Strategies

View best practices for planning, implementing, and assessing a project that integrates the *Visual Ranking Tool*.



1. Go to: [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Click **Instructional Strategies**.
3. Click the categories of interest: **Planning a Project, Implementing a Project, or Assessing Work**.

---

---

---

#### Step 2: Viewing Visual Ranking Project Ideas

Although you had an opportunity to view a few project ideas earlier in this module, if you have not decided on a project for your unit, you may want to explore more projects that integrate the *Visual Ranking Tool*.



1. Go to: [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Click **Project Examples**.
3. View projects that integrate the *Visual Ranking Tool* in either **Project Ideas** or **Unit Plans**.

---

---

---

---

## Using the Visual Ranking Tool to Target Thinking Skills

### References

Anderson, L. & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York: Longman.

Ringstaff, C. & Kelley, L. (2002). *The learning return on our educational technology investment: A review of findings from research 2002*. San Francisco: WestEd Regional Technology in Education Consortium. Retrieved from:  
[www.wested.org/online\\_pubs/learning\\_return.pdf](http://www.wested.org/online_pubs/learning_return.pdf)



## Module 5

---

### Using the Visual Ranking Tool to Target Thinking Skills

Use this summary to review this module's main points and check for understanding.

#### Module 5 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

##### Module 5 Key Points:

- Any project that has students prioritizing, choosing among options, and/or evaluating different perspectives could benefit from the *Visual Ranking Tool*.
- The *Visual Ranking Tool* can be used at any stage of a learning project: to help students discuss their prior knowledge, put learning in a new context, or to assess or reflect on learning.

##### Accomplishments:

- Practiced brainstorming and ranking a list as it would be done in a classroom
- Explored the strengths of the *Visual Ranking Tool* to determine its potential use in my unit

In the following modules, we build on these concepts as we discuss ways we can support and encourage higher-order thinking skills by using thinking tools.

---

 Considering the Visual Ranking Tool for Your Unit

## Activities

### Activity 1: Clarifying Project Ideas for Using Visual Ranking ..... 6.01

**Review:** The needs of your unit  
**View:** Sample project descriptions  
**Share:** Your ideas

### Activity 2: Planning Your Project ..... 6.08

**Create:** A project description, prompt, and practice list for *Visual Ranking*

### Activity 3: Setting Up a Visual Ranking Project ..... 6.12

**Set Up:** A *Visual Ranking* project online

### Activity 4: Trying Out Your Visual Ranking Idea ..... 6.16

**Test:** Your project ideas through a practice ranking

### Activity 5: Revisiting Your Unit Plan ..... 6.21

**Understand:** Best classroom practices  
**Revise:** Your Unit Plan

### Activity 6: Sharing Your Results ..... 6.26

**Reflect:** On your use of *Visual Ranking*

### Extension Activity: Finalizing Your Visual Ranking Project ..... 6.27

**Complete:** The *Visual Ranking* project to fully meet expectations and learning goals

### References ..... 6.28

### Module Summary ..... 6.29



## MODULE 6

# Considering the Visual Ranking Tool for Your Unit

**Description:** During this module, you explore additional uses of the *Visual Ranking Tool*, view project descriptions and create your own, set up a teacher workspace, and create a project online. You try out your ideas for targeting higher-order thinking skills through the use of the *Visual Ranking Tool* by creating a practice list to rank and obtaining feedback from others.

## Activity 1: Clarifying Project Ideas for Using Visual Ranking

### Step 1: Reviewing the Needs of Your Unit

Before determining a possible use for the *Visual Ranking Tool* in your unit, review your targeted higher-order thinking skills, standards, and learning objectives. Compare them with the thinking skills that would be supported by *Visual Ranking*.

1. Open your Unit Plan.
2. Review your "Habits of Learning Taxonomy."
3. Review the standards indicated in your Unit Plan and note those standards that could benefit from the use of the *Visual Ranking Tool*. If the standards are not already highlighted in a color specific for *Visual Ranking* (which may have been done in the activity on page 2.05), you may want to highlight them now or identify them beside the key words listed below and on the next page.

- compare \_\_\_\_\_
- contrast \_\_\_\_\_
- differentiate \_\_\_\_\_
- order \_\_\_\_\_
- organize \_\_\_\_\_
- perspective \_\_\_\_\_

## Module 6

---

### Considering the Visual Ranking Tool for Your Unit

- placement \_\_\_\_\_
- point of view \_\_\_\_\_
- rank \_\_\_\_\_
- sort \_\_\_\_\_
- other: \_\_\_\_\_



**Note:** In your review of the standards, do not be limited by these key words. You may need to look for hidden opportunities for higher-order thinking, especially if your state's standards focus mainly on very specific knowledge-based tasks or understanding.

4. Review your learning objectives and identify which objectives could be supported by the use of *Visual Ranking*. You may want to highlight them in your Unit Plan or identify them below.

---

---

5. Consider how the learning objectives for the sample project descriptions on the following pages (and in Appendix D) would be supported through the use of *Visual Ranking*. Keep your standards and objectives in mind as you think about your own project.



**Note:** If you do not believe *Visual Ranking* will be a good fit for the unit being developed in this course, you will have the opportunity to try out an idea for a different unit.

Do not try to force the use of *Visual Ranking* when it is not a good use of time or academically warranted.

### Step 2: Viewing Sample Project Descriptions and Prompts

When you create a *Visual Ranking* project online, you need to enter a Project Description and Project Prompt to guide your students' work. Use this time to help clarify your project ideas.

#### Project Description

The Project Description is a focused, short paragraph that describes the project to your students and explains how they will use the *Visual Ranking Tool* to help them answer the questions of the project. The Project Description should be able to convey in a few sentences why this is a project or problem that is worthy of study, as well as define what your students will be trying to solve, produce, respond to, test, recommend, or find out.

---

## Considering the Visual Ranking Tool for Your Unit

### Project Prompt

In addition to the Project Description, you will need to create a prompt. A good prompt is an essential component of incorporating the *Visual Ranking Tool* into a project so that students know how they should rank the list.

### Hints for Creating Prompts

When developing a prompt, think about the following:

- A helpful prompt may include the criteria for sorting.
  - Example: "Put this list of inventions in order of their importance to modern life."
- It may be necessary to leave out the criteria if each team will be developing, or will receive from you, its own criteria. If the prompt does not include the criteria for sorting, the ordered lists will vary according to the criteria each team uses. This can create an opportunity to discuss how applying different criteria results in different rankings.
  - Example: "Put this list of inventions in order of their importance."
- A good prompt tells students that they are sorting all of the items and not just picking out the best.
  - Instead of "Who were the greatest presidents?" the prompt might state, "List these presidents in terms of their impact on civil rights, ranking the president with the greatest impact first."

After you develop a prompt, you should discuss with your students the meaning of the qualifiers in your prompt. For instance, specifically explore what "impact," "significant," and "best" mean.

### Examples

Here are a few examples of Learning Objectives, Project Descriptions, and Prompts:

**Note:** For more examples, see ideas beginning on Appendix C.03.

- **Language Arts**
  - **Learning Objectives:**
    - Draw conclusions about how character interactions affect plot
    - Analyze literature to find evidence in support of a thesis
    - Formulate rational arguments and apply the art of persuasion and debate

### Considering the Visual Ranking Tool for Your Unit

- **Project Description:** Two people madly in love with only a desire that love would conquer all—what could possibly go wrong? Neither Romeo, Juliet, nor their families could foresee the grave future ahead of them. By the end of the play, six people are dead and others injured. Is it fate, simply unlucky circumstances, or something else that causes these deaths? Use the *Visual Ranking Tool* to help clarify who are most to blame for Romeo and Juliet’s deaths. From those ideas, you will write an essay that discusses who and what contribute to the deaths of Romeo and Juliet.
- **Prompt:** Rank these characters in the order of their influence upon and responsibility for the deaths of Romeo and Juliet, according to each character’s actions or inaction.
- **Health**
  - **Learning Objectives:**
    - Weigh the positive and negative effects of vaccines
    - Make recommendations regarding the necessity of vaccinations
  - **Project Description:** Some parents are concerned that childhood vaccines could produce adverse effects and cause health problems for their children, such as autism, damage to the immune system, brain damage, and so on. You are part of a committee that will make recommendations regarding these immunization concerns. The audience for your report could be federal vaccine research policymakers, state and local vaccine program implementers, health care professionals, the public, or the media. Use the *Visual Ranking Tool* to rank the possible positive and negative effects of vaccines. Research and make recommendations based on the relationship between vaccines and any adverse effects.
  - **Prompt:** Rank the following effects of vaccines in order of their impact on your decision as to whether children should be vaccinated.
- **Math**
  - **Learning Objectives:**
    - Prioritize investment options based on financial goals
    - Project future economic trends based on current and past information
    - Weigh potential risks and benefits of different investment strategies
    - Make investment recommendations based on research and projections

---

## Considering the Visual Ranking Tool for Your Unit

- **Project Description:** Most young people understandably want the best things in life—nice homes, new cars, expensive clothes, and vacations in fun places. Your job in an investment firm is to advise others on how to invest their money. A client has \$100 a month to invest in such things as savings, bonds, and the stock market. Research and rank the best options for investment, depending on the goals of your client.
- **Prompt:** Rank the following investment choices in the order of their potential risk, listing the highest risk first.
- **Second Prompt:** In your second ranking, rank those investment choices in order of their largest potential gain.
- **Science**
  - **Learning Objectives:**
    - Understand the components in an ecosystem
    - Identify and prioritize causes of wildfires
    - Determine the best course of action to deal with wildfires
    - Propose new policy to preserve and protect natural resources
  - **Project Description:** An average of 5 million acres burn every year in the United States due to wildfires, causing millions of dollars in damage. Many people believe all fire is bad for a forest, including prescribed or controlled burning. Some believe healthy forests need to be managed in order to control fire risk; others think that any natural fire should be allowed to run its course. What should we do about wildland fires? A new policy needs to be developed to determine the best course of action when dealing with fires and potential fires in forest areas. You have been assigned to a task force to research and recommend a policy. First, you will need to research what contributes the most to wildfires. Second, you will research and recommend a new policy on how we can preserve and protect our natural resources in such a way that the needs of all involved are met.
  - **Prompt:** Before policies can be made, we need to know the facts. What contributes the most to the outbreak of wildfires? Rank the items below from the greatest to least significance.



### Considering the Visual Ranking Tool for Your Unit

- **Social Studies/History**
  - **Learning Objectives:**
    - Analyze cause-and-effect relationships as they relate to immigration
    - Project future immigration trends based on the past
    - Propose feasible solutions to address current immigration concerns
  - **Project Description:** Continued immigration constantly reshapes the demographics, economy, and society of the world. In the United States during the 1990s, an average of more than 1.3 million immigrants—legal and illegal—settled in the United States each year, and this trend continues. To begin to understand the issues of immigration, we need to know why people came to the United States in the past and why people still want to come live in the United States today. Additionally, what are the benefits and the problems of immigration—for both the immigrants and existing populations? Your job as the head of the Center for Immigration Studies is to address these concerns and prepare a report that will be passed on to a Senate Subcommittee that is investigating this issue.
  - **Prompt:** What are the greatest influences that contribute to immigration? What causes people to immigrate? Rank the list with the items having the greatest effect first, according to your assigned historical time period.

## Considering the Visual Ranking Tool for Your Unit

### Step 3: Sharing Your Ideas

If you started a wiki in Module 2, create another entry to share your ideas for a project that incorporates the use of the *Visual Ranking Tool* into your classroom. If you are not using a wiki, share in small groups.

For this activity, share with those participants who teach in a similar grade or subject area.

Share your ideas on these questions on your wiki page as you reflect on your plan for *Visual Ranking*:

- What idea do you have for using *Visual Ranking*?
- How will the use of *Visual Ranking* fit into your Unit Plan and help your students meet the learning objectives and target higher-order thinking skills? If you have already decided that *Visual Ranking* will not be a good fit for your unit, what ideas do you have for using *Visual Ranking* with your students in other units?
- What concerns do you have in using this tool or incorporating ranking?
- What feedback would you like from others?

In small groups, discuss each other's ideas. If using a wiki, share your wiki pages and provide feedback on their ideas. Specifically provide feedback on how to best use the tool to encourage higher-order thinking skills. Consider how they could bring in other points of view.



1. Open the wiki site URL for this course from your Favorites.

**Note:** The URL and login information may be written down on Overview page vi or in your login Information document.

2. Edit your page and create a new entry to summarize your ideas for using *Visual Ranking*. Besides reflecting on the questions above, include:
  - An overview of how the *Visual Ranking Tool* would be integrated into your unit
  - Concerns, questions, and desired feedback



**Note:** Depending on the wiki site chosen, you may be instructed to either edit the same wiki page or create a new sub-page.



3. Save your wiki page.
4. Share your wiki page in a small group and, if needed, note any feedback directly on your page. Provide feedback to your colleagues on their project ideas, concerns and questions they have, and any new ways to look at the project to better target higher-order thinking and different perspectives within the unit.

### Considering the Visual Ranking Tool for Your Unit

#### Activity 2: Planning Your Project

##### Step 1: Creating Your Own Project Description and Prompt

In this activity, you create your own project description and prompt that will appear in your students' workspace. As you develop your project description, consider including the following elements. Even if you think you might want to use or modify an existing project from the Intel® Education Web site, think about how you might want to modify that project to include a stronger emphasis of these elements.

- Setup of an authentic problem, significant question, or real-life scenario
- Explanation as to why the project or problem is worthy of study
- Definition of what your students will try to solve, produce, respond to, test, recommend, or find out
- Description of what students will be required to decide, prioritize, negotiate, or seek consensus on
- Use of age-appropriate language that makes the topic engaging and interesting

Consider the following questions as you develop a Project Description:

- Does the project engage the students' interest? Will it motivate them to pursue and explore the concepts deeply?
- Is the project cast in a context familiar to the students? Is it based on a real-world situation, scenario, or controversy?
- Is the project staged well? Is the project developed so that student interest builds?
- Is the information provided adequate to solve the questions of the project? Is too much information provided? Too little?
- Does the complexity and length of the project warrant and support working collaboratively?
- Is the problem or scenario of the project open-ended, which will provide different entry points and paths for your students?
- Does the project challenge students to use higher-order thinking skills?



Modified from: "Guidelines for Reviewers,"  
Problem-Based Learning Clearinghouse, University of Delaware  
[www.udel.edu/pblc/reviewers](http://www.udel.edu/pblc/reviewers)

## Considering the Visual Ranking Tool for Your Unit

### Draft Your Project Ideas

1. Open your Unit Plan.
2. Review your Curriculum-Framing Questions. Consider how your students' work with *Visual Ranking* could help to support your unit's questions.
3. Review your project priorities on pages 2.20–2.22. Consider how different perspectives or members outside of your classroom could be incorporated into your project ideas.
4. Preview the Project Reflection Checklist on page 6.19.  
**Note:** You may also want to review the Project Rubric on page 2.18-2.19.
5. Use the following table to draft the **Project Description** and **Prompt** for your ranking or type them directly into your Unit Plan.
6. If you are planning to modify an existing project on the Intel Education Web site (which you can copy to your Teacher Workspace), review Steps 2 and 3, but then skip ahead to Activity 3 (Steps 1–3), starting on page 6.12, and make your edits to the project details online.




**Note:** If you do not think the use of the *Visual Ranking Tool* will be a good fit for your unit, save the Visual Ranking Project Idea document in the *Thinking Tools, Visual Ranking Tool* folder on the Curriculum Resource CD and try out a project idea for a different unit.

Do not try to force the use of *Visual Ranking* when it is not a good use of time or academically warranted.

Example	<b>Project Description</b>	Mother's Day is coming! Our class needs to earn money for an upcoming field trip. Put the two together and what do you get? An opportunity! You will be involved in researching, planning, marketing, and selling flowers for Mother's Day. You, as a member of the class, are now a business partner, and you have many important decisions to make so that your business is successful. Use the <i>Visual Ranking Tool</i> to begin research on your first decision: which flowers to sell. Let's grow a business!
	<b>Prompt</b>	Which flower(s) should we sell for Mother's Day based on price, profit, and availability?
Possible Ideas	<b>Project Description</b>	
	<b>Prompt</b>	

### Considering the Visual Ranking Tool for Your Unit

#### Step 2: Planning Your Use of Visual Ranking

1. Open your Unit Plan.
2. In the *Visual Ranking* section of the Unit Plan, type the Project Title, Project Description, and Prompt.
-  3. Save your Unit Plan. Keep this document open for the next step.

#### Step 3: Creating a Practice List

Often you will want to brainstorm with your students to come up with a list to rank, like we did in Module 4, rather than simply providing them with a pre-created list. However, in order to try out your project ideas, brainstorm a list that you would expect your students might come up with—or a list that you will provide for them. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified in this step.

#### Tips for Creating Items to Rank

- The *Visual Ranking Tool* can accommodate a list with a maximum of 16 items. The number of characters per line is limited to 83 characters; however, if you have any list item over 37 characters, you are limited to 12 items in your list.
- Try not to have too few or too many items. With too few items to rank, teams may have difficulty seeing much of a variation when comparing lists. With too many items, teams may have difficulty ranking a large list and/or understanding the distinction between items. A good rule of thumb is to include 7–12 items.
- Short names for the items are easier to sort. The text boxes will resize to match the length of the longest item.
- Review the list to make sure that items are not too similar or overlapping (for example, in an activity that asks students to sort favorite pets, avoid including both “dogs” and “Collies”).
- Items appear in the order they are entered. Look through your list of items to see if the order conveys any unintentional bias. Entering a list alphabetically will prevent any bias from showing and will also make it clear when a list has not yet been sorted.

---

## Considering the Visual Ranking Tool for Your Unit

### Create Items to Sort

1. Use the space below to brainstorm items to sort, or go directly to direction 2 below to type your list in your Unit Plan.

---

---

---

---

---


---

---

---

---

---

-  2. In your Unit Plan, type the list of items for your practice ranking in the **Sorting List** section. Press the Enter key after each item to make it easier to paste into the *Visual Ranking* workspace.
3. If you wish, sort your list alphabetically. (See *Word Processing Skill 7.19*.)
4. Will your student teams have different criteria for sorting the items? Will they be sorting according to different perspectives? Will you be assigning a team ID to any outside guests so they can also rank the list? If so, begin thinking about the types of team ID names that would help students to identify the different perspectives when they compare their rankings. You may want to preview the directions for assigning specialized team ID names. (See *Teaching Tools, Visual Ranking Tool Skill 1.11*.)

Refer to the following skills in the Help Guide for this section:

- *Word Processing Skill 7.19: To sort or change the order of rows based on certain information*
- *Visual Ranking Tool Skill 1.11: Creating unique team names*


---

---

---

---

---

-  5. Save your document, but keep it open for the next activity.

## Module 6

### Considering the Visual Ranking Tool for Your Unit

Your facilitator will briefly demonstrate Step 2 on page 6.10 (creating a new project) and Step 3 on page 6.14 (setting up teams with the project wizard). Note Step 4 on page 6.15 for creating specialized team names to call out different perspectives or ranking criteria. Be sure to write down your practice team login information on Overview page vii or type it in the electronic file.

### Activity 3: Setting Up a Visual Ranking Project

During this activity, you create a new *Visual Ranking* project online, as well as learn how to manage the project and student teams. Use the *Help Guide* if you need assistance in completing any technology skills identified below.

#### Step 1: Creating a Visual Ranking Project from an Existing Project

If you saw a project online that you would like to use as a starting point, you can use the project wizard to copy the project's description, prompt, and sample sorting list to your Teacher Workspace. If you want to create a new project based on your own ideas, skip this step and go directly to Step 2 on page 6.13.



1. Open *Visual Ranking* from your Favorites. ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))

2. Click **Project Examples**.

3. Open the appropriate project in either **Unit Plans** or **Project Ideas**.



4. Copy the project so you can set up this project in your workspace. (See Teaching Tools, Visual Ranking Tool Skill 1.6.)

5. Edit the description, prompt, or list to rank of the project in your Teacher Workspace. (See Teaching Tools, Visual Ranking Tool Skill 1.8.)

6. Decide whether you want the correlation to appear when students compare their list with other teams. (See Teaching Tools, Visual Ranking Tool Skill 1.7.6.)



7. Save your changes.

8. After editing the project information online, copy the details into your Unit Plan.



**Note:** If you do not think the use of the *Visual Ranking Tool* will be a good fit for your unit, open the Visual Ranking Project Idea document in the *Thinking Tools, Visual Ranking Tool* folder on the Curriculum Resource CD and try out a project idea for a different unit.



9. Save your Unit Plan (or the Visual Ranking Project Idea document).

10. Return to your Teacher Workspace and click **Done**.

11. Review Step 2 to familiarize yourself with creating a project from scratch, and then go to Step 3 to set up teams.

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.6: Creating a Visual Ranking project from an existing project
- Visual Ranking Tool Skill 1.7.6: Showing correlation when students compare lists
- Visual Ranking Tool Skill 1.8: Editing a project
- Visual Ranking Tool Skill 1.11: Creating unique team names

Do not try to force the use of *Visual Ranking* when it is not a good use of time or academically warranted.

## Considering the Visual Ranking Tool for Your Unit

### Step 2: Creating a New Visual Ranking Project

Use the *Help Guide* for assistance in creating a new *Visual Ranking* project from scratch.



1. From within the Teacher Workspace, set up a new *Visual Ranking* project. (See Teaching Tools, Visual Ranking Tool Skill 1.7.)
2. Type the **Project Name**. This name could specifically reference the purpose or use of the *Visual Ranking Tool* in your overall unit. This title will appear in the *Student Workspace* and above your students' *Visual Ranking* lists. You can change the name of the project later if you wish. (See Teaching Tools, Visual Ranking Tool Skill 1.8.)
3. Under **Project Description**, type the project description that you created on page 6.08 (or copy and paste the description from your Unit Plan). This description will appear in the Student Workspace. (See Word Processing Skills 2.6 and 2.8.)
4. Type a statement or question for the project in the **Prompt for Students** box. This prompt will also be displayed on the top of the students' list to rank. (See page 6.09 or copy and paste the statement from your Unit Plan.)
5. Add your practice **List to Sort** from page 6.11 or copy and paste the list from your Unit Plan.



**Note:** Do not leave any blank rows when typing your list. If you plan on brainstorming the list with your students, you can edit your project later. Before creating a list with your students, you will need to delete this practice list and add at least two placeholder items. You will not be able to save the project without at least two items entered in the List to Sort section.

6. Determine whether you want the correlation to appear when students compare their list with other teams and make the appropriate selection. (See Teaching Tools, Visual Ranking Tool Skill 1.7.6.)

**Note:** The correlation that is displayed in *Visual Ranking*, called the Spearman Correlation coefficient, is a measure that is reserved for looking at data sets that are arranged in rank order. Any two sets of data (in this case, two ordered lists) can be compared to see to what extent they are related. The strength of this correlation varies from 0 (we can't tell at all that they are similar) to 1 (we are certain they are similar). The correlation also has a sign to indicate whether the item in list B will be in a similar position to the item in list A (a positive correlation) or in an opposite position (a negative correlation). For more information on the Spearman Correlation coefficient, see the *Visual Ranking Tool Resources* folder on the Curriculum Resource CD.

7. Submit the project.
8. The *Manage Project Teams* page will open.
9. Go to Step 3 for instructions on assigning teams.

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.7: Creating a new Visual Ranking project
- Visual Ranking Tool Skill 1.7.6: Showing correlation when students compare lists
- Visual Ranking Tool Skill 1.8: Editing a project
- Word Processing Skill 2.6: To copy words or text
- Word Processing Skill 2.8: To paste words or text in a new place



### Considering the Visual Ranking Tool for Your Unit

#### Step 3: Creating Teams IDs with the Project Wizard

The project wizard allows you to create all your team IDs and passwords at one time, using the same base word with a unique number (Team01, Team02, and so forth). The team ID identifies the different teams in the drop-down comparison box. The student teams you create will be available for future projects.

If you plan on having anyone outside of the class participate in the ranking or having your students rank using different criteria, you may want to create unique team IDs (such as florist, mother, student) to identify the perspective so that it is clear to students when they compare lists. To create unique team names, skip to Step 4 on the next page. To create multiple teams with the same perspective (or all teams with the same perspective), you can use the following steps to use the project wizard to create several (or all) teams with the same base name (such as florist1, florist2). You can always add more teams after you use the project wizard to create your initial set of teams.

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.9: Creating a new set of student teams
- Visual Ranking Tool Skill 1.14: Unassigning teams from a project
- Visual Ranking Tool Skill 1.28: Deleting a project
- Word Processing Skill 2.8: To paste words or text in a new place



1. Create new teams using the project wizard. Consider whether you want to keep the default word of Team as the base word of your team IDs. Change if desired. (See Teaching Tools, Visual Ranking Tool Skill 1.9.)

**Note:** The passwords will be the same as the team names.



2. Go to Overview page vii and write down your team IDs and passwords or use the Login Information form in the *Unit Development* folder on the Curriculum Resource CD or saved in your Project Folder.



**Note:** When you assign a team ID, you may end up changing the team members later (for example, for the next project or for the next school year). When the new members log on under that same team ID and password, they will be able to see all the work that was done by the previous team members. To clear existing work before new team members are assigned to an existing team ID, you should either delete the completed project(s) or unassign the old team IDs and reassign them. (See Teaching Tools, Visual Ranking Tool Skills 1.14 and 1.28.)

## Considering the Visual Ranking Tool for Your Unit

### Step 4: Creating Specialized Student Teams

You may want to create specialized team IDs (such as florist, mother, student, and so forth) to help students identify different perspectives or ranking criteria when comparing ranked lists.

1. Go to the *Manage Project Teams* page of your project.
2. Add a new student team with a unique team ID that identifies the team's perspective so that it is clear to students when they compare lists. (See Teaching Tools, Visual Ranking Tool Skill 1.11.)

**Note:** The *Team Members* section is an optional field.

3. Type a unique password for the team.

**Note:** You may want to keep the team ID and password the same so students can remember them more easily. If they forget their password, you can see what their password is in the Teacher Workspace. (See Teaching Tools, Visual Ranking Tool Skill 1.12.)

4. Submit the team information and the team will be added to your project as well as to your list of teams available for other projects.
5. Create at least one additional team.
6. Go to Overview page vii and write down your team IDs and passwords or use the Login Information form in the *Unit Development* folder on the Curriculum Resource CD or saved in your Project Folder.

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.11: Creating unique team names
- Visual Ranking Tool Skill 1.12: Viewing or editing team information

### Step 5: Recording Your Team ID Information

Go to Overview vii to write down the login information for your practice project or type the information in the "Login Information" document. You need one team login for you to try your ranking activity and a second team login for another teacher/team to try your ranking activity.



**Note:** The Login Information document is available in the *Unit Development* folder on the Curriculum Resource CD. You may have already saved this document into your Project Folder.

### Considering the Visual Ranking Tool for Your Unit

#### Activity 4: Trying Out Your Visual Ranking Idea

The purpose of creating a practice ranking is to test your concepts; check for different interpretations of the prompt and new avenues of thought; practice the type of discussions and questions you would ask your students; and then revise your project, prompt, and requirements, as needed. Use the *Help Guide* if you need assistance in completing any technology skills identified below.

##### Step 1: Creating a Practice Ranking

Follow the steps below to create a practice ranking. These are the same directions you would provide to your students when you are ready to have them create their own rankings. Use the *Help Guide* if you need assistance in completing any technology skills identified below.

To make the reviewing session go more smoothly, you may want to write your reviewing team login information on a sticky note or index card to give to the reviewer(s).

1. Select another teacher or team to help you rank your list. Your team will also help rank the other teacher's or team's list.
2. Share your learning objectives for this project.
3. Open *Visual Ranking* from your Favorites.  
([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking))
4. Click **Student Log-In**.
5. Type your **Teacher ID**, your practice **Team ID**, and **Password** for your practice ranking (see Overview page vii or the Login Information document) and click **Sign In**.



**Note:** All your student teams will use the same teacher ID, so you can write it on the board or on their assignment sheets. You will need to inform each team of their individual team ID and password.




6. At the same time you are completing your ranking, have the other teacher or team log in using your teacher ID and your second team's ID and password. (See Teaching Tools, Visual Ranking Tool Skill 1.2.)
7. Click the name of the project to load the *Visual Ranking Tool* with the appropriate list.
8. Rank the list. (See Teaching Tools, Visual Ranking Tool Skill 1.15.)

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.2: Logging in as a student
- Visual Ranking Tool Skill 1.15: Ranking items in a list  
1.12: Viewing or editing team information


## Considering the Visual Ranking Tool for Your Unit

-  9. Enter your rationale for the first, last, and middle two items into the appropriate comment boxes. Explain why you placed the ranked item where you did. An item's rationale should reflect the sorting criteria, as well as the item's relative placement. For example, in ranking inventions in order of how they have improved people's lives, students might write about their third choice (printing press) in relation to their second choice (computers) this way: *Information is power. Books and other printed work gave people access to information prior to computers.* (See Teaching Tools, Visual Ranking Tool Skill 1.16.)
- When sorting items objectively, students can use the item's *Comments* box to enter the data that justifies their sorting. For example, if students are asked to sort the planets by distance from the sun, they put the distance in miles in the Comments box.
  - For sorting subjectively ranked items, students enter their *justification* for where they are placing an item based on the sorting criteria.

**Note:** *Comments* boxes do not have spell check.

10. Compare your list with the list ranked by the authoring teacher or team. (See Teaching Tools, Visual Ranking Tool Skill 1.20.)
11. Look at the correlation between the two lists and discuss the differences. (See Teaching Tools, Visual Ranking Tool Skills 1.21 and 1.22.)

**Note:** If a team assigned to the project is not being used, it should be unassigned so the class average will not be skewed. (See Teaching Tools, Visual Ranking Tool Skill 1.14.)

-  12. Discuss your rankings with the other team. Ask questions to foster discussion about the other team's interpretation of the items in the lists as well as their criteria for ranking. The following questions model the types of questions you might ask your students as they work on ranking their list:
- What does this item mean to your group?
  - You put this item first/last. Why?
  - Why is this item ranked higher/lower than that one?
  - Why are these two in the middle? Why is the fourth one above the fifth one?
  - What criteria are you using to rank? Have you mentioned that in the item's comments?
  - How do you distinguish between this item and that one?
  - What did you discuss that lead you to decide...?

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.14: Unassigning teams from a project
- Visual Ranking Tool Skill 1.16: Commenting on an item
- Visual Ranking Tool Skill 1.20: Comparing lists
- Visual Ranking Tool Skill 1.21: Understanding results
- Visual Ranking Tool Skill 1.22: Understanding correlations

## Module 6

---

### Considering the Visual Ranking Tool for Your Unit

- Where would you expect Team B (group with alternate perspective) to place this item? *Why?*
  - What evidence could you supply that would convince another team to see it your way?
  - What team ranks most like you do? What team ranks most differently?
  - To what do you attribute the differences in ranking?
  - What more would you like to know about Team B's rating of this item?
  - The placement of this item is the same on both lists, but the reasons are different. What do you make of that?
  - Have any other teams influenced your thinking? How?
  - What does a tie mean in this case?
14. Decide whether you want to make any changes to your ranking based on the comparison of the two lists and your discussion.
15. Switch roles and complete a ranking for the other teacher's or team's project.

## Considering the Visual Ranking Tool for Your Unit

### Step 2: Assessing Your Practice Ranking

With the other team, take turns looking at the overall concept of each other's project, as well as the prompt and ranked list. Consider whether your practice ranking supports and begins to provide answers for the overall questions of the unit. Use the checklist below and the Project Rubric on page 2.18-2.19 to help guide your discussion. Use the comments section on the checklist to note any needed revisions.

This activity models what is necessary in your classroom. When using the *Visual Ranking Tool*, plan for self-assessment and reflection activities with your students.

#### Visual Ranking Project Reflection Checklist

Checklist	Comments
<ul style="list-style-type: none"> <li><input type="checkbox"/> The project description is focused and clear. The description provides background and/or context for how the use of the <i>Visual Ranking Tool</i> fits within the unit.</li> <li><input type="checkbox"/> The project description defines what the students will be trying to solve, produce, respond to, test, recommend, or find out.</li> <li><input type="checkbox"/> The prompt clearly indicates the criteria by which to sort.</li> <li><input type="checkbox"/> The ranking activity incorporates role play, perspectives, or contributors from outside of the classroom.</li> <li><input type="checkbox"/> A well-designed, definite reason exists for students to compare their ranking with the rankings of other teams. The students use the knowledge gained from the ranking comparisons to consider new ways of looking at the issue or to reconsider their position.</li> <li><input type="checkbox"/> The ranking and overall project require students to use higher-order thinking skills.</li> <li><input type="checkbox"/> The use of the <i>Visual Ranking Tool</i> helps students meet the learning objectives of the unit.</li> <li><input type="checkbox"/> The overall project idea meets the highest ratings of the Project Rubric on pages 2.18-2.19.</li> </ul>	

## Module 6

### Considering the Visual Ranking Tool for Your Unit

Refer to the following skills in the Help Guide for this section:

- Visual Ranking Tool Skill 1.5: Opening a Visual Ranking project in the Teacher Workspace
- Visual Ranking Tool Skill 1.8: Editing a project
- Visual Ranking Tool Skill 1.10: Adding a new student team
- Visual Ranking Tool Skill 1.11: Creating unique team names
- Visual Ranking Tool Skill 1.12: Viewing or editing team information
- Visual Ranking Tool Skill 1.17: Opening and closing a comment attached to an item
- Visual Ranking Tool Skill 1.23: Reviewing student or team work
- Visual Ranking Tool Skill 1.24: Commenting on a project
- Visual Ranking Tool Skill 1.26: Viewing a report
- Visual Ranking Tool Skill 1.27: Printing a report
- Visual Ranking Tool Skill 1.28: Deleting a project
- Web Technologies Skill x.xx: Turning off a pop-up blocker/results
- Visual Ranking Tool Skill 1.22: Understanding correlations

#### Step 3: Editing Your Project

After the discussion with your colleagues, you may need to modify the scope of the project or the prompt. To edit the project, or to practice editing a project, follow the directions below.

1. Log in to your Teacher Workspace.
2. Open the project name you want to edit, and then change any of the project information. (See Teaching Tools, Visual Ranking Tool Skill 1.5.)
3. Add or edit student team information. (See Teaching Tools, Visual Ranking Tool Skills 1.10, 1.11, and 1.12.)

#### Step 4: Reviewing Student Work

Follow the steps below to practice reviewing a student ranked list.

1. Log in to your Teacher Workspace.
2. Review the work for the desired team. (See Teaching Tools, Visual Ranking Tool Skill 1.23.)
3. Enter your comments to the team. (See Teaching Tools, Visual Ranking Tool Skill 1.24.)



**Note:** In this review mode, the ranking is fully functional. Be sure not to change any of your students' work as these changes will become permanent.

3. **Note:** You can add more than a single line of text. When you update your comments, all comments, past and present, will appear in the *Comments* section.
4. View the team's ranking of the items as well as the rationale the students entered for any of the items' ranking. View the report to show all the ranking comments in one place. (See Teaching Tools, Visual Ranking Tool Skills 1.17 and 1.26.)  
**Note:** If you have a pop-up blocker, you need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps. **Macintosh\* users:** You may be able to override a pop-up blocker by holding down the **Command** key as you click the link.
5. If desired, print the report. (See Teaching Tools, Visual Ranking Tool Skills 1.27.)

#### Step 5: Deleting a Project

Your projects will be saved until you delete them. Use this step if you copied a project into your workspace and you do not want to keep it. Delete a project within the *Manage Projects* section. (See Teaching Tools, Visual Ranking Tool Skill 1.28.)

---

## Considering the Visual Ranking Tool for Your Unit

### Activity 5: Revisiting Your Unit Plan

During this activity, you will discuss ways to implement and manage projects that use the *Visual Ranking Tool* and continue working on your Unit Plan. If you are not going to use *Visual Ranking* in your unit, continue working on other parts of your Unit Plan that need completion.

#### Step 1: Understanding Best Classroom Practices

Review the following items as you plan how best to implement your unit ideas.

##### Working in Teams

- Group students into teams of two to four. When students share their opinions about an item or convince their teammate to change a ranking, they are engaged in their learning. They are more likely to share opinions in a smaller group.
- On the road to “making thinking visible,” the tool makes thinking discussible. Students—as a team—need to make decisions, prioritize, negotiate, or seek consensus.
- Create ground rules. The most important rule is that all members of the team must agree to the placement of the items in the list. When agreement cannot be attained, students need to understand the process of consensus. Each team member must be able to justify why the item was placed where it was—why is it below a certain item, why it is at the very top, and so forth.
- You may want to put two groups together after they have ranked the same list and see if one group can convince the other group to change their rankings. See how persuasive students can be.
- Consider ways to extend the learning community. You can add outside experts, students in other classrooms or schools, parents, and others as team members in your project. Because the tool is web-based, others can contribute their rankings and join the discussion from anywhere.

##### Setting Up and Implementing a Project

- Many teachers use a whole-class activity to determine which items to sort. The process of arriving at this list can be a meaningful activity in itself. Through brainstorming and class discussion, students negotiate wording, build understanding, and decide which items are most important to include.
- The list of items to sort can be edited after the activity begins. If a new item is added or an existing item is changed, ask your students to reevaluate all of the items in the list.



### Considering the Visual Ranking Tool for Your Unit

- If you have a team that is not being used, make sure you unassign that team. If you do not remove all unassigned teams, the class average will be skewed, because all assigned teams are automatically calculated in the class average. You will want to make sure the pull-down menu only displays working teams.
- Think about how or whether to use the correlation feature in class discussions.
- Think about how to discuss the class average and its meaning.
- Set up different projects for each class. This is particularly important to ensure that the “class average” is not skewed.

#### Comparing Rankings

- Give students a reason to compare their lists. Part of the power of the *Visual Ranking Tool* is that it allows students to make comparisons.
- Have two teams negotiate to get their lists more similar. You could include a requirement that the teams reach at least a “moderate” correlation between their lists.
- Ask teams to reflect on why they think their lists differ from the class average.
- Use the class average as the pooled wisdom of the group. This could lead to a discussion of why taking an average is or is not “fair.”
- Have students identify the team whose list is most different (that is, the lowest correlation) from their own. Have the teams review each others’ comments to determine whether they are using the same criteria to make decisions about rankings.

#### Reflecting on Learning

- Have teams discuss the differences in their rankings.
  - Ask teams to reflect on why they think their lists differ from the class average.
  - Have students identify the team whose list is most different (that is, the lowest correlation number) from their own. Have the teams review each others’ comments to determine whether they are using the same criteria to make decisions about rankings.
- Look at how opinions change over time. Consider projects where comparisons with earlier lists can lead to reflection on learning. One way to accomplish this is to compare teams over time by creating a new team name for each revised ranking. For example, the Red team might have a team name of Red1 for the activity at the beginning of a project and a team name of Red2 for the activity at the end. Their password can be the same for each.

---

## Considering the Visual Ranking Tool for Your Unit

- As students are ranking, be ready to listen, question, and direct their efforts. Ask questions to foster discussion about their interpretation of the items in the lists and their criteria for ranking. Encourage students to write what they are thinking and discussing in the comments field associated with each item. See sample questions from your practice ranking on page 6.17.
- Use the *Show Report* feature to print a team's current thinking in order to compare it to a previous or future ranking.

### Using Multiple Methods of Assessment Throughout the Project

The *Visual Ranking Tool* provides multiple opportunities to monitor student progress and learning during a project, as well as assess final products and performances. An effective unit plan will include assessment that provides explicit expectations and methods for students to demonstrate their learning, promote student self-management, and allow for teacher monitoring of progress.

- Assess students using multiple forms:
  - Multiple assessors—such as the students themselves, peers, the teacher, and mentors
  - Multiple units of assessment—such as individual students, groups, the whole class
  - Multiple formats—such as written work (formal assignments and informal journal entries), observations (of group activities and individual work), presentations, informal discussions and questions, project designs, and the final media product
- Ask your students at the beginning of a project to rank what they think is important in assessing the project. Their data will provide you with a good starting point for discussions about assessment.
- Require students to complete daily journal entries, learning logs, essays, or other written reflection activities for regular monitoring of progress during the project.
- Set aside time for team progress reports and ask students to discuss what is working, what needs improvement, and what are the next steps.
- Assess how student opinions, attitudes, or beliefs change over the life of a project by having your students rank a list at the beginning of the project and again at the end. After students complete each ranking, they can use the print feature of the list to copy and paste the report into a document. Have them analyze and explain the changes in their thinking that becomes part of a portfolio.

## Module 6

---

### Considering the Visual Ranking Tool for Your Unit

- Use the data contained in the items' *Comments* boxes of a team's list as a rich source of assessment information. You will have a record of the degree to which students applied criteria to their rankings, the logic they used in resolving equally strong justifications for a ranking, and even their reflections on their work.
- Use your Teacher Workspace to make comments, ask for information, and enter your own reflections in a comment dialog between you and each student team.
- Assess lists directly that are sorted according to objective criteria. If you want students to self-assess, you can add an "answer key" team to the project and sort that list in the correct order. The correlation of students' lists to the "answer key" list will give a good indication of how close each team was to the correct ranking, but should not be used for grading purposes.
- Set up a role-play, experiment, scenario, or other hands-on activity to assess skills and knowledge.
- Use debates, interviews, or oral presentations to uncover the depth of students' understanding and comprehension.
- Have students create a final project, such as a presentation or publication, that analyzes, evaluates, and proposes new action based on the use of the online thinking tools and the students' corresponding research.

Some of the information above is modified from:



#### **Rubric to Assess a PBL (Project-Based Learning) and Rubric**

[www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)

#### **Project Based Learning with Multimedia**

Originally from: <http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html>

(link no longer active)

---

## Considering the Visual Ranking Tool for Your Unit

### Step 2: Revising Your Unit Plan

Considering the information in the previous step and what you have learned through your practice ranking, revise your ideas for your Unit. Step back from just the use of the *Visual Ranking Tool* and sketch out the larger picture of the overall unit.

1. Open your Unit Plan.
2. Revise the **Visual Ranking Project Name, Project Description, Project Prompt, and Sorting List**, if needed.
3. Consider whether additional standards or learning objectives could be targeted in your Unit. Revise the **Standards or Learning Objectives**, if necessary.
4. Review your **Curriculum-Framing Questions** and revise if necessary.
5. Considering the ideas on the previous two pages about ongoing assessment, in the **Assessment Summary** section, add your ideas for how you would assess the learning during the unit. Revise the **Timeline** section, if needed.
6. In the **Procedures** section, draft the activities that will occur in the classroom that lead up to, include, and follow the use of the thinking tools and assessments.
7. Draft or outline the **Unit Summary** by briefly describing your ideas for the overall unit. Include your general concept of the whole unit, not just the activity that will use the *Visual Ranking Tool*. Explain the main task, scenario, or challenge you will use to engage your students.



8. Save your work.

### Considering the Visual Ranking Tool for Your Unit

#### Activity 6: Sharing Your Results

If you are using a wiki, create another entry to reflect on and share your experience with the *Visual Ranking Tool*. Review and provide feedback to one or two other colleagues that you have not reviewed earlier. If you are not using a wiki, share in small groups.



1. Go to the wiki site for this course and log in.

**Note:** The URL and login information may be written down on Overview page vi or in your login Information document.

2. Use the following questions to help you reflect on your use of *Visual Ranking*.
  - Did you try out an idea for your main unit or for a different project idea?
  - Considering your test results, do you think you will keep this tool in your Unit Plan?
  - How do you see the use of the *Visual Ranking Tool* fitting in with the objectives and standards you are trying to target—and your overall plan for your unit? How will the use of this tool help students meet those requirements?
  - How do you see the *Visual Ranking Tool* enhancing your students' higher-order thinking skills, as well as collaboration and communication in your classroom?
  - What questions do you still have about this project's design, implementation, or assessment?



3. Save your wiki page.

4. Review one or two other wiki entries from colleagues you have not reviewed before.



5. Provide suggestions and feedback on their ideas, concerns, or questions.

---

## Considering the Visual Ranking Tool for Your Unit

### Extension Activity: Finalizing Your Visual Ranking Project

The following resources are available to you for self-study or as an optional extension within your course.

If you anticipate that this *Visual Ranking* project will be implemented for your unit because it is a good fit for the unit's objectives, complete any unfinished elements of your *Visual Ranking* project. Include appropriate references, comments, and analysis in your student sample that you would expect your students to include in their *Visual Ranking* projects. Make any necessary edits to the project itself, if necessary.



1. Go to: [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
2. Click **Teacher Workspace** or **Student Log** in depending on whether you need to edit the project parameters or your sample student project.
3. Enter the login information, which may be written down on Overview page vii or in your login Information document.
4. Make any necessary additions or changes.



5. Save your changes.

### Considering the Visual Ranking Tool for Your Unit

#### References

Assessing student work with project-based learning. (1997–2001). *The multimedia project: Project-based learning with multimedia*. Retrieved from San Mateo County Office of Education Web site: <http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html>

*Guidelines for reviewers*. (n.d.). Retrieved from University of Delaware, Problem-Based Learning Clearinghouse Web site: [www.udel.edu/pblc/reviewers](http://www.udel.edu/pblc/reviewers)

*Rubric to assess a PBL and rubric*. (n.d.). Retrieved from Innovative Designs for Education Web site: [www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)

---

## Considering the Visual Ranking Tool for Your Unit

### Module 6 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

#### Module 6 Key Points:

- The *Visual Ranking Tool* helps to develop students' collaboration, cooperation, and persuasion skills, as well as their ability to analyze, evaluate, and prioritize information—often with consideration of different perspectives.
- The *Visual Ranking Tool* provides an opportunity to extend the learning community by adding outside experts, students in other classrooms or schools, parents, and others as team members in a project.
- A team's verbal and written explanations for a ranking may be useful to determine the depth of understanding. Questions should be a part of the process to foster discussion about list item interpretations and ranking criteria. Ongoing assessment throughout a project is essential.

#### Accomplishments:

- Integrated the use of the *Visual Ranking Tool* into a unit or project idea
- Used a wiki to document the evolution of my unit ideas and use of *Visual Ranking*
- Completed a practice ranking
- Revised my project and overall unit based on feedback and reflection

In Module 11, you will make your final decisions regarding which thinking tools would best meet your unit's learning objectives for your students.





---

 Using the Seeing Reason Tool to Target Thinking Skills

## Activities

### Activity 1: Looking at Seeing Reason in Action ..... 7.01

**Review:** Your *Seeing Reason* map

**Analyze:** A unit that uses *Seeing Reason*

### Activity 2: Digging Deeper into Cause and Effect ..... 7.06

**Discuss:** Causal maps and cause-and-effect relationships

**Review:** Benefits of the *Seeing Reason Tool*

### Activity 3: Viewing Project Ideas ..... 7.14

**Review:** Thinking skills supported by the *Seeing Reason Tool*

**View:** Sample projects

**Brainstorm:** Project ideas that could incorporate *Seeing Reason*

### Activity 4: Clarifying Project Ideas for Using Seeing Reason ..... 7.20

**Review:** The needs of your unit

**View:** Sample project descriptions

### Activity 5: Sharing Your Ideas ..... 7.25

**Discuss:** Your ideas for using *Seeing Reason* in your classroom

### Activity 6: Planning Your Project ..... 7.26

**Create:** A project description and research question

**Set up:** A *Seeing Reason* project online

### Extension Activity: Understanding Best Practices with Seeing Reason ..... 7.31

**View:** Strategies and project ideas for using the *Seeing Reason Tool*

### References ..... 7.32

### Module Summary ..... 7.33



## MODULE 7

# Using the Seeing Reason Tool to Target Thinking Skills

**Description:** Causal mapping helps develop communication, thinking, and collaboration skills. In this module, you discuss the benefits of using the *Seeing Reason Tool*, view project ideas, and brainstorm ways to integrate *Seeing Reason* into your own classroom project.

## Activity 1: Looking at Seeing Reason in Action

### Step 1: Taking a Look at Your Seeing Reason Map

In this activity, you analyze the benefits of *Seeing Reason* from a teacher's point of view. Recall how you returned to the map several times in the previous modules. View how your team's thoughts evolved through those first few modules of the course.



1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Teacher Workspace**.
3. Enter the **Login ID** and **Password** provided by your instructor to view your map from the **Teacher Workspace**. Click **Login**.
4. Open your team's current active map for the **Thinking** project.



**Note:** In this review mode, the maps you view are fully functional. Any changes you make will be saved.



5. View your team's map in print mode. The most recent map that your team saved is displayed. (See Teaching Tools, Seeing Reason Tool Skill 2.25.)
6. View the map and descriptions of the factors and the relationships.
7. To see how your team's thoughts have evolved through the project, view the Portfolio. (See Teaching Tools, Seeing Reason Tool Skill 2.33.)

**Note:** If you have a pop-up blocker, you need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps. **Macintosh\* users:** You may be able to override a pop-up blocker by holding down the **Command** key as you click the link.

The facilitator will provide his or her teacher login ID and password that was used to set up the *Seeing Reason* project for the course.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.25: Viewing the most recent map and factor information from the Student Workspace
- Seeing Reason Tool Skill 2.33: Viewing and printing all maps in a Portfolio

### Using the Seeing Reason Tool to Target Thinking Skills



8. With your teams, review the differences in your maps, and then discuss the following questions as a whole group:
- How did your maps change?
  - How have your maps shown a progression in thinking?
  - Did this cycle of revisiting the maps increase deeper understanding?
  - How do you see this tool being beneficial in the classroom?
  - Most projects do not require your students to return to the map as many times as you did in the previous modules, but what benefits do you see in having students investigate in cycles of evidence gathering, map building, and reflecting?

#### Step 2: Examining a Unit that Uses Seeing Reason

Now that you have used the *Seeing Reason Tool*, take a look at how this tool could be used in a classroom. Explore the Unit Summary, Curriculum-Framing Questions, and procedures for the *Ecology Explorers* unit in Appendix G.04.

- Underline or highlight areas that specifically address complex systems or cause-and-effect relationships. How does the *Seeing Reason Tool* help to support those kinds of concepts?
- Notice the kind of guiding questions the teacher plans to use to help students better understand the intricacies of a balanced ecosystem. What can you do in your classroom to ensure that your students stay on track when they are more directly responsible for their own learning?
- What kinds of questions does the teacher ask to help the students reflect more deeply on their thinking and decision making process?
- How does collaboration in this unit enhance student learning?
- What methods of assessment are used in this project? How do these assessment methods help the students and the teacher?
- Review the Curriculum-Framing Questions. How does the *Seeing Reason Tool* help students find answers to the Unit Questions and begin to understand the Essential Question?

#### Notes:

---

---

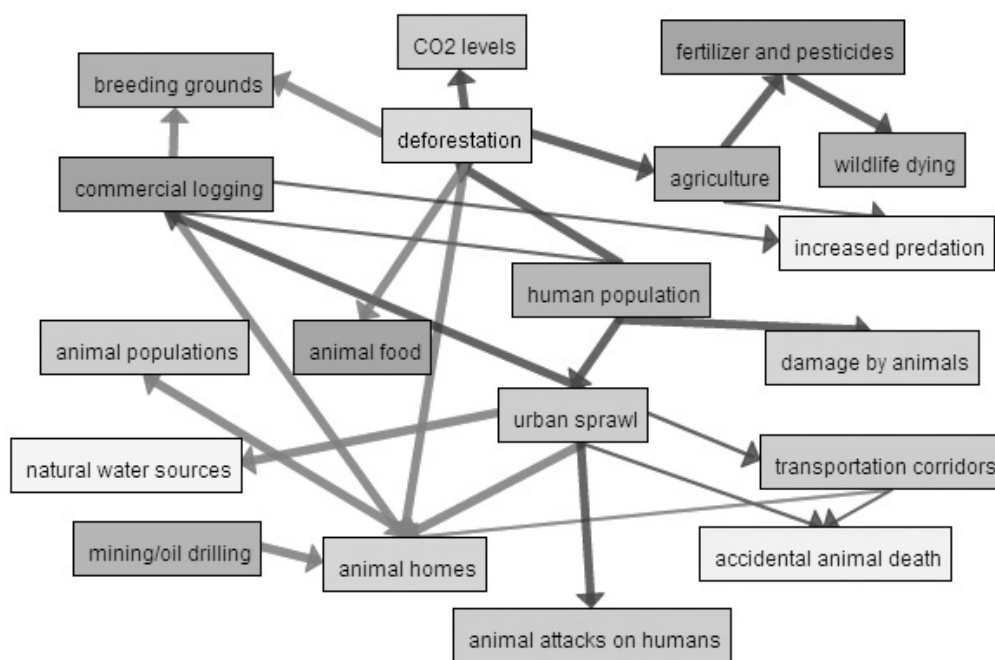
---

Using the Seeing Reason Tool to Target Thinking Skills

To view live versions of the maps in this unit, view the unit on the Intel® Education Web site.



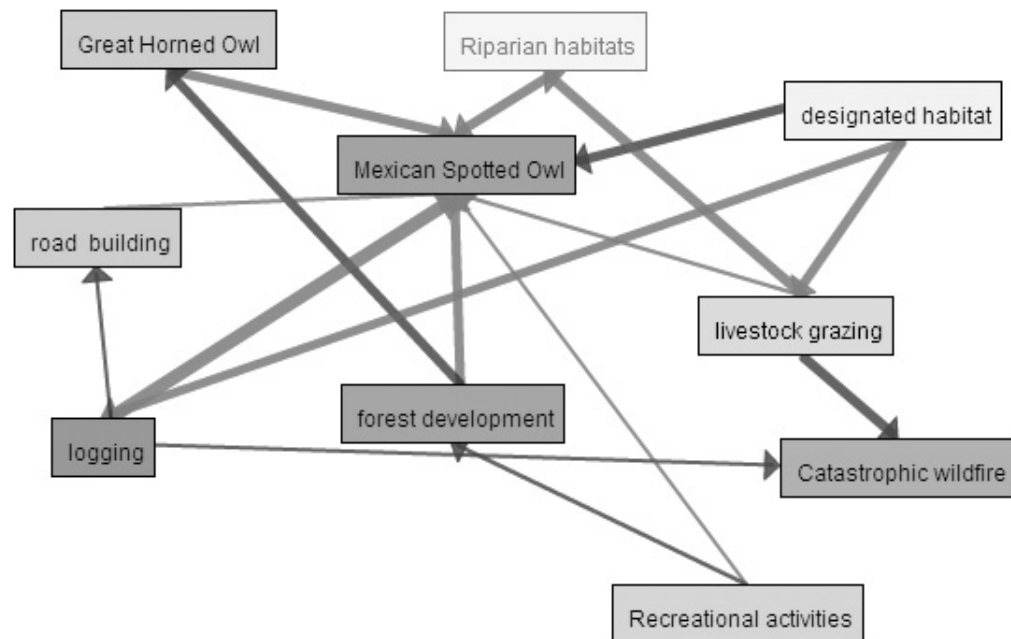
1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Project Examples**.
3. Click **Unit Plans**.
4. Click **Ecology Explorers**.
5. Scroll down to view the first map in the unit that answers the question, *What happens when human and animal habitats overlap?*



## Module 7

### Using the Seeing Reason Tool to Target Thinking Skills

6. The *Seeing Reason Tool* does not show loose associations, like a concept map. *Seeing Reason* shows direct cause-and-effect relationships. Double-click various factors and relationships on the first map in the Ecology Explorers unit to view their descriptions.
  - At first glance, the relationship between agriculture and increased predation may seem unclear. When you double-click the relationship arrow, how does the description clarify that causal relationship? Is it valid?
  - Double-click the relationship arrow between deforestation and CO2 levels. Does the explanation provide evidence that the student team understands the process of the Oxygen-Carbon Cycle?
  - Read the description of the relationship between urban sprawl and commercial logging. Is this a direct causal relationship?
7. Scroll down to view the second map in the Ecology Explorers unit that answers the question, *What influences the biological success of your specific species?*



## Using the Seeing Reason Tool to Target Thinking Skills



8. Double-click some of the factors and relationship arrows to view the descriptions, evidence, and explanations of the strength of the causal relationships. Discuss the questions you would have for the student team who created this map. Consider the following as you review the map:
- How did the student team provide support or evidence that the causal relationships are valid?
  - Are you concerned with the ability to measure or observe any of the factors?
  - Do you have questions about the evidence or descriptions they are using for any of the factors or relationships?
  - Do you have questions about any of the causal relationships that this team has created?
9. What kinds of questions would you ask if the following factors and relationships were added to this map?
- As **weather** increases, catastrophic fire decreases (Explanation given: If it rains a lot, fires won't have a chance to spread)
  - As **human population** increases, the Mexican Spotted Owls decrease. (Explanation given: The more people there are, the less room there is for the owls.)



**Note:** Additional information about causal fallacies and relationships that are not causal is available in the *Thinking Tool, Seeing Reason Tool* folder on the Curriculum Resource CD.

The proposed factors in item 9 include certain causal fallacies:

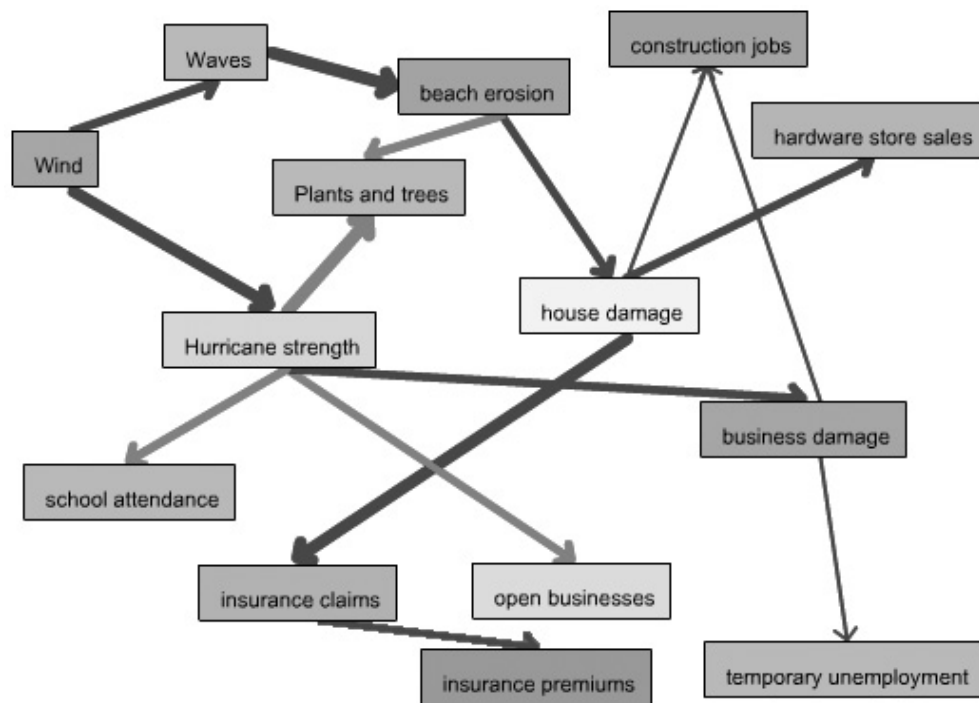
- Weather factor — Weather does not increase or decrease. Weather describes the current state of the atmosphere. A more precise word is needed for the factor.
- Human population factor — The increase in humans does not directly impact animal populations. The team should be asked what it is about increasing human population that impacts the Mexican Spotted Owl populations. There are intermediary factors that should be included.



## Activity 2: Digging Deeper into Cause and Effect

### Step 1: Understanding Causal Maps

As we saw in the *Ecology Explorers* unit, the *Seeing Reason Tool* helps students create causal maps that have one specific purpose—to visually represent specific, measurable, or verifiable factors that influence or impact a problem or system. Through causal mapping, students describe how, and to what degree, factors affect one another. Mapping helps students represent their understanding as they investigate the nature of problems that require thinking about cause and effect. The following example investigates how hurricanes affect people, land, and businesses.



A causal map has the visual elements of a concept map but places explicit meaning on each element in the map. Boxes contain factors with linked arrows. Links between the factors depict causal relationships and show an increase or decrease in the intensity of the effect by the thickness and color of the connecting lines. This is very important to causal mapping because it means students can interpret the map through its visual structure.

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Step 2: Understanding Cause and Effect

Many concepts are better understood when their causes and effects are known and clearly identified. The cause explains why something happens. The effect describes what happens. In cause-and-effect relationships, you can say:

Because of X, Y happens

**or**

X affects Y

**or**

X results in Y

**or**

Y is caused by X

Examples of cause-and-effect relationships:

- Because of the moon's gravitational pull, tides occur.
- The amount of light given to a plant affects its growth.
- Dumping chemical waste in a river results in polluted water.
- An unattended campfire started a forest fire.

Map building is needed when investigating a complex problem or issue that involves multiple influences that impact the outcomes in a system. For instance, the simple statement above, an unattended campfire started a forest fire, may actually involve more complex issues than the statement implies. Intermediary factors may need to be investigated when determining all factors that contributed to the cause of the forest fire, such as drought, weather conditions, forest management policies, campground safety issues, fire safety education, and so forth. When students revise maps, encourage them to re-examine how direct relationships are between two factors. For example, does drought directly cause fire? Other factors may be involved between drought and fire.



### Using the Seeing Reason Tool to Target Thinking Skills

#### Helping to Identify Cause-and-Effect Relationships

When discussing cause and effect with your students, you may want to talk about words that signal a cause-and-effect relationship. Review the words in the following table for ideas.

Words that may signal a cause	Words that may signal an effect
as a result of	so
reasons for ... are	then
because	therefore
if	resulting in
in that	leads to
since	for this reason
for	consequently
after	as a consequence
due to (the fact)	hence
when	thus
	accordingly
	nevertheless
	is necessary for/to

Contributed by Ruth Sunda



**Note:** Synonyms for the words *cause* and *effect* are available in the *Thinking Tool, Seeing Reason Tool* folder on the Curriculum Resource CD.

Students often confuse the words *affect* and *effect*. You may need to clarify the use of these two words.

**Affect** (verb) means to influence.

Examples:

- Laura's lack of sleep affected her science test grade.
- The wheat crop was adversely affected by the drought.

## Using the Seeing Reason Tool to Target Thinking Skills

**Effect** (noun) means the result.

Examples:

- The negative health effects of cigarettes are well-known, but people still smoke.
- Poor grades are often the effect of not studying.

For additional teaching strategies and Web resources for helping students understand cause and effect, visit:



### Cause & Effect

[www.literacymatters.org/content/text/cause.htm](http://www.literacymatters.org/content/text/cause.htm)



**Note:** Information about causal fallacies and relationships that are not cause and effect can be found in the *Thinking Tool, Seeing Reason Tool* folder on the Curriculum Resource CD.

### Step 3: Helping Students Understand Causal Relationships Using the Seeing Reason Tool

Before students work on the “real” causal map for the project, have them practice on a simple causal map. This will help them to better understand cause and effect, as well as become familiar with the *Seeing Reason Tool*. An easy way to practice with a map is to go to *Seeing Reason* and use the sample map.



1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Try the Tool**.
3. On the page that opens, click **Demo**. (See Teaching Tools, Seeing Reason Tool Skill 2.1.1.)
4. You can use the sample map about traffic jams to help your students understand the meaning behind the visual construction of the map. Have students use the Intel® Education *Help Guide* as needed to understand how to use the *Seeing Reason Tool*.
  - Double-click factor boxes and relationship arrows to read their descriptions.
  - As a whole group, discuss factors that could be added to the map.
  - Add factors and relationships to the map and type more detailed explanations in the description fields.

This step is a brief review of *Seeing Reason* for you, but provides details on how you can introduce *Seeing Reason* to your students.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.1.1: Viewing a Seeing Reason demonstration
- Teaching Tools, Group 2: Seeing Reason Tool

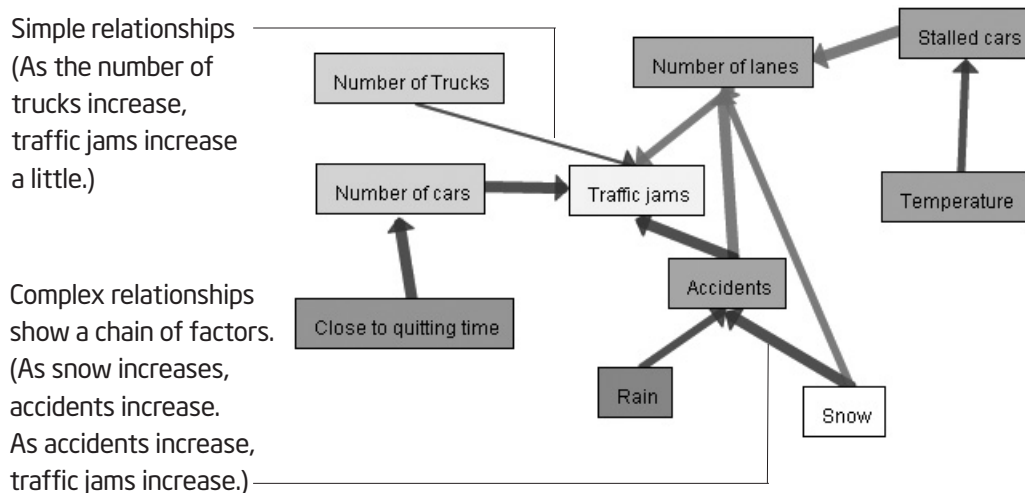
## Module 7

### Using the Seeing Reason Tool to Target Thinking Skills

#### Discussing the Traffic Jam Map With Your Students

This section presents one way of demonstrating to your students how to read a causal map and use the features of the *Seeing Reason Tool*.

The sample traffic jam map on the *Seeing Reason* site (also shown below) shows one student team's ideas of the cause-and-effect relationships involved in traffic jams. The map has both simple relationships (for example, As the number of trucks increase, traffic jams increase) and complex ones that show a chain of factors (for example, As snow increases, accidents increase; and as accidents increase, traffic jams increase).



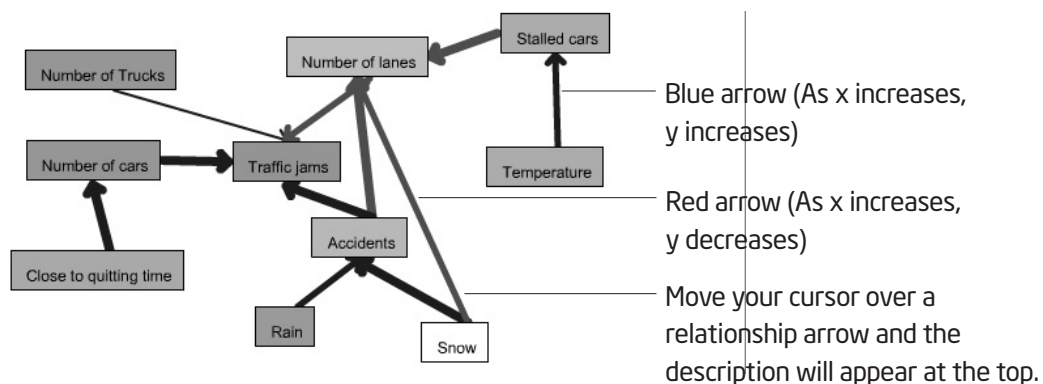
On the causal map above and on the next page, notice the arrows of varying thicknesses.

- Thicker arrows show a stronger relationship.
- Thinner arrows show a weaker relationship.
- Blue arrows indicate positive relationships (as x increases, y increases).
- Red arrows indicate negative relationships (as x increases, y decreases).

When you use your cursor to point to a relationship arrow, the description of the relationship appears at the top of the map below the toolbar. When you double-click an arrow, the full relationship description displays in a dialog box. Students will use the dialog box to present a theory of the causality of the relationship (in an early map) or provide evidence to support a claim, including sources of information, such as Web sites, specific bibliographic citations, quotations, lab results, and so forth (in later revisions).

## Using the Seeing Reason Tool to Target Thinking Skills

By double-clicking a factor box, you can view the full factor description that could include a more detailed description or definition of the factor, a description of how the factor is measured or quantified, sources or Web addresses for information on that factor, and so forth.



Scroll down below the map to view the *Comments* box. This feature allows students to communicate with other team members when they are working on the map independently, as well as to communicate with the teacher to discuss questions, problems, insights, or recent updates. Teachers can use the *Comments* feature to ask questions of the student teams to help students clarify and evaluate their thinking, question their assumptions, and broaden or narrow their focus.

**Comments:**

**Add a New Comment:**

Update Comments   Clear All Comments

Both teachers and students can use the **Add a New Comment** area to discuss topics involving the causal map.

**Note:** If you are interested in seeing how this practice map can be part of a larger classroom project, see the tutorial section of the *Seeing Reason* Web site.

## Module 7

### Using the Seeing Reason Tool to Target Thinking Skills

You have had enough practice with the *Seeing Reason Tool* to understand how to use it. This section is included only as an example for how to introduce the *Seeing Reason Tool* to students. You do not need to complete this part of the activity.



#### Having Your Students Create a Practice Map

Direct your students to go to *Try the Tool* section of *Seeing Reason*. In partners, have your students investigate a question that does not require much prior knowledge, such as “What affects a student’s grades?” Provide the following instructions. Use the Intel® Education *Help Guide* as needed to complete any technology skills identified below.

1. Clear the map for the demo map. (See Teaching Tools, Seeing Reason Tool Skill 2.1.1.)
2. Add factors and relationships that explore the causes of student grades. As you create cause-and-effect relationships, remember that the first factor in the equation always *increases*. This approach is necessary to enable students and teachers to accurately interpret the maps visually. Below are some examples of how to change a *decreases* statement into an *increases* statement. (See Teaching Tools, Seeing Reason Tool Skills 2.15 and 2.20.)

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.1.1: Viewing a Seeing Reason demonstration
- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.16: Adding or changing the color of an existing factor
- Seeing Reason Tool Skill 2.20: Adding a relationship

Inappropriate Wording for Seeing Reason	Appropriate Wording for Seeing Reason
As attendance decreases, grades decrease.	As absenteeism increases, grades decrease.
As parent involvement decreases, grades decrease.	As parent involvement increases, grades increase.



**Note:** The choice of colors for the factors is determined by the map creators. If working in a team, you may want to have a discussion with your team member(s) about whether the colors of your factors will have any special meaning. (See Teaching Tools, Seeing Reason Tool Skill 2.16.)

3. Students can use the *Help Guide* or the **Need help?** link at the top right of the map for further instruction.

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Step 4: Viewing the Benefits of the Seeing Reason Tool

Now that you have dug deeper into a unit that uses the *Seeing Reason Tool* and gained a better understanding of ways to help students understand cause and effect, review the benefits of using *Seeing Reason* in the classroom.

#### Benefits of the Seeing Reason Tool

##### Students:

- Learn the tool easily and begin identifying and organizing factors and relationships right away
- Focus on important content instead of the “bells and whistles” of a tool
- Show their thinking processes, which provoke discussion among students and between students and teachers
- Use the Comments feature to communicate progress
- Apply mathematical reasoning and understanding through using logic, critical thinking, and visually representing direct and inverse relationships
- Use precise language as they identify causal factors and explain the evidence that support the relationships
- Develop investigation skills
- Easily save work and can insert maps into other documents or presentations

##### Teachers:

- Can view every version of each team’s maps to see the changes and progression of their thinking, ideas, and research
- Identify important project milestones and have students save maps in a Portfolio



Using the Seeing Reason Tool to Target Thinking Skills

Activity 3: Viewing Project Ideas

During this activity, you identify the components of a good project, view examples, and brainstorm some ideas for integrating the *Seeing Reason Tool* into your unit.

Step 1: Reviewing the Power of the Seeing Reason Tool

In Module 4, you used Bloom’s Taxonomy to consider the types of thinking that the *Visual Ranking Tool* supports. Another model, Costa and Kallick’s Habits of Mind, shows the range of thinking that could be supported by the *Seeing Reason Tool*.

Uses of Seeing Reason Classified by Costa and Kallick’s Habits of Mind	
Thinking and Communicating with Clarity and Precision	<ul style="list-style-type: none"><li>▪ Communicating ideas clearly in writing, verbally, and visually, (for example, writing detailed explanations of factors and relationships, discussing the causal relationships with a partner or teacher, and arranging and color-coding factors and their causal relationships so that they can be understood visually)</li><li>▪ Using precise language to accurately communicate complex concepts (for example, creating factors and relationships that fit in the linguistic form of the tool)</li></ul>
Creating, Imagining, and Innovating	<ul style="list-style-type: none"><li>▪ Creating representations of and understanding patterns in complex systems (for example, creating and arranging factors in new ways to model a novel approach to visualizing a complex issue)</li><li>▪ Conceiving new solutions to problems by examining alternate possibilities (for example, using the information gained from the <i>Seeing Reason Tool</i> to create solutions to a problem)</li></ul>

## Using the Seeing Reason Tool to Target Thinking Skills

Uses of Seeing Reason Classified by Costa and Kallick's Habits of Mind	
Thinking Flexibly	<ul style="list-style-type: none"> <li>Examining possibilities from many angles (for example, using the <i>Seeing Reason Tool</i> to explore all the possible factors involved in the cause of a particular effect)</li> <li>Changing one's thinking and opinion about a topic or issue when confronted with new and/or conflicting information (for example, using the <i>Seeing Reason Tool</i> to help develop understanding over time; allowing for and supporting map changes as new information is received)</li> </ul>
Striving for Accuracy	<ul style="list-style-type: none"> <li>Supporting ideas with specific, relevant, measurable, and accurate evidence (for example, providing specific data to clarify the meaning of factors or relationships)</li> </ul>
Thinking Interdependently	<ul style="list-style-type: none"> <li>Thinking with others to contribute to a better understanding of an issue (for example, all members of a team work together to find and make sense of evidence, determine factors, and explain relationships)</li> </ul>
Remaining Open to Continuous Learning	<ul style="list-style-type: none"> <li>Building on initial ideas to obtain greater understanding of complex systems (for example, returning to add factors and relationships to a Seeing Reason map after research and fact-gathering)</li> </ul>
Thinking About Our Thinking	<ul style="list-style-type: none"> <li>Planning for, reflecting on, and evaluating the quality of one's own thinking skills and strategies; reflecting on the map for the purpose of self-evaluation (for example, supporting reflection through the Comments feature and self-reflective activities tied to the various iterations of the map)</li> </ul>

### Using the Seeing Reason Tool to Target Thinking Skills

The *Seeing Reason Tool* provides students with the ability to hypothesize, research, and draw preliminary conclusions about how some part of the world operates. Using the *Seeing Reason Tool*, students:

- **List Factors**—In teams of two or more, students discuss and create factors that are related to their problems. They create these factors on a Seeing Reason map and add descriptions of the factors. The teacher talks with the students, using probing questions, to help them develop their hypothesis. .
- **Show Relationships**—As students talk through the relationships among the factors, they show those relationships on their maps by connecting factors with arrows. Both simple relationships (for example, As the number of cars increase, traffic jams increase) and complex relationships (for example, As snow increases, accidents increase, and as accidents increase, lanes decrease) are shown. When students add relationships, they describe how the relationship works and what evidence would prove whether the relationship is valid.
- **Investigate and Revise**—After students have a map that shows their initial reasoning about a problem, they test and research their ideas. Armed with new data, the teams modify their maps to reflect changes of opinion based on new knowledge.
- **Present Findings**—When students have finalized their maps and researched and obtained evidence for their findings, they decide how to best present the information.

Students can express understanding of cause and effect without technology, but the *Seeing Reason Tool* is powerful because it enhances reasoning and communication. When students discuss, represent, and defend the ideas on the maps, their understanding deepens. When teachers examine changing maps, they find opportunities to interact with students and guide their learning.

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Step 2: Understanding What Makes a Good Project

A good project that incorporates the *Seeing Reason Tool* grows out of a real-world problem with complex relationships. *Seeing Reason* helps students sort through complex relationships. For student investigations, a problem is best framed in the form of an open-ended question or problem statement that requires higher-order thinking skills. The tool supports cycles of investigation where students gather what they know, organize that knowledge into a map, investigate whether their initial concepts are supported by evidence, revise their maps, and then use their new understanding to make decisions and plans of action to answer questions of the larger project.

When designing a project that incorporates the *Seeing Reason Tool*, consider the following project characteristics:

- **The project is complex, preferably connecting to real-world problem-solving.** The *Seeing Reason Tool* is a useful tool when investigating multiple influences (factors) that impact other outcomes in a system. The context should have sufficient complexity; that is, it should have a high level of interaction among the factors. From the students' initial investigations, which are supported by the *Seeing Reason Tool*, students develop further plans of action, decisions, or conclusions to answer the larger questions of the project.
- **The project has a meaningful research question that requires investigation of an issue or concept involving cause and effect.** The research question is the direct question that students answer in their causal maps. This question must be open-ended so that students are challenged to explore many possibilities. The question should be designed to capture student interest, encourage in-depth discussion and research, and set the stage for further questioning. The research question and the resulting investigation provide a foundation for students to answer the larger questions or issues of the project.

For example, the question, *What causes ice?* would probably produce a map with relatively few factors and fairly direct relationships. However, the additional factors and relationship complexity found in answering, *What is causing the north and south poles to melt?* would justify the need for map building. This question, in turn, would help students understand the larger problem of how to prevent unnatural climactic changes, allowing students to continue their research and develop recommendations based on their initial assessments of the effects on climate.

- **The problem is influenced by factors that can be measured, observed, or verified.** When students must limit factors to ideas they must prove in some way, they are required to think carefully and critically about cause and effect.

## Using the Seeing Reason Tool to Target Thinking Skills

- **The project is interdisciplinary.** A good project can be studied from many disciplines. For example, while a social studies teacher might design a project that looks at the causes and effects of the Irish potato famine from a historical perspective, an interdisciplinary approach might include a variety of student project choices about the Irish potato famine, such as researching the resulting literature and music of the period, the repercussions in the worldwide economy, or the effects of the redistribution of population.

### Step 3: Viewing Sample Projects

In this step, view and discuss sample projects that use the *Seeing Reason Tool*.



1. Open Seeing Reason from your Favorites.  
([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Project Examples**.
3. Review example projects for ideas on how the *Seeing Reason Tool* can be integrated into a project.

**Note:** See additional project ideas starting on Appendix C.03. The sample project plan, *Ecology Explorers*, is available starting on Appendix F.01. Articles about two units that integrate *Seeing Reason* are available in the *Seeing Reason Tool Resources* folder on the Curriculum Resource CD.



4. Discuss how a project that uses the *Seeing Reason Tool* can help develop students' thinking. Share your ideas with the group.

#### Notes:

---

---

---

---

---

---

---

---

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Step 4: Thinking About Your Unit

Brainstorm some ideas for effective uses of *Seeing Reason* for your unit. Be sure to select topics that have strong cause-and-effect components that can be developed into a project. You may also want to refer to the Project Rubric on page 2.18-2.19 to help clarify your ideas.

**Remember:** When developing a project that involves cause and effect, be sure that elements of the project can be measured, observed, or verified. Also consider whether the project is complex enough to warrant using the *Seeing Reason Tool*.

**List possible content topics:**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Activity 4: Clarifying Project Ideas for Using Seeing Reason

#### Step 1: Reviewing the Needs of Your Unit

Before determining a possible use for the *Seeing Reason Tool* in your unit, review your targeted higher-order thinking skills, standards, and learning objectives. Compare them with the thinking skills that would be supported by *Seeing Reason*.

1. Open your Unit Plan.
2. Review your Habits of Learning Taxonomy.
3. Review the standards identified in your Unit Plan and note those standards that could benefit from *Seeing Reason*. If the standards are not already highlighted in a color specific for *Seeing Reason*, you may want to highlight them now or identify them beside the key words listed below.

- affect \_\_\_\_\_
- cause \_\_\_\_\_
- effect \_\_\_\_\_
- impact \_\_\_\_\_
- influence \_\_\_\_\_
- inspire \_\_\_\_\_
- produce \_\_\_\_\_
- result \_\_\_\_\_
- system \_\_\_\_\_
- other: \_\_\_\_\_
- other: \_\_\_\_\_



**Note:** In your search of the standards, do not be limited by these key words. You may need to look for the hidden opportunities for higher-order thinking, especially if your state's standards focus mainly on very specific knowledge-based tasks or understanding.

---

## Using the Seeing Reason Tool to Target Thinking Skills

4. Review your learning objectives and identify which objectives could be supported by *Seeing Reason*. You may want to highlight them in your Unit Plan or identify them below.

---



---



---

5. Consider how the learning objectives for the sample project descriptions on the following pages (and in Appendix C) would be supported through using *Seeing Reason*. Keep your standards and objectives in mind as you think about your own project.



**Note:** If you do not believe *Seeing Reason* is a good fit for your unit, you will have the opportunity to try out an idea for another unit.

Do not try to force using *Seeing Reason* when it is not a good use of time or academically warranted.

### Step 2: Viewing Sample Project Descriptions and Research Questions

When you create a *Seeing Reason* project online, you need to enter a Project Description and Research Question to guide your students' work. Use this time to help clarify your project ideas.

#### Project Description

Just like for the *Visual Ranking Tool*, the project description for *Seeing Reason* is a focused, short paragraph that describes the project to your students and explains how they will use the *Seeing Reason Tool* to help them answer the project's questions. The project description should be able to convey, in a few sentences, why the project or problem is worthy of study, as well as define what your students will try to solve, produce, respond to, test, find out, or recommend.

#### Research Question

The research question is the direct question that students will respond to in their causal map. This question and the resulting investigation provide a foundation on which students will build understanding around the complexities of the project or problem.



### Using the Seeing Reason Tool to Target Thinking Skills

The following are a few examples of learning objectives, project descriptions, and research questions:

- **Language Arts**
  - **Learning Objectives:**
    - Examine and weigh the causes of violence and death in *Romeo and Juliet*
    - Analyze character actions, motives, and alternative courses of action
    - Use the themes in the play to better understand current-day relationships
  - **Project Description:** Two people madly in love with only a desire that love would conquer all—what could possibly go wrong? Neither Romeo, Juliet, nor their families could foresee the grave future ahead of them. By the end of the play, six people are dead and others injured. Is it fate, simply unlucky circumstances, or something else that causes these deaths? Use the *Seeing Reason Tool* to help you determine the causes of the violence and death in *Romeo and Juliet*. You will use that information to write an editorial in the *Verona Times*.
  - **Research Question:** What causes the violence and death in Shakespeare's *Romeo and Juliet*?
- **Health**
  - **Learning Objectives:**
    - Draw conclusions about the relationship between vaccines and possible adverse effects
    - Advise policymakers on how to best deal with immunization concerns
  - **Project Description:** Some parents are concerned that childhood vaccines could produce adverse effects and cause health problems for their children, such as autism, damage to the immune system, brain damage, and so forth. You are part of a committee that will make recommendations regarding these immunization concerns. The audience for your report could be federal vaccine research policymakers, state and local vaccine program implementers, healthcare professionals, the public, or the media. Use the *Seeing Reason Tool* to research the relationship between vaccines and any adverse effects. You will use that information to make recommendations to your targeted audience.
  - **Research Question:** How could vaccines affect me?

---

## Using the Seeing Reason Tool to Target Thinking Skills

- **Interdisciplinary**
  - **Learning Objectives:**
    - Determine what factors influence the price of flowers
    - Select and reject products based on analysis of data
    - Project profit
  - **Project Description:** Mother's Day is coming! Everyone has a hard time finding the perfect gift for his/her special mom. Our class needs to earn money for an upcoming field trip. Put the two together and what do you get? An opportunity! You will be involved in researching, planning, marketing, and selling flowers for Mother's Day. You, as a member of the class, are now a business partner and you have many important decisions to make so that your business is successful. To make good decisions on which flowers to sell, you will need to understand what influences flower prices. Use the *Seeing Reason Tool* to help you understand the floral business so you can make the best choices.
  - **Research Question:** What influences flower prices?
- **Math**
  - **Learning Objectives:**
    - Determine what factors influence the rise and fall of stock prices
    - Predict market trends based on available data
    - Advise others on how to best invest their money based on market analysis and projections
  - **Project Description:** Most young people understandably want the best things in life—nice homes, new cars, expensive clothes, and vacations in fun places. Your job in an investment firm is to advise others on how to invest their money. A client has \$100 a month to invest in such things as savings, bonds, and the stock market. Research the best options for investment, based on your understanding of how the stock market changes and the goals of your client.
  - **Research Question:** What makes the stock market change?

### Using the Seeing Reason Tool to Target Thinking Skills

- **Science**
  - **Learning Objectives:**
    - Research the causes and effects of wildfires
    - Examine and debate opposing viewpoints
    - Promote new policy to help control and deal with fires in forest areas
  - **Project Description:** An average of 5 million acres burn every year in the United States due to wildfires, causing millions of dollars in damage. Many people believe all fire is bad for a forest, including prescribed or controlled burning. Some believe healthy forests need to be managed in order to control fire risk; others think that any natural fire should be allowed to run its course. What should we do about wildland fires? You are on a task force to develop a new policy on how to deal with fires and potential fires in forest areas. First, research the causes and effects of wildfires, and then research and recommend a policy that will preserve and protect our natural resources in such a way that the needs of all involved are met.
  - **Research Question:** What are the causes and effects of wildfires?
- **Social Studies/History**
  - **Learning Objectives:**
    - Identify and assess concerns related to immigration
    - Determine why people immigrate to the United States
    - Evaluate the impact of immigrants on their new community
    - Examine the benefits and costs of immigration
  - **Project Description:** Continued immigration constantly reshapes the demographics, economy, and society of the world. In the United States during the 1990s, an average of more than 1.3 million immigrants—legal and illegal—settled in the United States each year, and this trend continues. To begin to understand the issues of immigration, we need to know why people came to the United States in the past and why people still want to come live in the United States today. Additionally, what are the benefits and the problems of immigration—for both the immigrants and existing populations? Your job as the head of the Center for Immigration Studies is to address these concerns and prepare a report that will be passed on to a Senate Subcommittee that is investigating this issue.
  - **Research Question:** Why do people move from one country to another and how does it change their new communities?

**Note:** For more examples, see ideas starting on Appendix D.03.

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Activity 5: Sharing Your Ideas

Using a wiki or working in small groups, share your ideas for a project that incorporates *Seeing Reason*.

Share your ideas as you reflect on your plan for *Seeing Reason*:

- What idea do you have for using *Seeing Reason*?
- How will *Seeing Reason* fit into your Unit Plan and help your students meet the learning objectives and apply higher-order thinking skills?
- If you have already decided that *Seeing Reason* will not be a good fit for your unit, what ideas do you have for using *Seeing Reason* with your students in other units?
- Does your unit involve a complex system or issue that warrants delving into identifying and analyzing cause-and-effect relationships?
- What concerns do you have about using this tool in your unit?
- What feedback would you like from others?

In small groups, discuss each other's ideas. If using a wiki, share your wiki pages and provide feedback on others' ideas. Specifically, provide feedback on how to best use the tool to encourage higher-order thinking skills. Consider whether the project ideas you review truly involve a complex system or issue that includes cause-and-effect relationships.



1. Open the wiki site URL for this course from your Favorites.
2. Edit your page and create a new entry to summarize your ideas for using *Seeing Reason*. Besides reflecting on the questions above, include:
  - An overview of how the *Seeing Reason Tool* would be integrated into your unit
  - Concerns, questions, and desired feedback



3. Save your wiki page.



4. Share your wiki page in a small group and, if needed, note any feedback directly on your page. Discuss project ideas, concerns, and questions with your colleagues. Provide suggestions to help them better target higher-order thinking and, possible cause-and-effect issues in the unit.

For this sharing activity, review wiki pages of those participants who teach in a similar grade or subject area, if possible.

### Using the Seeing Reason Tool to Target Thinking Skills

#### Activity 6: Planning Your Project

##### Step 1: Creating a Seeing Reason Project from an Existing Project

If you saw a project online that you would like to use as a starting point, you can use the project wizard to copy the project into your Teacher Workspace. If you want to create a new project based on your own ideas, skip this step and go directly to Step 2 on page 7.27.

##### Copying an Existing Project to Your Workspace



1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Project Examples**.
3. Open the appropriate project in either *Unit Plans* or *Project Ideas*.
4. Copy the project into your Teacher Workspace. (See Teaching Tools, Seeing Reason Tool Skill 2.6.)

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.6: Creating a Seeing Reason project from an existing project
- Seeing Reason Tool Skill 2.8: Editing a project



##### Review Your Unit Ideas and Edit the Project Information Online

1. Open your Unit Plan.
  2. Review your Curriculum-Framing Questions. Consider how your students' work with *Seeing Reason* could help support your unit's questions.
  3. Review your project priorities on pages 2.20–2.22.
  4. Preview the Project Reflection Checklist on page 8.07.
- Note:** You may also want to review the Project Rubric on page 2.18-2.19.
5. Edit the title, description, and question of your project as necessary. (See Teaching Tools, Seeing Reason Tool Skill 2.8.)
  6. After editing the project information online, copy the details into your Unit Plan.



**Note:** If you do not think the *Seeing Reason Tool* is a good fit for your unit, open and save the *Seeing Reason Project Idea* document from the *Thinking Tools, Seeing Reason Tool* folder on the Curriculum Resource CD and try a project idea for another unit.



7. Save your Unit Plan.
8. Return to your Teacher Workspace. If you have made any changes to your project online, click **Submit**.

---

## Using the Seeing Reason Tool to Target Thinking Skills

- Review Steps 2–4 to familiarize yourself with the project-creation options, and then go to Step 5 on page 7.30 to set up teams.

### Step 2: Creating Your Own Project Description and Research Question

Review the following suggestions for creating a Project Description from scratch.

- Set up an authentic problem, significant question, or real-life scenario.
- Explain why the project or problem is worthy of study.
- Define what your students will try to solve, produce, respond to, test, recommend, or discover.
- Describe what students will be required to decide, prioritize, seek consensus on, or negotiate.
- Use age-appropriate language that makes the topic engaging and interesting.

Consider the following questions as you develop a Project Description that reflects your project:

- Does the project engage the students' interest? Will it motivate them to pursue and explore the concepts deeply?
- Is the project cast in a context familiar to the students? Is it based on a real-world situation, scenario, or controversy?
- Is the project staged well? Is the project developed so student interest builds?
- Is the information provided adequate to solve the questions of the project? Is too much or too little information provided?
- Does the complexity and length of the project warrant and support working collaboratively?
- Is the problem or scenario of the project open-ended, which will provide different entry points and paths for your students?
- Does the project challenge students to use higher-order thinking skills?

Modified from:

"Guidelines for Reviewers"

Problem-Based Learning Clearinghouse


University of Delaware

Using the Seeing Reason Tool to Target Thinking Skills

Draft Your Unit Ideas

1. Open your Unit Plan.
2. Review your Curriculum-Framing Questions. Consider how your students' work with *Seeing Reason* could help to support your unit's questions.
3. Review your project priorities on pages 2.20-2.22.
4. Preview the Project Reflection Checklist on page 8.07 and review the Project Rubric on page 2.18-2.19.
5. Use the table below to draft the Project Description and Research Question for your map or type them directly into your Unit Plan.

Please do not force *Seeing Reason* when it is not a good use of time or academically warranted.




**Note:** If you do not think the *Seeing Reason Tool* is a good fit for your unit, open and save the *Seeing Reason* Project Idea document in the *Thinking Tools, Seeing Reason Tool* folder on the Curriculum Resource CD and try a project idea for another unit.

Example	<b>Project Description</b>	Problems arise as wildlife and human habitats overlap. You will take on the role of a wildlife conservationist and become an expert on an endangered animal or plant in your region. You will study the organism's needs to understand interdependencies in the ecosystem in which it lives. Using the <i>Seeing Reason Tool</i> , map the intricacies of a balanced ecosystem, and the human factors that influence that balance. From your map-building and research, you will determine what elements affect an organism's survival and propose practical and economically feasible solutions to ensure the organism's survival.
	<b>Research Question</b>	What influences the biological success of your species?
Possible Ideas	<b>Project Description</b>	
	<b>Research Question</b>	


## Using the Seeing Reason Tool to Target Thinking Skills

### Step 3: Planning Your Use of Seeing Reason


1. Open your Unit Plan.
2. In the *Seeing Reason* section of the Unit Plan, complete the Project Title, Project Description, and Research Question sections.
-  3. Save your file.

### Step 4: Creating a New Seeing Reason Project

Use the directions in this step to help you create a new *Seeing Reason* project. Use the Intel® Education *Help Guide* as needed to complete any technology skills identified below.

-  1. Open *Seeing Reason* from your Favorites and log in to your Teacher Workspace. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))

**Note:** Your login information may be listed on Overview vi or in the Login Information document in your Project Folder.

-  2. When setting up a new *Seeing Reason* project, consider the following. (See Teaching Tools, Seeing Reason Tool Skill 2.7.)
  - **The Project Name** could specifically reference the purpose or use of the *Seeing Reason Tool* in your overall project. This title will appear in the *Student Workspace* and above your students' *Seeing Reason* maps. You can change the name of the project later if you wish. (You may want to copy and paste the title from your Unit Plan.) (See Teaching Tools, Seeing Reason Tool Skill 2.6.2.)
  - **The Project Description** will appear in the *Student Workspace*, so you should use vocabulary that is age-appropriate. (See page 7.28 or copy and paste the description from your Unit Plan.) (See Teaching Tools, Seeing Reason Tool Skill 2.6.3.)
  - **The Research Question** will also be displayed on the top of the students' maps. (See page 7.28 or copy and paste the statement from your Unit Plan.) (See Teaching Tools, Seeing Reason Tool Skill 2.6.4.)
3. Continue with either Step 5 or Step 6 on page 7.30 to set up teams.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.7: Creating a new Seeing Reason project
- Seeing Reason Tool Skill 2.6.2: Adding a project name
- Seeing Reason Tool Skill 2.6.3: Adding a project description
- Seeing Reason Tool Skill 2.6.4: Adding a research question



### Using the Seeing Reason Tool to Target Thinking Skills

#### Step 5: Creating Teams IDs with the Project Wizard

The project wizard enables you to create all your team IDs and passwords at one time and assign the teams to a project. To create specialized team names, skip to Step 6.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.9: Creating a new set of student teams
- Seeing Reason Tool Skill 2.11: Creating unique team names
- Seeing Reason Tool Skill 2.12: Viewing or editing team information2.6.4: Adding a research question



Create at least one team for this practice project. Go to Overview page vii to write down your team ID and password or type the information in the Login Information document. (See Teaching Tools, Seeing Reason Tool Skill 2.9.)

**Note:** If you already have wizard-created teams and you use the project wizard again to set up teams for this project (with the same base word), the wizard will recognize that you already have those teams and assign them to this project. The student teams will be able to view and access both projects from their Student Workspace.

#### Step 6: Creating Specialized Student Teams



Create specialized team IDs to designate different team projects, areas of focus, or different perspectives (such as *conservationist*, *lawmaker*, *consumer*, and so forth). Go to Overview page vii to write down your team ID and password or type the information in the Login Information document. (See Teaching Tools, Seeing Reason Tool Skill 2.11.)

**Note:** You may want to keep the team ID and password the same so students can remember them easily. If they forget their passwords, you can see their passwords in the *Teacher Workspace*, under *Manage Teams*. (See Teaching Tools, Seeing Reason Tool Skill 2.12.)

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Extension Activity: Understanding Best Practices with Seeing Reason

The following resources are available to you for self-study or as an optional extension in your course. Complete Step 1 and/or Step 2 to view strategies and project ideas for using *Seeing Reason* in the classroom.

#### Step 1: Viewing Instructional Strategies

View best practices for planning, implementing, and assessing a project that integrates the *Seeing Reason Tool*.

1. Go to: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
2. Click **Instructional Strategies**.
3. Click the categories of interest: **Planning a Project, Implementing a Project, or Assessing Work**.
4. View resources and articles on using *Seeing Reason* and understanding cause and effect in the *Thinking Tool, Seeing Reason Tool* folder on the Curriculum Resource CD.

---



---



---

#### Step 2: Viewing Seeing Reason Project Ideas

Although you had an opportunity to view a few project ideas earlier in this module, if you want additional ideas to help focus or expand your project, explore units that integrate the *Seeing Reason Tool*.

1. Go to: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
2. Click **Project Examples**.
3. View projects that integrate the *Seeing Reason Tool* in either **Project Ideas** or **Unit Plans**.

---



---



---

### Using the Seeing Reason Tool to Target Thinking Skills

#### References

Costa, A., & Kallick, B. (2000–2001). *Describing 16 habits of mind*. Retrieved from [www.habits-of-mind.net/pdf/16HOM2.pdf](http://www.habits-of-mind.net/pdf/16HOM2.pdf)

*Guidelines for reviewers*. (n.d.). Newark, DE: University of Delaware, Problem-Based Learning Clearinghouse. Retrieved from [www.udel.edu/pblc/reviewers](http://www.udel.edu/pblc/reviewers)

---

## Using the Seeing Reason Tool to Target Thinking Skills

### Module 7 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

#### Module 7 Key Points:

- The *Seeing Reason Tool* is useful to investigate multiple influences (factors) that impact other outcomes in a system.
- The factors and relationships in a *Seeing Reason* map should be measurable, observable, or verifiable.

#### Accomplishments:

- Looked deeply into a unit that includes the *Seeing Reason Tool* to get ideas on project design, implementation, teacher-student dialog, and assessment
- Set up a project online that integrates the *Seeing Reason Tool*

In Module 8, you try out your ideas for *Seeing Reason*.



---

 Considering the Seeing Reason Tool for Your Unit

## Activities

### Activity 1: Trying Out Your Seeing Reason Idea ..... 8.01

**Create:** A practice *Seeing Reason* causal map

### Activity 2: Sharing Causal Maps and Practicing

#### Effective Questioning ..... 8.04

**Share:** Your practice *Seeing Reason* map

**Practice:** Effective questioning techniques

**Refelct:** On your causal map

### Activity 3: Revising Your Project ..... 8.08

**Edit:** Your *Seeing Reason* project

**Practice:** Reviewing students' *Seeing Reason* maps.

**Revise:** Your *Seeing Reason* map

### Activity 4: Revisiting Your Unit Plan ..... 8.10

**Discuss:** Best classroom practices

**Revise:** Your Unit Plan

### Activity 5: Sharing Your Results ..... 8.14

**Reflect:** On your use of *Seeing Reason*

### Extension Activity: Finalizing Your Seeing Reason Project ..... 8.15

**Complete:** The *Seeing Reason* project to fully meet expectations and learning goals

### References ..... 8.16

### Module Summary ..... 8.17



## MODULE 8

# Considering the Seeing Reason Tool for Your Unit

**Description:** In this module, you try out your ideas by creating a practice *Seeing Reason* causal map. You also discuss and practice effective questioning techniques, provide and receive feedback on your ideas, and use tips on implementation and assessment to revise your Unit Plan.

## Activity 1: Trying Out Your Seeing Reason Idea

Creating a practice causal map enables you to test your concepts and disclose different interpretations of the research question and avenues of thought. You can then use your findings to revise your project, questions, and requirements, as needed. Note that your practice causal map should *not* be shown to your students as an example for them to follow. Rather, students should make their own discoveries. You can also use your practice causal map to determine whether the use of the *Seeing Reason Tool* is the best fit for your unit. You may decide, after trying out your ideas, that another thinking tool can support your unit's objectives in a more direct way.

Follow the steps below to create a practice causal map. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified in the steps. You can use the same directions with your students when you are ready to have them create their own causal maps.

When creating your practice causal map, ensure the following:

- The causal map directly answers a research question that investigates cause-and-effect relationships, and also supports and provides the basis for answering the in-depth project questions.
- The factors listed on the causal map can be measured, observed, or verified.
- The factors are clearly described, and the relationships between the factors are causal, valid, and defensible.



### Considering the Seeing Reason Tool for Your Unit

#### Step 1: Logging On as a Student



1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Student Log-In**.
3. Type your **Teacher ID**, **Team ID**, and **Password** (which you may have written on Overview page vii), and then click **Sign In**.

**Note:** All of the teams in your class will use the same teacher ID, so you can write it on the board or on assignment sheets. You will need to meet with each team to let them know their team ID and password.



4. Open your project. (See Teaching Tools, Seeing Reason Tool Skill 2.3.)

#### Step 2: Using the Seeing Reason Tool

The following instructions may seem redundant since you worked with *Seeing Reason* in previous modules; however, the instructions are provided here to model how you might instruct your students. Review the instructions and then create a sample map for your project that includes the level of detail that you might expect from your students. Direct your students to use the *Help Guide* as needed to complete any of the technological steps below.

1. Preview the checklist on page 8.07 and keep in mind its criteria for a well-developed project and map as you test your project ideas.
2. After you log on and select your project, a blank map opens.
3. Create a new factor. Name and describe the factor. (See Teaching Tools, Seeing Reason Tool Skill 2.15.)
4. Consider whether colors will have meaning for your factors, and then choose the color you want the factor to be. (See Teaching Tools, Seeing Reason Tool Skill 2.16.)
5. Continue adding new factors until you are ready to create relationships.
6. Be sure to save your work at frequent intervals and before you exit out of the map. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)



Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.3: Opening a Seeing Reason project in the Student Workspace
- Seeing Reason Tool Skill 2.15: Adding a factor
- Seeing Reason Tool Skill 2.16: Adding or changing the color of an existing factor
- Seeing Reason Tool Skill 2.23: Saving a project

## Considering the Seeing Reason Tool for Your Unit

7. Delete any factors you decide are not relevant or appropriate. (See Teaching Tools, Seeing Reason Tool Skill 2.19.)
8. Add relationships between factors. Be sure to provide an adequate explanation of the relationships between factors—similar to what you might expect from your students. (See Teaching Tools, Seeing Reason Tool Skill 2.20.)



**Note:** The description area in both the *Edit Factor Information* and *Edit Relation Information* dialog boxes can be used to clarify meaning, justify or quantify factors or relations, cite sources, and so forth.

9. Edit factors if relationships are difficult to define. (See Teaching Tools, Seeing Reason Tool Skill 2.18.)
10. Enter comments below the map that can be directed to the teacher or team members. All comments are saved sequentially, with the most recent on top. (See Teaching Tools, Seeing Reason Tool Skill 2.28.)
11. Preview or print your work. (See Teaching Tools, Seeing Reason Tool Skill 2.30.)



12. Save important stages of the map into your portfolio. The portfolio can be used to save milestone maps that students want the teacher to view. The teacher can always look at all of the saved maps; however, the portfolio can include maps that show significant changes. (See Teaching Tools, Seeing Reason Tool Skill 2.24.)

**Note:** You will have additional time to work on your sample map later in this module.



13. Before closing the window to exit out of the map, save your work. (See Teaching Tools, Seeing Reason Tool Skill 2.23.)

### Step 3: Saving a Map Image

You can insert a map image into other files, such as word processing documents (for your Unit Plan), presentations, or publications.



1. Copy a map image that can be inserted into any document or presentation or save a map to use at a later time. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)
2. Paste the map into a presentation or document (such as your Unit Plan). (See Teaching Tools, Seeing Reason Tool Skill 2.26.)

Refer to the following skills in the Help Guide for this section:

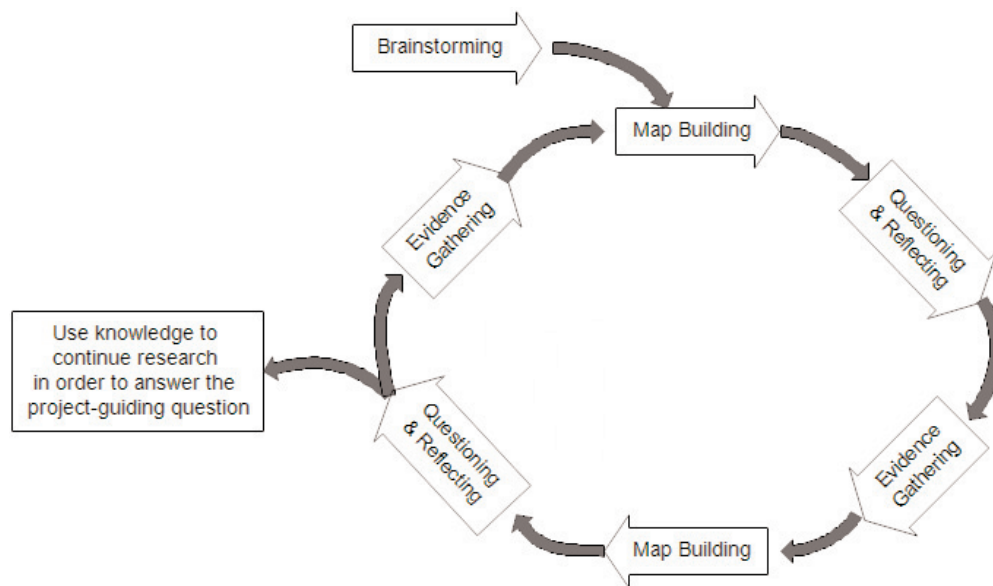
- Seeing Reason Tool Skill 2.18: Editing a factor
- Seeing Reason Tool Skill 2.19: Deleting a factor
- Seeing Reason Tool Skill 2.20: Adding a relationship
- Seeing Reason Tool Skill 2.23: Saving a project
- Seeing Reason Tool Skill 2.24: Saving a map to your portfolio
- Seeing Reason Tool Skill 2.26: Copying, saving, or printing a map as an image
- Seeing Reason Tool Skill 2.28: Commenting on a project
- Seeing Reason Tool Skill 2.30: Viewing and printing a team's most recent map

## Activity 2: Sharing Causal Maps and Practicing Effective Questioning

In this activity, you role-play teacher-student interactions using inquiry-based questions while sharing your practice causal map. In addition, you receive valuable feedback on your map’s effectiveness.

### Step 1: Taking a Deeper Look at Maps

The *Seeing Reason* mapping tool supports investigation that occurs in cycles:



After building an initial map that taps students’ prior knowledge of a topic, students experiment or research to gather more data and evidence, and then revise and adjust their maps. Part of the teacher’s task involves cycles of listening, questioning, and refocusing student work. The *Seeing Reason Tool* is best used for reasoning based on measurable or observable evidence. A teacher’s main job during map-building sessions is to lead students to evaluate their own thinking—each time refocusing students’ attention on the relationships among factors or weighing the evidence used to define relationships.

## Considering the Seeing Reason Tool for Your Unit



As a group, discuss some sample maps and the kinds of conversations you might have with the student teams that developed them.

Note any questioning techniques you learned during this activity.

---



---



---



---



---



---

Your facilitator will show some sample student maps for you to discuss. Various grade levels are represented in the sample maps. Although your facilitator may have additional ideas for questions and discussions, you should come up with as many ideas as you can for the types of conversations you would have with the student teams.

### Step 2: Using Effective Questioning Techniques

Successful causal mapping activities involve dialog between the teacher and the investigating team. The teacher should raise the bar on rigorous thinking by asking “how” and “why” questions, rather than procedural ones. Teachers need to test their students’ logic and probe for justification.

Have an open discussion about your map with your partner, and focus on how questions can help develop your students’ thinking processes.



1. In a small group or in pairs, talk through your practice causal maps.
2. Take turns role-playing student and teacher. In your role as a student, share and talk through the map you created. Use the space on the following page to note any suggested changes or new ideas for updating your map.
3. In your role as a teacher (while viewing your colleague’s causal map), practice the cycle of listening, questioning, and helping to refocus your “student’s” work. Peruse the following questions and use them as needed:
  - How have you described this factor?
  - Would you please read this relationship for me?
  - Is this factor measurable? Observable?
  - What other factors are related to this one?
  - What is your evidence for the relationship you show between these factors?
  - Why do you think this factor affects the other factor?
  - How have you described your evidence for this relationship?
  - How are these factors different?
  - What do you mean by... ?

## Module 8

---

### Considering the Seeing Reason Tool for Your Unit

- Is there another factor that contributes to ...?
- Why is this important to understand?
- What is happening in this relationship?
- Can this happen in another way?
- What causes this to happen?
- Can you explain this evidence further? Can it be measured? How? Reproduced?
- If you think this is evidence for that, then what is this evidence for?
- Can you explain this relationship further? How does it increase this factor?

**Note:** Students should also learn how to use effective questioning techniques as they work through and discuss their maps with each other.

From the feedback you received, write down any new ideas for your practice causal map.

---

---

---

---

---

---

---

---

---

---

Note any questioning techniques you learned during this activity.

---

---

---

---

---

---

---

---

---

---

## Considering the Seeing Reason Tool for Your Unit

### Step 3: Reflecting on Your Causal Map



With the other team or teacher from the previous step, discuss the overall concept of your project and practice map. Determine whether your project and map support the complexities of the concepts students will be studying in the unit. Additionally, consider whether your practice causal map supports and begins to provide answers for the overall unit. Use the Reflection Checklist below and the Project Rubric on pages 2.18–2.19 to help guide your discussion. Use the *Comments* section in the Reflection Checklist to note any needed revisions.



**Note:** This checklist is available in the *Thinking Tools, Seeing Reason Tool* folder on the Curriculum Resource CD.

### Seeing Reason Project Reflection Checklist

Reflection Checklist	Comments
<ul style="list-style-type: none"> <li><input type="checkbox"/> The project description is focused and clear. The description provides background and/or context for how the <i>Seeing Reason Tool</i> fits in the unit.</li> <li><input type="checkbox"/> The project description defines what students will be trying to solve, produce, respond to, test, recommend, or find out.</li> <li><input type="checkbox"/> The research question is worded so that it requires the building of a cause-and-effect map of a complex system or issue.</li> <li><input type="checkbox"/> The practice causal map contains factors of sufficient quantity and quality to adequately answer the research question.</li> <li><input type="checkbox"/> A high level of interaction or complexity exists among the factors.</li> <li><input type="checkbox"/> The factors listed on the causal map can be measured, observed, or verified.</li> <li><input type="checkbox"/> The factors and relationships are clearly described, and the relationships between the factors are causal, valid, and defensible.</li> <li><input type="checkbox"/> The map building and overall project require students to use higher-order thinking skills.</li> <li><input type="checkbox"/> The use of the <i>Seeing Reason Tool</i> helps students meet the unit's learning objectives.</li> <li><input type="checkbox"/> The overall project idea meets the highest ratings of the Project Rubric on pages 2.18–2.19.</li> </ul>	

### Considering the Seeing Reason Tool for Your Unit

#### Activity 3: Revising Your Project

Use any new ideas from your colleagues to revise your practice map. Use the Internet to research your evidence and then eliminate, validate, or add to your initial causal map ideas.

##### Step 1: Editing Your Project



If you need to edit the project, or want to practice editing a project, follow the directions below.

1. Open *Seeing Reason* from your Favorites. ([www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason))
2. Click **Teacher Workspace**.
3. Enter your **Login ID** and **Password**. (Your log on information may be listed on Overview page vii.)
4. Open the project that you want to edit. (See Teaching Tools, Seeing Reason Tool Skill 2.5.)
5. Change any of the project information. (See Teaching Tools, Seeing Reason Tool Skill 2.8.)
6. Add or edit team information. (See Teaching Tools, Seeing Reason Tool Skills 2.10 and 2.12.)



Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.5: Opening an existing project
- Seeing Reason Tool Skill 2.8: Editing a project
- Seeing Reason Tool Skill 2.10: Add a new student team
- Seeing Reason Tool Skill 2.12: Viewing or editing team information
- Seeing Reason Tool Skill 2.28: Commenting on a project
- Seeing Reason Tool Skill 2.30: Viewing and printing a team's most recent map



##### Step 2: Reviewing Student Work

Follow the steps below to practice reviewing a student causal map.

1. If you have logged out as a teacher, go to the *Seeing Reason Teacher Workspace* at [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason). Click **Teacher Workspace** and log on.
2. Review your sample team's work. The team's most recent map is displayed by default. (See Teaching Tools, Seeing Reason Tool Skill 2.30.)

**Caution:** In this review mode, the maps you view are fully functional. Any changes you make will be reflected in the students' map.

3. In the *Comments* section below the map, enter your comments to the team. (See Teaching Tools, Seeing Reason Tool Skill 2.28.)

**Note:** All comments are saved sequentially, with the most recent one at the top.

4. View how the team's thoughts have evolved through the project by viewing or printing maps from all work sessions. You can also view students' descriptions of the

## Considering the Seeing Reason Tool for Your Unit




factors and the relationships as well as delete maps. (See Teaching Tools, Seeing Reason Tool Skills 2.31 and 2.35.)

**Note:** If you have a pop-up blocker, you need to turn it off for this feature to work. Another way to override your pop-up blocker is to hold down the **Ctrl** key as you click the link to view the maps. **Macintosh\* users:** You may be able to override a pop-up blocker by holding down the Command key as you click the link.


- Most recent map** displays the most recent map and the descriptions of the factors and relationships.
- Select maps to view or print** shows small images of saved maps that you can select to view or print. You may only want to view or print maps showing significant changes.

Project ID: pollution-ty  
 Project: Students will monitor and identify causes of local pollution  
 Essential Question: What causes pollution in my community? What are the effects of pollution?  
 Investigator ID: 02


---

 Map Date: 5/12/2003 8:28:44 AM (PST)  
Iteration: 8


---

 Map Date: 5/12/2003 8:22:45 AM (PST)  
Iteration: 5

---

 Map Date: 5/12/2003 8:17:00 AM (PST)  
Iteration: 4

---

 Map Date: 5/12/2003 8:14:03 AM (PST)  
Iteration: 3

- All maps for this team** shows all the maps and the descriptions of the relationships.
- Maps in Portfolio** takes you to the maps the students have saved into their portfolio.

### Step 3: Revising Your Causal Map

Use any new ideas from your colleagues to revise your practice map. Use the Internet to research your evidence in order to eliminate, validate, or add to your initial causal map ideas.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.31: Viewing and printing selected maps
- Seeing Reason Tool Skill 2.35: Deleting selected maps



### Considering the Seeing Reason Tool for Your Unit

#### Activity 4: Revisiting Your Unit Plan

In this activity, you discuss ways to implement and manage projects that use the *Seeing Reason Tool* and continue working on your Unit Plan.

##### Step 1: Understanding Best Classroom Practices

**Learn the tool by using it.** The no-frills simplicity of the maps is intentional. Students spend little time on learning to use the tool and quickly turn their attention to the complexities of the problems they are exploring. Teachers find that a short 5- to 10-minute demonstration of creating factors and defining relationships followed by hands-on time building sample maps is sufficient preparation for first-time users. Students' natural trial-and-error tendencies will give them further confidence with the tool's features.

**Use the tool in groups—pairs is ideal.** On the road to "making thinking visible," the tool makes thinking discussible. Because map building naturally elicits debate and discussion about what is going on in students' minds, the maps are, most importantly, for groups. Teachers find that pairs of students work best, with regular rotations between one at the keyboard and one keeping track of the entries.

Teachers also offer one important ground rule—both members of the team must "own" the factors and relationships defined in the map. That is, each team member must be able to support the presence of a factor or relationship with evidence or reasoning. On occasion, students will disagree about adding factors, reporting that a partner "won't let me add my factors!" Encourage teams to first find factors that they can agree on, and then to look for and discuss evidence for the factors they disagree on.

Early elementary classrooms present a different challenge. The most effective way to use the *Seeing Reason Tool* is in a whole class activity where the teacher facilitates the building of the map.

**Not all work and discussion occurs at the computer.** The mapping tool supports investigation that occurs in cycles of evidence gathering, map building, and reflecting. After building an initial map that taps students' prior knowledge, students experiment or research to gather more data and evidence, and then return to revise and adjust their maps. Teachers report that journal reflections are essential to focus and refine work. Student pairs can end a map-revision session (developing new factors and relationships) by printing the revised map and leaving the computer to discuss and write a conclusion or summary for the day's work on a problem. Students also need time away from the computer to plan and carry out the next cycle of data gathering.

**Guide students in distilling essential information in their maps.** As investigations proceed and maps evolve, many students begin to collapse and categorize factors on their own. Other students need prompting to consider extraneous factors and possibly conflicting relationships (for example, arrows going both ways). Some students maintain

---

## Considering the Seeing Reason Tool for Your Unit

a boneyard of unused factors off to the side of their maps. You should discuss these irrelevant factors and confusing relationships with the map builders, encouraging them to distill the essential information to evidence-based relationships among factors.

**Recognize when maps are done.** Naturally, the complexity of student maps varies widely—some students reach a finishing point quickly on their own while others are never done, as if the goal is quantity of factors and a messy spiderweb of relationships. You will find that the lingering map builders begin to recycle old ideas—for example, adding “new” factors that are new in name only (adding boulders or pebbles when rocks is already a factor). Remind students that simple maps can get the job done.

### Use Multiple Methods of Assessment throughout the Project

The *Seeing Reason Tool* provides multiple opportunities to monitor student progress and learning during project work, as well as assess final products and performances. An effective unit will include assessment that provides explicit expectations and methods for students to demonstrate their learning, promote student self-management, and allow for teacher monitoring of progress.

The *Seeing Reason Tool* allows you to monitor your students’ initial understanding and to see their progress in interpretation and integration of information. You can use a series of saved maps and students’ writing to see how understanding changes over time. Assessment tools should evaluate how a map contributes to the understanding of the problem or system, rather than simply the number of factors and relationships in a map.

Ideas for incorporating multiple methods of assessment when using the *Seeing Reason Tool* include the following:

- Have students review their maps and write about the development of their understanding of the problem or system. Remind students to focus on the problem or system, not simply on the maps.
- Assess the quality of explanation regarding how students’ thoughts have changed as they revised their maps. Ask for explanations for the addition or removal of factors or for changes to the relationships among factors.
- Have students negotiate with their partner while they build their maps. Ask them to assess how closely they agreed with each other as they created factors and relationships, and decided which ones were valid.
- Pose a thought-provoking scenario that adds a major influence related to the system or problem, and ask students to predict what the scenario would do to other factors on their maps.

### Considering the Seeing Reason Tool for Your Unit

- Have students describe in their own words some aspect of the system that the map represents. Ask them to pick the most critical factors that influence the system or problem and explain why those factors are so critical, using information shown in the relationships defined on the map.
- Ask students to apply what they learned from their maps in another context.

#### Overall Project Assessment Ideas for All Online Thinking Tools

- Assess students using multiple forms:
  - Multiple assessors—students themselves, peers, teacher, mentors
  - Multiple units of assessment—individual students, groups, whole class
  - Multiple formats—written work (formal assignments and informal journal entries), observations (of group activities and individual work), presentations, informal discussions and questions, project designs, final media product
- Require students to complete journals, learning logs, essays, or other written reflection activities
- Set up a role-play, experiment, scenario, or other hands-on activity to assess skills and knowledge
- Use debates, interviews, or oral presentations to uncover the depth of students' understanding and comprehension
- Have students create a final project, such as a presentation or publication, that analyzes, evaluates, and proposes new action based on the use of the online thinking tools and the students' corresponding research

Some of the information above is modified from:



#### **Rubric to Assess a PBL (Project-Based Learning) and Rubric**

[www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)

#### **Project Based Learning with Multimedia**



<http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html> (link no longer active)

---

## Considering the Seeing Reason Tool for Your Unit

### Step 2: Revising Your Unit Plan

Considering the information in the previous step and what you have learned through the creation of your practice map, revise your ideas for your unit. Step back from just the use of the *Seeing Reason Tool* and sketch out the larger picture of the overall unit. If you are not going to use *Seeing Reason* in your unit, continue working on other parts of your Unit Plan that need completion.

1. Open your Unit Plan.
2. Revise the **Seeing Reason Title**, **Project Description**, and **Research Question**, if needed.
3. Consider whether additional standards or learning objectives need to be targeted in your unit. Revise the **Standards** or **Learning Objectives**, if necessary.
4. Review your **Curriculum-Framing Questions** and revise if necessary.
5. Consider the ideas on the previous two pages about ongoing assessment. In the **Assessment Summary** section of the Student Assessment Plan, add your ideas for how you plan to assess the learning during the unit. Revise the **Timeline** section, if needed.
6. In the **Procedures** section, draft the activities that will occur in the classroom that lead up to, include, and follow the use of the thinking tools and assessments.
7. Revise the **Unit Summary** by briefly describing your ideas for the overall unit. Include your general concept of the whole unit, not just the activity that will use the *Seeing Reason Tool*. Explain the main task, scenario, or challenge you will use to engage your students.
-  8. Copy an image of the practice map into the **Practice Map** section. (See Teaching Tools, Seeing Reason Tool Skill 2.26.)
-  9. Save your Unit Plan.

Refer to the following skills in the Help Guide for this section:

- Seeing Reason Tool Skill 2.26: Copying, saving, or printing a map as an image

### Considering the Seeing Reason Tool for Your Unit

#### Activity 5: Sharing Your Results

If you are using a wiki, create an entry to reflect on and share your experience with the *Seeing Reason Tool*. Review and provide feedback to one or two colleagues you have not reviewed before. If you are not using a wiki, share in small groups.



1. Go to the wiki site for this course and log on.

**Note:** The URL and logon information may be written down on Overview page vi or in your Login Information document.

2. Use the following questions to help you reflect on your use of *Seeing Reason*.
  - Did you try out an idea for your main unit or for a different project idea?
  - Considering your test results, do you think you will keep this tool in your Unit Plan?
  - How do you see the use of the *Seeing Reason Tool* fitting in with the objectives and standards you are trying to target as well as your overall plan for your unit? How will the use of this tool help students meet the requirements?
  - How do you see the *Seeing Reason Tool* enhancing your students' higher-order thinking skills as well as collaboration and communication in your classroom?
  - What questions do you still have about this project's design, implementation, or assessment?



3. Save your wiki page.



4. Review one or two other wiki entries by colleagues you have not reviewed before.
5. Provide suggestions and feedback on your colleagues' ideas, concerns, or questions.

---

## Considering the Seeing Reason Tool for Your Unit

### Extension Activity: Finalizing Your Seeing Reason Project

The following activities and resources are available to you as a self-study course enhancement or an optional extension in your course.

If you anticipate that your *Seeing Reason* project will be implemented in your unit because it is a good fit for the unit's objectives, complete any unfinished elements of your *Seeing Reason* project. Include appropriate references, comments, and analysis in your practice map that you would expect your students to include in their *Seeing Reason* projects. Make any necessary edits to the project, if necessary.



1. Go to: [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
2. Click **Teacher Workspace** or **Student Log-In** depending on whether you want to edit the project parameters or your sample student project.
3. Enter the login information, which may be written down on Overview page vii or in your Login Information document.
4. Make any necessary additions or changes.

### Considering the Seeing Reason Tool for Your Unit

#### References

Assessing student work with project-based learning. (1997–2001). *The multimedia project: Project-based learning with multimedia*. Retrieved from San Mateo County Office of Education Web site: <http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html>

*Rubric to assess a PBL and rubric*. (n.d.). Retrieved from Innovative Designs for Education Web site: [www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)



**Note:** For additional resources on computer-based mapping, view resources in the *Thinking Tools, Seeing Reason* folder on the Curriculum Resource CD.

---

## Considering the Seeing Reason Tool for Your Unit

### Module 8 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding

**Module 8 Key Points:**

- The use of the *Seeing Reason Tool* supports mathematical reasoning and understanding across the curriculum through the use of logic, critical thinking, precise language, and the visual representation of direct and inverse relationships.
- The *Seeing Reason Tool* supports investigation that occurs in cycles of evidence gathering, map building, and reflecting.

**Accomplishments:**

- Integrated the use of the *Seeing Reason Tool* into a unit or project idea
- Completed a practice causal map
- Used a wiki to document the evolution of unit ideas and use of *Seeing Reason*
- Revised the project and overall unit based on feedback and reflection

In Module 11, you determine which thinking tools you will use in your unit to meet the learning objectives for your students.





---

 Using the Showing Evidence Tool to Target Thinking Skills

## Activities

### Activity 1: Looking at Showing Evidence in Action ..... 9.01

**Discuss:** Argumentation in the classroom

**Review:** Components of an argument

**Discuss:** Your *Showing Evidence* case

### Activity 2: Digging Deeper into Argumentation ..... 9.06

**Discuss:** Uses and expectations for argumentation in your classroom

**Analyze:** A unit that uses *Showing Evidence*

**Discuss:** Rating rubrics, evidence, claims, and making conclusions

**Review:** Benefits of the *Showing Evidence Tool*

### Activity 3: Viewing Project Ideas ..... 9.20

**Review:** Thinking skills supported by the *Showing Evidence Tool*

**View:** Sample projects

**Brainstorm:** Project ideas that could incorporate *Showing Evidence*

### Activity 4: Clarifying Project Ideas for Using Showing Evidence ..... 9.27

**Review:** The needs of your unit

**View:** Sample project descriptions

**Consider:** Implementation models for the *Showing Evidence Tool*

### Activity 5: Sharing Your Ideas ..... 9.32

**Discuss:** Your ideas for using *Showing Evidence* in your classroom

### Activity 6: Planning Your Project ..... 9.33

**Create:** A project description and prompt

**Set Up:** A *Showing Evidence* project online

### Extension Activity: Understanding Best Practices with Showing Evidence ..... 9.41

**View:** Strategies and project ideas for using the *Showing Evidence Tool*

### References ..... 9.42

### Module Summary ..... 9.43



## MODULE 9

# Using the Showing Evidence Tool to Target Thinking Skills

**Description:** During this module, you learn more about argumentation and the communication, thinking, and collaboration skills that are associated with that process. You also discuss the benefits of the *Showing Evidence Tool*, view project ideas, and brainstorm ways to integrate the *Showing Evidence Tool* into your Unit.

## Activity 1: Looking at Showing Evidence in Action

### Step 1: Considering Argumentation in the Classroom

Argumentation is essential to human thinking and discourse. People construct and evaluate arguments every day in school, work, and informal settings to resolve issues as simple as what brand of soda to buy to as complex as whether stem cell research should be legalized. The ability to evaluate and construct arguments is particularly important in today's society where individuals are constantly confronted with new information. Argumentation is about making claims and providing justification for those claims. Justification means that people can question why they should believe an assertion or claim. A claim should not just be an individual's opinion, but should be justifiable if another individual challenges it.

#### The Importance of Including Argumentation in the Classroom

Argumentation:

- **Prepares students for real-world problems.** Argumentation is a significant part of higher-order thinking and reasoning (Kuhn, 1992), and is used across different content areas and professions (Reznitskaya & Anderson, 2002). Arguments are an important part of everyday life, and therefore, learning to construct and evaluate arguments is critical.

### Using the Showing Evidence Tool to Target Thinking Skills

- **Helps students develop higher-order thinking skills.** Engaging in argumentation in the classroom helps students take critical stances when confronted with arguments. Classroom argumentation also helps students learn how to evaluate the quality of what they read or hear (Reznitskaya & Anderson, 2002). If students receive explicit instruction and support in creating arguments, they are more likely to support their claims with the appropriate evidence and reasoning (McNeill, Lizotte, Krajcik, & Marx, 2004).
- **Increases students' content knowledge.** Creating strong arguments requires an understanding of argumentation as well as a solid understanding of the appropriate content knowledge. By engaging in argumentation, students can increase their content knowledge (Driver, Newton, & Osborne, 2000). Students need to think deeply about the content and construct their own understanding of the content as they construct their arguments.
- **Encourages thoughtful student discussions.** Including argumentation in the classroom can result in an environment where students question each other's claims and ask for appropriate evidence, warrants, and backing (Jiménez-Aleixandre, Rodríguez & Duschl, 2000). Students actively engage and debate important ideas.

#### Step 2: Taking a Look at the Format of an Argument

One of the most common formats for an argument was developed by Stephen Toulmin in 1958. His argumentation structure contains six components:

- Claim
- Data
- Warrant
- Backing
- Qualifier
- Rebuttal

The *Showing Evidence Tool* uses a modified version of Toulmin's argumentation model. The basic structure is similar, although the terms have been changed to make them more accessible to students:

- Make a claim (Toulmin's claim)
- Provide evidence (Toulmin's data)
- Evaluate the quality of evidence (Toulmin's qualifier)
- Make explicit links between the claim and evidence (Toulmin's warrant)
- Provide reasoning for why the evidence supports the claim (Toulmin's backing)
- Consider counterarguments

## Using the Showing Evidence Tool to Target Thinking Skills



**Note:** Additional information on Toulmin and his argumentation model is available starting in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD. You may also want to review the resources on argumentation available at:



[www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)

Click **Thinking Skills**, click **Higher-Order Thinking Skills**, click **Analysis**, and then click **Argumentation** in the call-out box.

*Showing Evidence* Evidence also adds the idea of counterargument—students consider the evidence against their claim as well as the evidence for their claim.

In the table below, the elements of an argument are defined, along with examples from an argument about whether genetically engineered food should be banned in the United States.

**Note:** Because this table is provided to give examples of the components of an argument, only one example for supporting and opposing evidence is listed. However, an argument would normally include multiple pieces of evidence.

Component	Definition	Example
Claim	The conclusion or assertion that a student is attempting to prove.	Genetically modified foods should not be banned.
Evidence	Facts or data that are used to support the claim.	Crops can be genetically engineered to produce a pesticide.
Quality of Evidence	Confidence in the evidence: Do you trust the source? Do multiple sources agree?	<i>High quality</i> —Many sources discuss this. Numerous crops, such as potatoes, cotton, and corn, have been modified with a Bt gene that controls production of a toxic protein.
Linking Claim and Evidence	A connection between the claim and evidence.	If a crop produces a pesticide that is harmful only to pests, this is a very strong reason to allow genetically engineered food.
Reasoning	The general principle or idea that allows you to make the connection between the claim and the evidence.	A pesticide is a chemical substance used to kill pests, like insects. By genetically engineering crops to produce insecticides, fewer crops will be lost to insects, which will produce more food.
Counterargument	Consideration of evidence (counterevidence) and reasoning that goes against the claim.	Genetically engineering crops that include pesticides can kill other “non-target” insects, such as monarch butterflies.

### Using the Showing Evidence Tool to Target Thinking Skills

*Showing Evidence* requires students to specifically link their claims and evidence. This helps students consider the relevance and the importance of their evidence. Besides connecting their evidence, students need to provide reasoning to explain why the evidence supports their claim. The reasoning should include general ideas or principles that allow students to make that connection. In the preceding example, students talk about pesticides and why pesticides might be an important consideration in whether genetically engineered food should be banned.

Different thinking skills are required depending on whether students make a claim and then gather evidence, or they gather evidence first, and then determine their claim. Both approaches are valid and require students to evaluate evidence when making a conclusion about a claim.

#### Step 3: Looking Closely at Your Showing Evidence Case

Using *Showing Evidence* in Module 4, you were able to make a claim, identify evidence, weigh the evidence, link the evidence to the claim by identifying its support or opposition of the claim, and then make a conclusion based on the evidence. Review your *Showing Evidence* case again, focusing on the elements of an argument. Consider the following questions as you discuss your initial experience with the *Showing Evidence Tool*:

Review these questions on your own, and then be prepared to have a whole group discussion about your initial experience with *Showing Evidence*.

##### 1. Making a Claim

- How does the argumentation process change if you start with evidence first, rather than making a claim based in part on prior knowledge and then looking for evidence to support it?
- If, during your collection of evidence, you found that your claim could not be supported, would you consider changing your claim? Or would you make a new one? Or would you stay with the current claim and use the evidence to show the claim cannot be supported?

##### 2. Gathering Evidence

- In this first use of the tool, the evidence bin was pre-populated with teacher-created evidence. In what ways was that helpful? How might it also hinder your investigation?
- Did you gather your own evidence? If so, how did you select or find the evidence? What were you looking for in your choice of evidence?

---

## Using the Showing Evidence Tool to Target Thinking Skills

### 3. Evaluating the Evidence

- Did you have discussions about the validity, reliability, or relevance of the evidence?
- What kinds of evidence would you consider credible or reliable?

### 4. Linking Evidence to the Claim

- Did all the evidence weigh equally in support or opposition of the claim?
- Did you have questions about any of the evidence as to whether the evidence truly supported or opposed the claim?
- Could any of the evidence be used to both support and oppose the claim, depending on how the evidence was used?
- Did you have questions about any of the evidence belonging in the argument?

### 5. Considering Counterarguments

- Why is it important to include both supporting and opposing pieces of evidence in an argument?
- What discussions did you have as you considered the opposing evidence?
- Did the opposing evidence weigh equally with the supporting evidence?

### 6. Making a Conclusion

- What did you consider as you discussed whether the claim could be supported by the available evidence?
- Did you discuss whether the claim should be rewritten? Would it help clarify the issue if sub-claims could be explored?
- The claim itself doesn't answer the question of the case or argument; the conclusion does. What did you conclude about the claim?

### Overall

- What information would you have liked to know prior to starting your work?
- In what ways did the *Showing Evidence Tool* help you to refine and evaluate your ideas?

---

---

---

---



Using the Showing Evidence Tool to Target Thinking Skills

### Activity 2: Digging Deeper into Argumentation

#### Step 1: Thinking about Your Classroom

Think of the many ways that argumentation is required in your classroom.

- When do your students engage in argumentation?
- At what points do students have problems in creating and supporting a clear argument?

---

---

---

---

---

---

---

---

#### Step 2: Setting Up Expectations for an Argument

Research suggests many benefits for including argumentation in the classroom but also shows that students have difficulty constructing arguments. When students in grades 5–12 have been asked to construct arguments without specific instruction in this area, they typically generate weak arguments (Means & Voss, 1996). Even with instruction, students have difficulty providing certain components of arguments, such as describing their reasoning for why their evidence supports their claim (McNeill et al., 2004). Students need instructional support as they construct arguments. Consider how you can use the *Showing Evidence Tool* as a scaffold for students, as well as the strategies you would need to use in class to help students create high-quality arguments.

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Understanding the Parts of an Argument

Discussing the components of an argument at its most basic levels is critical before using the *Showing Evidence Tool*, particularly with younger students. The simplest argument consists of only a claim and evidence.

- **Claim**—The conclusion or assertion that a person is attempting to prove.
- **Evidence** —The facts or data used to either support or oppose the claim. This is also known as proof, data, arguments, observations, or grounds. The support of a claim can come in the form of facts and statistics, expert opinions, examples, explanations, logical reasoning, witness testimony, documentation, and so forth.

#### Claim—What you are trying to prove or persuade

Supporting Evidence

Counterevidence

When an argument is more complicated, particularly when multiple claims could be supported, the following components become essential to evaluating and justifying the claim:

- **Quality of the evidence**
  - Is the source reliable and credible?
    - Is the author of the source just someone with a Web site or is the author an expert in the field? Is the associated organization well respected and considered trustworthy?
    - Does the source have a built-in bias? If so, does it compromise the quality of the evidence?
    - Is it a primary or secondary source?
    - Other source quality evaluation criteria:
  - How accurate is the evidence?
    - How old is the evidence? Does age of the content matter for this topic?
    - Is the evidence verifiable?
    - Is the data presented appropriately and accurately? Is it misrepresented or taken out of context?
    - Is the data or content provided as evidence of a fact, an interpretation of a fact, or someone's opinion?

## Module 9

---

### Using the Showing Evidence Tool to Target Thinking Skills

- If the evidence is student-created (experiments, mathematical proofs, their own data gathering, and so forth), what steps were taken to ensure that the evidence is accurate?
- Other accuracy evaluation criteria: \_\_\_\_\_  
\_\_\_\_\_



**Note:** View examples of argumentation errors and misuse of evidence in Evaluating Arguments in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.

- **Strength of the evidence to support or oppose the claim**
  - Were all important counter-arguments explored and included?
  - Is the evidence central to the argument?
    - Does the evidence go to the heart of the claim?
    - If this piece of evidence were taken away, would your argument fall apart?
    - Does the evidence provide only superficial or minor support?
    - Other strength criteria: \_\_\_\_\_  
\_\_\_\_\_
- **Reasoning for why the evidence supports or opposes the claim**
  - What general principle or idea allows the connection of the evidence to the claim?
  - How does this particular piece of evidence support or oppose the claim?
  - Other reasoning criteria: \_\_\_\_\_  
\_\_\_\_\_

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Step 3: Reviewing a Sample Case

In this step, you open a sample student case for *The Case of the Mysterious Malady* unit designed for high school students. For context, review the Unit Summary and Curriculum-Framing Questions below. Then, with a partner, open the sample student case and review the team's exploration of the case prompt, *What is the cause and source of Sally's illness?* Consider the elements of an argument on the previous pages as you review this argument case.

#### Unit Summary

Students act as consulting investigators for the Environmental Protection Agency (EPA) to evaluate the illnesses of a family in the area. They receive memos with clues that guide them through their team's research of a potential toxin. Students use previous experience with gas laws and apply their knowledge to determine the source of the illness. Students evaluate four different claims and find research that either strengthens or weakens each claim. They use the *Showing Evidence Tool* to organize their evidence and come to a conclusion as to what is causing the illnesses. Students' research and persuasive skills are put to the test as teams argue their conclusions in a mock trial.

#### Curriculum-Framing Questions

##### Essential Question

How do we decide which scientific claims to believe?

##### Unit Questions

How does one gather and process scientific data to support a claim?

How can we apply gas laws to help us solve a problem?

Why might symptoms not provide enough information when we are trying to diagnose an illness?

##### Content Questions

What is a toxin?

How does the random motion of molecules explain diffusion of gases such as carbon monoxide, chlorofluorocarbons, and radon?

How does the Ideal Gas Law apply to the diffusion of toxic gas indoors?

## Module 9

---

### Using the Showing Evidence Tool to Target Thinking Skills



1. Open *Showing Evidence* from your Favorites.  
([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))

2. Click **Project Examples**.

3. Click **Unit Plans**.

4. Click the Unit Plan title, **Mysterious Malady**.



5. Scroll down to view the live version of the *Showing Evidence* case. With your partner, explore some of the evidence, explanations, ratings, and comments by double-clicking the elements in the case.

6. What questions would you ask this team about its ratings and explanations?

---

---

---

---

---

---

---

7. What kinds of questions could the teacher ask, either verbally or as comments in the tool, to help students reflect more deeply on their thinking in general?

---

---

---

---

---

---

---

8. Review the Curriculum-Framing Questions at the top of the Unit Plan (or on page 9.09). How does the *Showing Evidence* Tool help students find answers to the Unit Questions and help them begin to understand the Essential Question?

---

---

---

---

---

---

---

Using the Showing Evidence Tool to Target Thinking Skills

**Step 4: Discussing Rating Rubrics**

Students with little experience with argumentation often assume that all evidence is equal—or do not know how to weigh the differences. In this step, you discuss two rubrics from the *Mysterious Malady* unit that are used with the *Showing Evidence Tool*—one to rate the quality of the evidence and the other to rate the strength of the evidence that supports the claim. Your classroom discussion about rating and evaluating evidence would be somewhat different from this particular classroom, depending on your subject matter and the grade level of your students. Using the example rubrics on the following pages, consider how you might set up the idea of creating rating qualifiers with your own students.

For context, review the Unit Summary and Curriculum-Framing Questions for the *Mysterious Malady* unit on page 9.09, and then discuss how the rubrics could be used to help the students during the unit as they evaluate the evidence.



- 1. In a small group, discuss the criteria and descriptors for the following rubric that is used for the *Mysterious Malady* unit to evaluate evidence quality.
- 2. How would the discussion and use of this rubric in the classroom help students to better rate and evaluate evidence?
- 3. Consider the types of elements you would want to include for your own subject area, considering source, accuracy, and specific content.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Using the Showing Evidence Tool to Target Thinking Skills

Evaluation of Evidence Quality

<b>Quality of Evidence</b>	<p><b>Facts, numerical data:</b></p> <ul style="list-style-type: none"> <li>Source is a government or educational Web site or a publication known for its expertise (for example, EPA).</li> <li>Information is current.</li> <li>Information is from the original source.</li> <li>Information is complete and extensive.</li> </ul> <p><b>Subjective opinion/policy information:</b></p> <ul style="list-style-type: none"> <li>Information is clearly objective and unbiased.</li> <li>Information is accurate and verifiable.</li> </ul>	<p><b>Facts, numerical data:</b></p> <ul style="list-style-type: none"> <li>Source is a popular magazine, news article, or a reputable, educational Web site.</li> <li>Information is current.</li> <li>Original source is stated.</li> <li>Information is complete and thorough.</li> </ul> <p><b>Subjective opinion/policy information:</b></p> <ul style="list-style-type: none"> <li>Information is objective and unbiased.</li> <li>Information is accurate and verifiable.</li> </ul>	<p><b>Facts, numerical data:</b></p> <ul style="list-style-type: none"> <li>Source is a popular magazine, news article, or a reputable, educational Web site.</li> <li>Some information is outdated.</li> <li>Original source is stated.</li> <li>Information appears complete.</li> </ul> <p><b>Subjective opinion/policy information:</b></p> <ul style="list-style-type: none"> <li>While the source may have bias, the information doesn't appear to be distorted.</li> <li>Information appears to be accurate.</li> </ul>	<p><b>Facts, numerical data:</b></p> <ul style="list-style-type: none"> <li>Source is a Web site that appears to be reputable, but their data does not include references to its original source.</li> <li>Information is undated or outdated.</li> <li>Some information may be missing or out of context.</li> </ul> <p><b>Subjective opinion/policy information:</b></p> <ul style="list-style-type: none"> <li>Information appears to be slanted to support a biased viewpoint.</li> <li>Some information is not accurate and may conflict with information found in more reputable sources.</li> </ul>	<p><b>Facts, numerical data, or subjective opinion/policy information:</b></p> <ul style="list-style-type: none"> <li>Source is a personal Web site with no author stated or author is clearly not an expert in the subject matter.</li> <li>Source is a tabloid newspaper or other non-reputable publication.</li> <li>Information is clearly slanted to support the source's biased viewpoint.</li> <li>Information is not accurate and conflicts with information found in more reputable sources.</li> <li>Content is purely someone's personal opinion.</li> </ul>

## Using the Showing Evidence Tool to Target Thinking Skills

**Note:** Not all rubrics would need to separate the type of information when considering the quality of the evidence. However, in some units, students may explore social issues and concerns, as well as factual data.



This rubric is available for your own use in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.

In the previous example, a one-check rating is clearly not acceptable evidence. The teacher may tell the students that if the evidence is rated a one-check, it should not be included as evidence—or it could be included in the evidence bin since it was considered but not attached to the claim. However, you may decide to make the one-check rating the *lowest acceptable* quality of evidence, rather than *unacceptable* evidence.

For the next rating, consider for the moment that the evidence is true and reliable. How well does it support or oppose the claim—assuming that the evidence is true? Review the following qualifiers and criteria that would be used for the *Mysterious Malady* unit to evaluate the strength of the evidence in supporting or opposing the claim.

**Note:** Concerns about the *quality* of the evidence is not included in this rubric—only in the previous rating.



1. How would the discussion and use of this rubric in the classroom help students build a better argument? What kinds of discussions would you need to have with your students about evidence that opposes their claim?
2. Consider any other criteria and descriptors you would want to include for your own subject area.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



## Module 9

### Using the Showing Evidence Tool to Target Thinking Skills

The use and inclusion of counter-arguments is very important in an argument. You should not leave out significant evidence that opposes your claim. Students need to understand the importance of including evidence that opposes the claim in order to truly evaluate the claim.

#### Evaluation of the Evidence Strength

<b>Strength of Evidence in Support of Claim</b>	<b>Critical Support</b> If the evidence is true, it makes a very strong case for the claim.	<b>Important Support</b> A small amount of room for interpretation or other variable is possible, but basically the evidence is strong in its support of the claim.	<b>Helps Build a Case for the Claim</b> Other pieces of evidence are included that are more critical to the case, so this evidence is not terribly important, but it does help to build the case.	<b>Superficial Support</b> The evidence seems to support the claim, but significant uncertainties exist as to whether that support really proves the claim is true.	<b>Insignificant Support</b> The evidence has little effect on the determination of whether the claim is true or valid.
<b>Strength of Evidence in Opposition of Claim</b>	<b>Critical Opposition</b> If the evidence is true, it makes a very strong case against the claim.	<b>Important Opposition</b> A small amount of room for interpretation or other variable is possible, but basically the evidence is strong in its opposition of the claim.	<b>Helps Build a Case Against the Claim</b> Other pieces of evidence are included that come into play, so this evidence is not terribly important, but it does help to build the case against the claim.	<b>Superficial Opposition</b> The evidence seems to weaken the claim, but significant uncertainties exist as to whether that opposition really proves the claim is false.	<b>Insignificant Opposition</b> The evidence has little effect on the determination of whether the claim is untrue or invalid.



The rubric is available for your own use in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Step 5: Determining Acceptable Evidence

Different subject areas may require different types of evidence. For example:

- A literature course may require quotations from text as evidence.
- A science course may accept experiment results and research from scientific journals.
- A history course may accept primary sources, certain academic Web sites, and a list of approved books.
- A project about a social issue may permit survey results, interviews, approved Web sites, and certain books.
- The audience is an important factor to consider when determining the “best” evidence to use in an argument. For instance, what is important to a teenager may be different from what is important to a politician. How will you incorporate the idea of considering the intended audience when making an argument?

When determining acceptable types of evidence for students to use, consider the following questions:

- Should students consider all evidence—even poor evidence—or will there be a minimum threshold for quality?
- What is the highest or most desirable source for evidence?
- Do you expect direct quotes or summaries of the evidence?
- How do you want the source cited?
- Are you requiring a minimum number of supporting and/or opposing pieces of evidence?
- Considering your subject area, what kinds of evidence or sources would you accept in a research project or debate?

---

---

---

---

---

---

---

---

---

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Step 6: Evaluating the Claim

As evidence becomes attached to a claim, the pro and con arguments begin to stack up. This provides a visual indication as to whether the scales are tipping one way or another for a supported claim or an unsupported claim. Both the *Support* and the *Quality* ratings must be taken into consideration when weighing the evidence. Consider some of the discussions you might want to have with your class:

- If a poor-quality piece of evidence strongly supports a claim, should the evidence be disregarded?
- What if a claim has a lot of mediocre evidence? How is quantity weighed in comparison to quality?
- What happens when a jury has to make a decision about whether someone is guilty or innocent? What do they consider? How can that process be related to the evaluation of a claim?

What other discussions would you want to have with your class?

---

---

---

---

---

---

---

The rubric on the following page is a starting point for discussion in determining the overall rating of a claim. What would you change or add to this rubric to help your students evaluate and rate the claim after evidence has been collected and considered?

---

---

---

---

---

---

---

## Using the Showing Evidence Tool to Target Thinking Skills

## Evaluation of Claim

★★★★★	★★★★☆	★★★☆☆	★★☆☆☆	★☆☆☆☆
<p><b>True and Valid</b></p> <p>Considering all of the evidence and the quality of that evidence, it is quite obvious that the claim is true and valid.</p>	<p><b>Likely True</b></p> <p>There is room for interpretation or other possibility, but considering all of the evidence and the quality of that evidence, the claim is strongly supported and is most likely true and/or valid.</p>	<p><b>"Hung Jury"</b></p> <p>The evidence provided does support the claim, but there are still uncertainties as to whether that support really proves the claim is true. This rating is the result of a "hung jury."</p>	<p><b>"Reasonable Doubt"</b></p> <p>Circumstantial or minor evidence does seem to support the claim, but not enough to make a decision. "Reasonable doubt" exists.</p>	<p><b>Unfounded</b></p> <p>Considering all of the evidence and the quality of that evidence, the claim has been proven beyond a shadow of a doubt to be untrue.</p>



This rubric is available for your own use in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.

In your own classroom, you can determine how you want to use the description areas of the claim. In this case, the section *Your Explanation* is used to provide additional detail to further define what the team means in their one-sentence claim. The *Your Rating* section is where students make a final assessment with a five-star rating system as to whether the claim has been proven to be true or valid—or not—and to explain how they came up with that determination.

Using the Showing Evidence Tool to Target Thinking Skills

<b>YOUR CLAIM</b>
Freon gas is under pressure, leaking into the home, thermally reacting to
<b>Your Explanation</b>
Freon is used in air conditioning & cooling systems.
<b>Your Rating</b>
★★★★☆
This scenario seems plausible because most the symptoms listed



**Note:** View the additional argumentation resources in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.

**Step 7: Making a Conclusion**

Students use the *Conclusion* area to answer the question of the case. In the conclusion, students can make thoughtful summaries about the claim and evidence as they consider the issue as a whole.

<b>Conclusion:</b>
The evidence suggests the cause of Sally Citizen’s illness is a combination of two toxic chemicals: 1) Carbon Monoxide and 2) Freon. Both toxins are highly toxic to humans. The Citizen family had experienced symptoms of high concentrations of both.

The conclusion area is also helpful if students have multiple claims that they considered in their cases. The conclusion gives the breadth and full understanding of the answer. Using the court case analogy, it may not be enough to simply answer the question of whether the accused is guilty of the crime, but also to consider whether it was intentional. The conclusion area provides a space where students can voice their concerns about the areas of the case that are not so clear-cut.

In what other ways could you see the conclusion space being used?

---

---

---

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Step 8: Reviewing the Benefits of the Showing Evidence Tool

The *Showing Evidence Tool* provides the scaffolding needed to create an effective argument. Review the following benefits as you begin to consider how this tool could be used in your own classroom.

#### Benefits of the Showing Evidence Tool

##### Students:

- Improve collaboration and higher-order thinking skills
- Engage in discussion and understand complex ideas
- Develop visual representation skills
- Use precise language when presenting or evaluating evidence.
- Improve argumentation skills through the peer review process

##### Teachers:

- Shift to student-centered instructional practices
- View the progression of the students' thinking, ideas, and research
- Can quickly and easily set up and manage as many team projects as needed
- Provide ongoing feedback and guidance using the comments feature

Using the Showing Evidence Tool to Target Thinking Skills

**Activity 3: Viewing Project Ideas**

In this activity, you identify the components of a good project, view examples, and brainstorm ideas for integrating the *Showing Evidence Tool* into your unit.

**Step 1: Reviewing the Power of the Showing Evidence Tool**

In the previous modules, Bloom’s Taxonomy was used to consider the types of thinking that the *Visual Ranking Tool* could support and Costa and Kallick’s Habits of Mind was used to review the range of thinking that could be supported by the *Seeing Reason Tool*. During this step, consider how the *Showing Evidence Tool* could be used to support the thinking skills identified in Marzano’s Dimensions of Learning (1992).

Components of Learning		Focus	Use of Showing Evidence to Support Marzano’s Dimensions of Learning
Dimension 1	Attitudes and Perceptions	<ul style="list-style-type: none"> <li>▪ Establishing positive attitudes about the classroom climate                             <ul style="list-style-type: none"> <li>- Feeling accepted by teacher and peers</li> <li>- Perceiving order</li> </ul> </li> <li>▪ Valuing and finding interest in classroom tasks</li> </ul>	<ul style="list-style-type: none"> <li>▪ Understanding expectations of peer and teacher review (for example, the comment feature is used by teacher and peers in a defined way to pose questions and provide comments)</li> <li>▪ Feeling safe to make a claim and support it, understanding that the assessment of their case is based on the quality of the argument, not right or wrong choices of claims or evidence</li> </ul>
Dimension 2	Acquire and Integrate Knowledge	<ul style="list-style-type: none"> <li>▪ Relating new knowledge to what students know</li> <li>▪ Organizing and internalizing knowledge:                             <ul style="list-style-type: none"> <li>- Declarative Knowledge</li> <li>- Facts, concepts, generalizations, and principles</li> <li>- Procedural Knowledge</li> <li>- Skills, procedures, and processes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Collecting and sorting evidence</li> <li>▪ Creating an appropriate claim that provides a statement of fact, definition, value, or policy that will be evaluated</li> <li>▪ Understanding the use of the tool (for example, following a model of for creating new claims and evidence)</li> </ul>

## Using the Showing Evidence Tool to Target Thinking Skills

	Components of Learning	Focus	Use of Showing Evidence to Support Marzano's Dimensions of Learning
<b>Dimension 3</b>	Extend and Refine Knowledge	<ul style="list-style-type: none"> <li>▪ Developing in-depth understanding and applying and refining that knowledge using reasoning processes:               <ul style="list-style-type: none"> <li>- Comparing—How are these things alike?</li> <li>- Classifying—How can these be organized?</li> <li>- Inductive Reasoning—Based on these facts, what is your conclusion?</li> <li>- Deductive Reasoning—Based on this rule, what conclusions can you draw that must be true?</li> <li>- Analyzing Errors—How is this information misleading?</li> <li>- Constructing Support—What is an argument that would support this claim?</li> <li>- Abstracting—To what other situations can this apply?</li> <li>- Analyzing Perspectives—What is the reasoning behind this perspective?</li> <li>- Analyzing Perspectives—What is the reasoning behind this perspective?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Rating and evaluating positive and negative evidence, and then weighing that evidence to come to a conclusion about a complex issue</li> <li>▪ Comparing and classifying the different types of evidence quality</li> <li>▪ Basing conclusions on the preponderance of evidence</li> <li>▪ Analyzing the reliability, credibility, and accuracy of the evidence</li> <li>▪ Creating a complete argument to support or refute a well-founded claim</li> <li>▪ Considering bias in evidence</li> </ul>

(Continued)



Using the Showing Evidence Tool to Target Thinking Skills

Components of Learning		Focus	Use of Showing Evidence to Support Marzano’s Dimensions of Learning
Dimension 4	Use Knowledge Meaningfully	<ul style="list-style-type: none"> <li>▪ Constructing tasks to encourage meaningful use of knowledge:                             <ul style="list-style-type: none"> <li>- Decision Making</li> <li>- Investigation</li> <li>- Experimental Inquiry</li> <li>- Problem Solving</li> <li>- Systems Analysis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Choosing the best and most representative evidence</li> <li>▪ Investigating all sides of an argument</li> <li>▪ Considering all possibilities of an argument before making a decision</li> <li>▪ Using the final outcome of the argument to help plan and decide the next steps for solving a problem or dealing with an issue</li> <li>▪ Analyzing the parts to clearly see the whole</li> </ul>
Dimension 5	Productive Habits of Mind	<ul style="list-style-type: none"> <li>▪ Developing habits of mind to think critically, think creatively, and regulate their behavior:                             <ul style="list-style-type: none"> <li>- Critical Thinking</li> <li>- Creative Thinking</li> <li>- Self-Regulation—Metacognition</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Using the anytime, anywhere nature of the tool to continue building a well-reasoned argument</li> <li>▪ Self-monitoring their own progress and the quality of their argument assessments</li> </ul>

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Step 2: Understanding What Makes a Good Showing Evidence Project

The *Showing Evidence Tool* is most beneficial when students need to develop arguments supported by evidence or facts. Developing these arguments often involves analyzing conflicting information, sorting through complex ideas, or evaluating controversial topics. *Showing Evidence* can be used in a variety of projects to:

- Analyze experiments and draw conclusions
- Research hypotheses
- Understand different perspectives
- Investigate social issues
- Analyze characters or plots
- Evaluate credibility
- Apply knowledge
- Create a cost-benefit analysis
- Organize ideas for projects or essays
- Debate a controversial issue

Characteristics of a project that integrates the *Showing Evidence Tool*:

- Contains elements of a controversial issue, debatable topic, moral or ethical dilemma, social issue, or challenge to an existing opinion
- Provides engaging, thought-provoking, and open-ended project questions
- Answers to the project are not readily attainable or evident
- Conflicting evidence exists, with multiple perspectives or methods of evaluation

### Using the Showing Evidence Tool to Target Thinking Skills

#### Plan for Opportunities to Reflect and Revise

To maximize learning, good projects have time built-in for student reflection. The *Showing Evidence Tool* supports investigation that occurs in cycles of evidence gathering, using the *Showing Evidence Tool*, and reflecting. After building an initial case, students experiment or research to gather more data and evidence, and then return to revise and adjust their cases, based on research and reflection. Journal reflections and peer review can be used in the tool to help students focus and refine their work. Students also need time away from the computers to plan and carry out the next cycle of data gathering and revision.

#### Plan for Student Teams

Although individual students can use the *Showing Evidence Tool*, the tool is more powerful when used by teams. Students are able to share their opinions as they consider the evidence to use and why the evidence is important. Students are more engaged in learning when they share opinions about particular evidence or try to convince their teammates to change the quality ranking of a piece of evidence. Such discussions help students further clarify their ideas. Working as a team, students make decisions, prioritize, negotiate, and seek consensus.

#### Consider Assigning Reviewing Teams

The *Showing Evidence Tool* allows teams to review other teams' work. Including team review in a project can help students become more thoughtful and express ideas more clearly. Providing guidelines on content and structure of feedback helps students develop constructive feedback. Teams can be paired together because they have differing opinions, or teams can be paired if they share the same views on an issue.

Using the Showing Evidence Tool to Target Thinking Skills

**Step 3: Viewing Sample Projects**

View and discuss unit plans that involve argumentation.



1. Open *Showing Evidence* from your Favorites. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))
2. Click **Project Examples**.
3. Click **Unit Plans**.
4. Click the Unit Plan title, **Romeo and Juliet**.



5. As a whole group, review the *Romeo and Juliet* unit to see how the *Showing Evidence Tool* helps support the learning objectives and Curriculum-Framing Questions of the unit.
6. Scroll down to view the live version of the *Showing Evidence* case. Explore some of the evidence, explanations, ratings, and comments by double-clicking on the elements in the case.
7. If time is available, review any additional example projects individually.
8. Note any ideas that you may be able to apply to your own classroom or project idea.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



---

## Using the Showing Evidence Tool to Target Thinking Skills

### Activity 4: Clarifying Project Ideas for Using Showing Evidence

#### Step 1: Reviewing the Needs of Your Unit

Before determining a possible use for the *Showing Evidence Tool* in your unit, review your targeted higher-order thinking skills, standards, and learning objectives. Compare them with the thinking skills that would be supported by *Showing Evidence*.

1. Open your Unit Plan.
2. Review your Habits of Learning Taxonomy.
3. Review the standards identified in your Unit Plan and note those standards that could benefit from the *Showing Evidence Tool*. If the standards are not already highlighted in a color specific for *Showing Evidence*, you may want to highlight them now or identify them beside the keywords listed below.

- analyze \_\_\_\_\_
- argument \_\_\_\_\_
- conjecture \_\_\_\_\_
- debate \_\_\_\_\_
- evaluate \_\_\_\_\_
- evidence \_\_\_\_\_
- hypothesis \_\_\_\_\_
- investigate \_\_\_\_\_
- persuade \_\_\_\_\_
- position \_\_\_\_\_
- premise \_\_\_\_\_
- social issue \_\_\_\_\_
- thesis \_\_\_\_\_
- other: \_\_\_\_\_

**Note:** In your search of the standards, do not be limited by the preceding keywords. You may need to look for the hidden opportunities for higher-order thinking, especially if your state's standards focus mainly on very specific knowledge-based tasks or understanding.

## Module 9

---

### Using the Showing Evidence Tool to Target Thinking Skills

4. Review your learning objectives and identify which objectives could be supported by *Showing Evidence*. You may want to highlight them in your Unit Plan or identify them below.

---

---

---

---

---

Do not try to force using the *Showing Evidence* when it is not a good use of time or academically warranted.

5. Consider how the learning objectives for the sample project descriptions on the following pages (and in Appendix D) would be supported through using *Showing Evidence*. Keep your standards and objectives in mind as you think about your own project.



**Note:** If you do not believe *Showing Evidence* is a good fit for your unit, you can try out another idea for a different unit.

### Step 2: Viewing Sample Project Descriptions and Prompts

When you create a *Showing Evidence* project online, you need to enter a project description and prompt to guide your students' work. Use this time to help clarify your project ideas.

#### Project Description

Just like in *Visual Ranking* and *Seeing Reason*, the project description is a focused, short paragraph that describes the project to your students and explains how they will use the *Showing Evidence Tool* to help them answer the questions of the project. The project description should be able to convey in a few sentences why the project or problem is worthy of study, as well as define what your students will try to solve, produce, respond to, test, find out, or recommend.

#### Prompt

In addition to completing the *Project Description*, you need to create a prompt, which is the question that students respond to in their case. This question and resulting investigation provide a foundation for students to build understanding around the complexities of the project or problem.

---

## Using the Showing Evidence Tool to Target Thinking Skills

The following are examples of learning objectives, project descriptions, and prompts:

- **Language Arts**
  - **Learning Objectives:**
    - Analyze different perspectives and maintain respect for the point of view of others
    - Use varied sources (literature, current events, law, and policy) to provide evidence for your argument
    - Present a persuasive oral presentation
  - **Project Description:** Some school administrators, teachers, and parents feel strongly about the need to protect students from exposure and access to controversial materials. Even books that are called “classics” can be deemed “inappropriate.” Now that we have read *Huckleberry Finn*, consider its use and appropriateness for school. If this book were banned, it would mean removing it from the library, prohibiting its use in the classroom, and prohibiting students and teachers from having the book on school property. Analyze the social, political, and legal issues surrounding *Huckleberry Finn* as you consider whether it should be used in school.
  - **Prompt:** Should *Huckleberry Finn* be banned in our school?
- **Health**
  - **Learning Objectives:**
    - Analyze the health risks of tobacco
    - Research current law and regulations
    - Propose a solution for the regulation, use, and distribution of tobacco
  - **Project Description:** Health advocates have long lobbied for government restrictions over the tobacco industry because of the known health risks associated with smoking, such as various cancers, emphysema, bronchitis, asthma, and heart disease. Even though the Surgeon General declared nicotine an addictive drug in 1988, tobacco is not under the jurisdiction of the Food and Drug Administration (FDA), and is therefore not subjected to the same testing and marketing regulations as other drugs or food products. Anti-tobacco activists maintain that the FDA should regulate tobacco, because the addictive nature of nicotine hooks smokers as adolescents and makes it difficult for them to quit as adults. Determine whether tobacco should be regulated by the FDA or whether the government should just let individuals decide how to live their own lives.\*
  - **Prompt:** Should tobacco be regulated by the FDA?

\*Modified from: <http://faculty.valenciac.edu/ckatz/pathfinders/Tobacco%20Industry.htm>



### Using the Showing Evidence Tool to Target Thinking Skills

- **Math**
  - **Learning Objectives:**
    - Use symbolic algebra to represent situations and to solve problems, specifically those that involve linear relationships
    - Formulate, investigate, and evaluate mathematical conjectures
    - Examine patterns and structures to formulate generalizations
  - **Project Description:** What would the perimeter be if you lined up (sharing one full side) any number of regular triangles in a row? Squares in a row? Regular pentagons in a row? Regular hexagons in a row? What is growing and changing for each polygon? What is different across the polygons? Can you create a rule for each polygon? Can you create a rule for any number of  $n$ -sided regular polygons? Use your generalization for any number of  $n$ -sided regular polygons to make mathematical conjectures backed by data and reasoning, and organize them through the use of the *Showing Evidence Tool*. Create your conjecture in the *Showing Evidence* workspace. You must find at least four pieces of evidence or data that supports the conjecture, and it must form a logical mathematical argument. Your evidence must back up your work on the problem and must not be based on opinions or guesses.
  - **Prompt:** What is the perimeter of any number of  $n$ -sided regular polygons lined up in a row?
- **Science**
  - **Learning Objectives:**
    - Understand the weather system, water cycle, and carbon cycle
    - Analyze data on weather patterns
    - Research and synthesize findings from leading scientists in the field
    - Make conclusions based on scientific data and make a proposal for any policy changes
  - **Project Description:** Global warming refers to an average increase in the Earth's temperature, which in turn causes changes in climate. A warmer Earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans. When scientists talk about the issue of climate change, their concern is about global warming caused by human activities. The topic of global warming can often involve heated debates. Some say global warming is a scare tactic that is based on flawed interpretation. Others say it is a real concern that is based on obvious scientific data. Now it is your turn to enter

---

## Using the Showing Evidence Tool to Target Thinking Skills

the debate—but with cool heads and well-reasoned and supported arguments. Determine whether the threat is real, and if so, whether we can do anything about it.

- **Prompt:** Global warming: How real of a threat is it?
- **Social Studies/History**
  - **Learning Objectives:**
    - Understand how laws are proposed, passed, and implemented
    - Assess the benefits and the drawbacks of the Patriot Act
    - Write a persuasive letter
  - **Project Description:** The U.S. Patriot Act was designed to help law enforcement detect and prevent terrorism. Since its passage in Congress in October of 2001, some have said the Patriot Act has played a key part in a number of successful operations to protect innocent Americans from the deadly plans of terrorists. Others say that it goes too far and threatens the very rights and freedoms that we are struggling to protect. Parts of the Patriot Act are going to expire this year unless Congress votes to renew them. Research this law and determine whether it should be renewed as is, changed, or allowed to expire. From your research and evidence, you will be writing to your representatives in Congress and entreating them to consider your viewpoint.
  - **Prompt:** Is the Patriot Act good for America?

**Note:** For more examples, see ideas starting on Appendix C.03.

Note any interesting project ideas here.

---



---



---



---



---



---

### Using the Showing Evidence Tool to Target Thinking Skills

#### Activity 5: Sharing Your Ideas

Using a wiki or working in small groups, share your ideas for a project that incorporates *Showing Evidence*.

Share your ideas as you reflect on your plan for *Showing Evidence*:

- What idea do you have for using *Showing Evidence*?
- How will *Showing Evidence* fit into your Unit Plan and help your students meet the learning objectives and apply higher-order thinking skills?
- If you have already decided that *Showing Evidence* will not be a good fit for your unit, what ideas do you have for using *Showing Evidence* with your students in other units?
- Does your unit involve a controversial issue, debatable topic, moral or ethical dilemma, social issue, or challenge to an existing opinion that is well suited for *Showing Evidence*?
- What concerns do you have about using this tool in your unit?
- What feedback would you like from others?

In small groups, discuss each other's ideas. If using a wiki, share your wiki pages and provide feedback on others' ideas. Specifically, provide feedback on how to best use the tool to encourage higher-order thinking skills.



1. Open the wiki site URL for this course from your Favorites.
2. Edit your page and create a new entry to summarize your ideas for using *Showing Evidence*. Besides reflecting on the questions above, include:
  - An overview of how the *Showing Evidence Tool* would be integrated into your unit
  - Concerns, questions, and desired feedback



3. Save your wiki page.



4. Share your wiki page in a small group and, if needed, note any feedback directly on your page. Discuss project ideas, concerns, and questions with your colleagues. Provide suggestions to help them better target higher-order thinking and, possible cause-and-effect issues in the unit.

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Activity 6: Planning Your Project

#### Step 1: Considering How Best to Use the Tool

The *Showing Evidence Tool* provides students with the ability to hypothesize, research, analyze evidence, and make conclusions. You can direct your students to use one of two usage models as they evaluate claims and evidence.

**Usage Model 1: Create claims and support with evidence** (closest to scientific method, proving a hypothesis)

- Establish initial position—stake your claim
- Build set of evidence items
- Evaluate quality of evidence (for reliability; how true is the evidence)
- Link evidence to claim
- Evaluate strength with which evidence supports the claim
- Evaluate claim and make new claim(s), as needed

**Usage Model 2: Analyze evidence to make a claim or form a hypothesis** (building a theory, analyzing data)

- Start with a set of evidence items
- Evaluate quality of evidence (for reliability; how true is the evidence)
- Analyze evidence and make a claim
- Link evidence to claim
- Evaluate strength with which evidence supports the claim
- Evaluate claim and make new claim(s), as needed

Consider the following questions before you set up your project online.

1. Will you require your students to start with a claim and then collect evidence to see if they can support the claim? Or, will your students collect evidence and then determine the claim?

---

---

---

---

### Using the Showing Evidence Tool to Target Thinking Skills

2. Will you provide your students with a claim or choice of claims? Or, will you allow them to determine and create their own claim? If you are going to pre-populate the case with a claim, draft an idea for the claim here.

---

---

---

3. How will your students find and create their evidence? Will you provide any of the evidence as a starter set in the *Showing Evidence Tool*? If so, what kinds of evidence do you need to locate?

---

---

---

4. Preview the checklist on page 10.07 and keep in mind its criteria for a well-developed project and case as you try out your project ideas.

#### Step 2: Creating a Showing Evidence Project from an Existing Project

If you saw a project online that you would like to use as a starting point, you can use the project wizard to copy the project's description, prompt, and any teacher-created evidence or claims to your teacher workspace. If you choose to complete this step, go to Step 6 when you are finished to assign teams to your new project. If you want to create a new project based on your own ideas—and not copy an existing project, skip this step and go directly to Step 3 on page 9.36.

#### Copying an Existing Project to Your Workspace



1. Open *Showing Evidence* from your Favorites. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))
2. Click **Project Examples**.
3. Open the appropriate project in either *Unit Plans* or *Project Ideas*.
4. Copy the project into your Teacher Workspace. (See Teaching Tools, Showing Evidence Tool Skill 3.7.)



**Note:** If you are not already logged in, you will be directed to a page that requests that you log on. Your login information may be written on Overview vii or in the Login Information document in your Project Folder. Information document in your Project Folder.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.7: Creating a Showing Evidence project from an existing project

## Using the Showing Evidence Tool to Target Thinking Skills

### Review Your Unit Ideas and Edit the Project Information Online

1. Open your Unit Plan.
2. Review your Curriculum-Framing Questions. Consider how your students' work with *Showing Evidence* could help support your unit's questions.
3. Review your project priorities on pages 2.20-2.22.
4. Preview the Project Reflection Checklist on page 10.07.

**Note:** You may also want to review the Project Rubric on page 2.18-2.19.



5. Edit the title, description, and prompt of your project as necessary. You can also change to the standard or simplified version of the workspace. (See Teaching Tools, Showing Evidence Tool Skill 3.10.)
6. Change the vocabulary of the *Showing Evidence* labels, if desired. The vocabulary that is used in the *Showing Evidence Tool* can be changed to match the particular project or subject matter that your student teams will address. (See Teaching Tools, Showing Evidence Tool Skill 3.9.)

**Note:** All of your students assigned to a project use the same vocabulary set. The labels you select are used in the tool for just this project.

7. Add or edit any pre-populated evidence or claims, if desired. (See Teaching Tools, Showing Evidence Tool Skills 3.20 and 3.21.)

**Note:** You will not be able to change, delete, or add to any pre-populated evidence or claims after you have assigned teams—unless you unassign them first. If you have doubts about any elements you are considering as pre-populated items in this practice case, you may want to simply add them in the *Student Workspace*, rather than in the *Teacher Workspace*. Since this is a practice project, it will not impact your practice project in any significant way.

8. After editing the project information online, copy the details into your Unit Plan.



**Note:** If you do not think *Showing Evidence* is a good fit for your unit, save and open the *Showing Evidence Project Idea* document in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD and try out a project idea for a different unit.



9. Save your Unit Plan.
10. Return to your Teacher Workspace and click **Submit**. This brings you to a page where you may assign student teams.
11. Review Steps 3–5 to familiarize yourself with the project-creation options.
12. Go to Step 6 on page 9.39 to assign teams to your project.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.9: Changing Showing Evidence labels
- Showing Evidence Skill 3.10: Editing a project
- Showing Evidence Skill 3.20: Creating a claim
- Showing Evidence Skill 3.21: Creating evidence

Do not force the use of *Showing Evidence* when it is not a good use of time or academically warranted.

### Using the Showing Evidence Tool to Target Thinking Skills

#### Step 3: Creating Your Own Project Description and Prompt

If you completed Step 2 and used the project wizard to copy a project to your Teacher Workspace, skip Steps 3–5. Otherwise, review the following tips for creating a Project Description. Then draft your project ideas on the following page.

- Setup of an authentic problem, significant question, or real-life scenario
- Explanation as to why this project or problem is worthy of study
- Definition of what your students will try to solve, produce, respond to, test, recommend, or find out
- Description of what students will be required to decide, prioritize, negotiate, or seek consensus on
- Use of age-appropriate language that makes the topic engaging and interesting

Consider the following questions as you develop a project description that reflects your project:

- Does the project engage the students' interest? Will it motivate them to pursue and explore the concepts deeply?
- Is the project cast in a context familiar to the students? Is it based on a real-world situation, scenario, or controversy?
- Is the project staged well? Is the project developed so that student interest builds?
- Is the information provided adequate to solve the questions of the project? Is too much information provided? Too little?
- Does the complexity and length of the project warrant and support working collaboratively?
- Is the problem or scenario of the project open-ended, which will provide different entry points and paths for your students?
- Does the project challenge students to use higher-order thinking skills?

Modified from:

"Guidelines for Reviewers"

Problem-Based Learning Clearinghouse

University of Delaware

## Using the Showing Evidence Tool to Target Thinking Skills

### Draft Your Project Ideas

1. Open your Unit Plan.
2. Review your Curriculum-Framing Questions. Consider how your students' work with Showing Evidence could help to support your unit's questions.
3. Review your project priorities on pages 2.20-2.22.
4. Preview the Reflection Checklist on page 10.07.

**Note:** You may also want to review the Project Rubric on pages 2.18–2.19.

5. Use the following table to draft the Project Description and Prompt for your case or type them directly into your Unit Plan.



**Note:** If you do not think the *Showing Evidence Tool* is a good fit for your unit, open the *Showing Evidence Project Idea* document from the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD and save it to your Project Folder. In Module 10, you can try out a project idea for another unit.

Example	<b>Project Description</b>	Until recently, Sally was living her dream. She had a loving and caring husband, two wonderful children, and had just moved into her lovely new custom-built home. Sally was very happy...until she started getting sick. You will research and evaluate evidence on four possible causes of Sally's illness. Based on your research, you will come to a conclusion as to what is the most likely cause and source of Sally's illness.
	<b>Prompt</b>	What is the cause and source of Sally's illness?
Possible Ideas	<b>Project Description</b>	
	<b>Prompt</b>	



### Using the Showing Evidence Tool to Target Thinking Skills

#### Step 4: Planning Your Use of Showing Evidence

1. If you did not complete the *Showing Evidence* section of the Unit Plan in the previous step, type the details for the Project Title, Project Description, and Prompt in your Unit Plan.



2. Save your file.

#### Step 5: Creating a New Showing Evidence Project



1. Open *Showing Evidence* from your Favorites and log on to your Teacher Workspace. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))



2. When setting up a new *Showing Evidence* project, consider the following. (See Teaching Tools, Showing Evidence Tool Skill 3.8.)

- **The Project Name** could specifically reference the purpose or use of the *Showing Evidence Tool* in your overall project. This title appears in the *Student Workspace* as well as above your students' *Showing Evidence* cases. You can change the name of the project later if you wish. (You may want to copy and paste the title from your Unit Plan.)  
**Note:** When more than one project is assigned to a team, a list of available projects appears on the *Student Workspace* page. Students should be able to differentiate the projects by looking at the project names. This is one reason that you should create a project name that specifically identifies the focus or use of the *Showing Evidence Tool*, rather than just the unit name.
- **The Project Description** appears in the Student Workspace, so you should use vocabulary that is age-appropriate. (See page 9.37 or copy and paste the description from your Unit Plan.)
- **The Prompt** (the section asking, What question will your students be asked to answer in this project?) is also displayed on the top of the students' *Showing Evidence* case. (See page 9.37 or copy and paste the statement from your Unit Plan.)
- *Showing Evidence* can be set up with a *Standard* or *Simplified* version of the tool. The simplified version does not require students to rate the evidence or support, nor explain how the evidence supports or opposes the claim. This version may be helpful with younger students or during practice session where you simply want students to get used to the idea of documenting evidence and weighing support for a claim. (See Teaching Tools, Showing Evidence Tool Skill 3.8.5 and 3.8.6.)

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.8: Creating a new Showing Evidence project
- Showing Evidence Step 3.8.5: Setting up a standard project
- Showing Evidence Step 3.8.6: Setting up a simplified project 3.21: Creating evidence

## Using the Showing Evidence Tool to Target Thinking Skills

- You can change the vocabulary of the *Showing Evidence* labels. The vocabulary that is used in the *Showing Evidence Tool* can be changed to match the particular project or subject matter that your student teams will be addressing. (See Teaching Tools, Showing Evidence Tool Skill 3.9.)
- You can pre-populate the student teams' cases to include claim(s) or unrated evidence. Set up the workspace as you want it to appear when your students begin working on their cases. (See Teaching Tools, Showing Evidence Tool Skills 3.20 and 3.21.)



**Note:** You will not be able to change, delete, or add to any pre-populated evidence or claims after you have assigned teams unless you unassign them first. If you have doubts about any elements you are considering to add as pre-populated items in this practice case, you may want to simply add them in the Student Workspace, rather than in the Teacher Workspace. Since this is a practice project, it will not impact your practice project in any significant way.

3. Continue with either Step 6 or Step 7 to set up teams.

### Step 6: Creating Teams IDs with the Project Wizard

In this step, you create generic Team IDs (Team IDs with the same base word plus a number). You also need to create a reviewing team for your practice project. If you prefer to create specialized Team IDs, skip this step and go to Step 7.

Consider whether you will include reviewing teams in your unit. If so, you can assign one or more reviewing teams to each team. A link to a read-only version of the team's argument case would appear in the reviewing team's workspace. The reviewing team will see the current work of the team they are reviewing, but will not be able to make changes to the work. Reviewing teams can, however, make comments by clicking the small triangle at the upper-right corner of the evidence, the evidence rating, the support rating, or the claim.



1. Use the Project Wizard to create at least two teams for this practice project and assign each of them as a reviewer of the other. (See Teaching Tools, Showing Evidence Tool Skill 3.11.)

**Note:** If you already have wizard-created teams and you use the project wizard again to set up teams for this project (with the same base word), the wizard will recognize that you already have those teams and assign them to this project. The student teams will be able to view and access both projects from their Student Workspace.



2. Go to Overview page vii to write down your team IDs and passwords or type the information in the Login Information document in your Project Folder.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.9: Changing Showing Evidence labels
- Showing Evidence Skill 3.20: Creating a claim
- Showing Evidence Skill 3.21: Creating evidence

For this practice case, be sure to assign a reviewing team.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.11: Creating a new set of student teams

## Module 9

---

### Using the Showing Evidence Tool to Target Thinking Skills

For this practice case, be sure to assign a reviewing team.

#### Step 7: Creating Specialized Student Teams

If you want to create team IDs that designate different team projects, areas of focus, or different perspectives (such as *prosecutor*, *defense*, and so forth), follow the directions in this step to create specialized student teams. You also need to create a reviewing team for your practice project.

Consider whether you will include reviewing teams in your unit. If so, you can assign one or more reviewing teams to each team. A link to a read-only version of the team's argument case would appear in the reviewing team's workspace. The reviewing team will see the current work of the team they are reviewing, but will not be able to make changes to the work. Reviewing teams can, however, make comments by clicking the small triangle at the upper-right corner of the evidence, the evidence rating, the support rating, or the claim.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.13: Creating unique team names
- Showing Evidence Skill 3.14: Viewing or editing team information



1. Create at least two teams for this practice project and assign each of them as a reviewer of the other. (See Teaching Tools, Showing Evidence Tool Skill 3.13.)
2. Go to Overview page vii to write down your team ID and password or type the information in the Login Information document in your Project Folder.

**Note:** You may want to keep the team ID and password the same so students can remember them more easily. If they forget their password, you can see what their password is in the Teacher Workspace, under *Manage Teams*. (See Teaching Tools, Showing Evidence Tool Skill 3.14.)

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Extension Activity: Understanding Best Practices with Showing Evidence

The following resources are available to you for self-study or as an optional extension in your course. Complete Step 1 and/or Step 2 to view strategies and project ideas for using *Showing Evidence* in the classroom.

#### Step 1: Viewing Instructional Strategies

View best practices for planning, implementing, and assessing a project that integrates the *Showing Evidence Tool*.



1. Go to: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
2. Click **Instructional Strategies**.
3. Click the categories of interest: **Planning a Project, Implementing a Project, or Assessing Work**.



4. View resources and articles on the Toulmin Model of Argument (on which the *Showing Evidence Tool* is based) and information on evaluating arguments in the *Thinking Tool, Showing Evidence Tool* folder on the Curriculum Resource CD.
- 
- 

#### Step 2: Viewing Showing Evidence Project Ideas

Although you had an opportunity to view a few project ideas earlier in this module, if you want additional ideas to help focus or expand your project, explore units that integrate the *Showing Evidence Tool*.



1. Go to: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
2. Click **Project Examples**.
3. View projects that integrate the *Showing Evidence Tool* in either **Project Ideas** or **Unit Plans**.

### Using the Showing Evidence Tool to Target Thinking Skills

#### References

- Driver, R., Newton, P., & Osborne, J. (2000). Establishing the norms of scientific argumentation in classrooms. *Science Education*, 84 (3), 287-312.
- Jiménez-Aleixandre, M.P., Rodríguez, A.B., & Duschl, R.A. (2000). "Doing the lesson" or "doing science": Argument in high school genetics. *Science Education*, 84, 757-792.
- Kuhn, D. (1992). Thinking as argument. *Harvard Educational Review*, 62(2), 155-177.
- Lizotte, D.J., McNeill, K.L., & Krajcik, J. (2004). Teacher practices that support students' construction of scientific explanations in middle school classrooms. In Y. Kafai, W. Sandoval, N. Enyedy, A. Nixon & F. Herrera (Eds.), *Proceedings of the sixth international conference of the learning sciences* (pp. 310-317). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- McNeill, K.L., Lizotte, D.J., Krajcik, J., & Marx, R.W. (2004, April). *Supporting students' construction of scientific explanations using scaffolded curriculum materials and assessments*. Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.
- Means, M.L., & Voss, J.F. (1996). Who reasons well? Two studies of informal reasoning among children of different grade, ability, and knowledge levels. *Cognition and Instruction*, 14, 139-178.
- Passmore, C., & Stewart, J. (2002). A modeling approach to teaching evolutionary biology in high schools. *Journal of Research in Science Teaching*, 39(3), 185-204.
- Reznitskaya, A., & Anderson, R.C. (2002). The argument schema and learning to reason. In C. C. Block & M. Pressley (Eds.), *Comprehension instruction: Research-based best practices* (pp. 319-334). New York: The Guilford Press.
- Toulmin, S. (1958). *The uses of argument*. Cambridge, UK: Cambridge University Press.
- Voss, J. F., & Van Dyke, J. A. (2001). Argumentation in psychology: Background comments. *Discourse Processes*, 32(2&3), 89-111.



For additional resources on argumentation, view references in the *Thinking Tool, Showing Evidence Tool* folder on the Curriculum Resource CD.

---

## Using the Showing Evidence Tool to Target Thinking Skills

### Module 9 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

#### Module 9 Key Points:

- Research shows that, regardless of grade level or subject area, argumentation skills extend learning.
- The argument model used by *Showing Evidence* consists of:
  - Making a claim
  - Providing evidence
  - Evaluating the quality of evidence
  - Making explicit links between the claim and evidence
  - Providing reasoning for why the evidence supports the claim
  - Considering counterarguments
  - Making a conclusion

#### Accomplishments:

- Looked deeply into a unit that includes the *Showing Evidence Tool* to get ideas on project design, implementation, teacher-student dialog, and assessment
- Set up a project online that integrates the use of the *Showing Evidence Tool*

In Module 10, you will try your ideas for *Showing Evidence*.



---

**Considering the Showing Evidence Tool for Your Unit****Activities****Activity 1: Creating a Practice Case** ..... 10.01**Create:** A practice *Showing Evidence* case**Activity 2: Reviewing Student Work** ..... 10.05**Review:** Your practice *Showing Evidence* case**Activity 3: Sharing Your Practice Case** ..... 10.06**Share:** Your practice case**Reflect:** On your *Showing Evidence* case**Activity 4: Revising Your Project** ..... 10.08**Revise:** Your *Showing Evidence* project**Activity 5: Revisiting Your Unit Plan** ..... 10.09**Discuss:** Best classroom practices**Revise:** Your Unit Plan**Activity 6: Sharing Your Results** ..... 10.13**Reflect:** On your use of *Showing Evidence***Extension Activity: Finalizing Your Showing Evidence Project** ..... 10.14**Complete:** The *Showing Evidence* project to fully meet expectations and learning goals**References** ..... 10.15**Module Summary** ..... 10.16





## MODULE 10

# Considering the Showing Evidence Tool for Your Unit

**Description:** During this module, you try out your project ideas by creating a practice *Showing Evidence* case, discuss and practice effective questioning techniques, provide and receive feedback on your ideas, and use tips on implementation and assessment to revise your Unit Plan.

## Activity 1: Creating a Practice Case

The purpose of creating a practice student case is to test your concepts, practice the types of discussions and questions you might want to ask your students, and then revise your project description, prompt, and requirements, as needed. The other purpose of this practice case is to determine whether the use of the *Showing Evidence Tool* really is the best fit for your unit. You may decide, after trying out your ideas, that the use of another thinking tool would support your unit's objectives in a more direct way.

When creating your practice student case, ensure that you model your expectations for:

- Rating criteria for evidence quality, evidence support, and claim
- Format and level of detail in the descriptions
- Choice and format of sources

Follow the steps on the next page to create a practice student case. You may want to use similar directions for your students when you are ready to have them create their own arguments. Use the Intel® Education *Help Guide* if you need assistance in completing any of the technology skills identified.

## Module 10

### Considering the Showing Evidence Tool for Your Unit

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.3: Opening a Showing Evidence project in the Student Workspace
- Showing Evidence Skill 3.20: Creating a claim



1. Open *Showing Evidence* from your Favorites. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))
2. Click **Student Log-In**.
3. Log on to the *Showing Evidence* Student Workspace using the student login information on Overview page vii or in your Login Information document.
4. Open your project. (See Teaching Tools, Showing Evidence Tool Skill 3.3.)
5. Review the elements of the *Showing Evidence* case



After all evidence has been evaluated, students determine whether the claim is valid, explain their reasoning, and provide an overall star rating of how well all the evidence supports the claim.

Start by either creating new evidence or by creating a new claim.

Review the **Save project, Show report, Change view, Shrink text size, Grow text size, and Delete** buttons.

Click **Create New Evidence** to start a new piece of evidence.

The screenshot shows the 'Showing Evidence' tool interface. On the left is the 'Create New Claim' panel with fields for 'YOUR CLAIM', 'Your Explanation', and 'Your Rating'. In the center is the main workspace with a table of evidence items. On the right is the 'Create New Evidence' panel. Annotations include: 'Click the titles for additional information.' pointing to the claim title; 'Evidence that supports a claim is linked to the claim in the green area. Evidence that weakens a claim is linked to the claim in the red area.' pointing to the 'Support' and 'Quality' columns; 'When a piece of evidence is attached to a claim, students rate how strongly the evidence either supports or weakens the claim, along with their reasoning (in the standard, not simplified, version).' pointing to the evidence items; 'The number of checkmarks indicates the team's evaluation of the quality of the evidence and the reliability of the source.' pointing to the checkmarks; 'Double-click an evidence item to view a detailed description, the quality rating of the evidence (in the standard version), and the sources of the evidence.' pointing to the evidence item; 'A colored triangle means a comment has been added.' pointing to a colored triangle; and 'A "t" indicates that the evidence was provided by the teacher.' pointing to a 't' icon.

**Note:** Depending on your project, you may be creating evidence first or a claim first. Follow the steps below in the order that is appropriate for your project.

## Considering the Showing Evidence Tool for Your Unit

6. Consider the following as you create a claim: (See Teaching Tools, Showing Evidence Tool Skill 3.20.)

- a. Use a short sentence in the *Your Claim* section so that it can be read with minimal scrolling.
- b. Enter a more detailed explanation of the claim in the *Your Explanation* section, if needed. Expand on the claim summary and elaborate on its meaning.
- c. The *Your Rating* section is normally completed after all the evidence has been created and evaluated. However, you may want to instruct your students to update this section as they go. It can provide a snapshot as to how they feel the argument is progressing at the moment. Students could then modify it as they gather more evidence.

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.21: Creating evidence
- Showing Evidence Skill 3.22: Rating the quality of evidence
- Showing Evidence Skill 3.23: Color-coding evidence
- Showing Evidence Skill 3.24: Linking evidence to a claim
- Showing Evidence Skill 3.29: Rating a claim



7. Consider the following as you create evidence: (See Teaching Tools, Showing Evidence Tool Skill 3.21.)

- a. The *Evidence Summary* needs to have a very short title that is as clear as possible. You need to be able to scan and understand the evidence titles when evidence is attached to the claim.
- b. The *Explanation* contains the detail of a piece of evidence. You will need to clarify for your students your expectations for this section.
- c. The *Source* contains information about where a piece of evidence came from. Web site addresses pasted in this section are “clickable.” Clarify for your students your expectations for this section as well, including the acceptable resources.
- d. If you are using the standard version of the tool, rate the quality of the evidence and provide the rationale. Five check marks mean high quality; one check mark means low quality. This rating should indicate the level of assurance you have for the reliability of the source and quality of the evidence. (See Teaching Tools, Showing Evidence Tool Skill 3.22.)



**Note:** The *Evidence Quality* is rated solely on how well you trust a source and believe that the evidence is accurate. The rating is not to be based on whether the evidence supports the claim. See the sample rubric on page 9.12.

- e. In the *Rating Rationale* section, include an explanation as to why you rated the quality as you did.

8. If desired, you can choose to color-code the evidence in the *Evidence Bin*. (See Teaching Tools, Showing Evidence Tool Skill 3.23.)

## Module 10

### Considering the Showing Evidence Tool for Your Unit

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.30: Adding or updating a conclusion
- Showing Evidence Skill 3.31: Adding a comment to a claim, link, rating, or evidence
- Showing Evidence Skill 3.37: Showing and printing a report

9. Attach evidence to the claim. (See Teaching Tools, Showing Evidence Tool Skill 3.24.)

- If you think a piece of evidence supports the claim, drag the evidence into the green (upper) area of the claim. If you think a piece of evidence weakens the claim, drag it into the claim's red (lower) area.
- If you are using the full version of the tool, rate how well the evidence supports or opposes the claim and enter your rationale.

**Note:** See sample rubric on page 9.14.

10. Review evidence to rate the claim. (See Teaching Tools, Showing Evidence Tool Skill 3.29.)

- After reviewing and rating all the evidence, analyze the strength and quality of the evidence and determine whether the entire body of evidence results in supporting or opposing the claim.
- Indicate by the number of stars in the *Your Rating* section how well you believe the claim is supported.

**Note:** See sample rubric on page 9.17.

- Type an explanation as to why you believe the claim is supported, refuted, or undetermined.



11. Make a conclusion. (See Teaching Tools, Showing Evidence Tool Skill 3.30)

- Use the *Conclusion* area below the *Claims Workspace* to summarize your thoughts about the case.
- If your case includes more than one claim, use the *Conclusion* area to make judgments about the case as a whole.

12. Add comments. (See Teaching Tools, Showing Evidence Tool Skill 3.31)

- Team members can use the *Comments* box to leave comments for each other (when not working together), the teacher, or reviewing teams. The teacher and reviewing teams communicate to the team authors through comments.
- Add text in the bottom section of the *Comments* box. (When you review another team's case, your team's name appears next to your comments.)

13. Examine your case using the *Show report* feature, which allows you to view all the descriptions and ratings of your evidence and claims in one page. A report can be helpful when students are using the information gathered using the *Showing Evidence Tool* to produce other reports or products. (See Teaching Tools, Showing Evidence Tool Skill 3.37)

## Considering the Showing Evidence Tool for Your Unit

### Activity 2: Reviewing Student Work

Each student case may be reviewed by the teacher and by a peer reviewing team that has been assigned by the teacher. In this activity, you review your practice case as a teacher. In the next activity, you work with another team to peer review each other's case and project idea. Use the *Help Guide* if you need assistance in completing any of the technology skills identified.

#### Reviewing as a Teacher



1. Log on to the Teacher Workspace in *Showing Evidence*, and open your student sample *Showing Evidence* project. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)) (See Teaching Tools, Showing Evidence Tool Skills 3.5 and 3.36)
2. Review the work for your student sample. You cannot make changes to the work, but you can add comments as a reviewer on the evidence, the evidence rating, the support rating, and the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.36 and 3.31)
3. A *Comments* box is available at the bottom of the screen to support open-ended communication among the teacher and students in the team, for comments on the project as a whole. The *Comments* box can only be seen by the teacher and the student team who has created the case. This box is provided for more general comments and concerns that the teacher wants to share with the team, the team members want to share with each other when not working in the same location, or responses to existing comments. All comments are saved sequentially, with the most recent one at the top. (See Teaching Tools, Showing Evidence Tool Skills 3.34)

Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.5: Logging in as a teacher
- Showing Evidence Skill 3.31: Adding a comment to a claim, link, rating, or evidence
- Showing Evidence Skill 3.33: Editing a comment attached to a claim, link, rating, or evidence
- Showing Evidence Skill 3.34: Commenting on a project
- Showing Evidence Skill 3.36: Opening and reviewing a student project

## Module 10

### Considering the Showing Evidence Tool for Your Unit

Before this reviewing activity, be sure you have assigned reviewing teams to your practice case.

#### Activity 3: Sharing Your Practice Case

During this activity, you work with another team to review each other's work. In addition to reviewing the other team's student sample case, you also provide feedback on the prompt and overall project idea. Consider whether your practice *Showing Evidence* case supports and begins to provide answers for the overall questions of the unit. Use the *Help Guide* if you need assistance in completing any of the technology skills identified.

This activity models what is necessary in your classroom when using reviewing teams. When using the *Showing Evidence Tool*, plan for guided reflection activities with your students.

#### Step 1: Reviewing the Practice Case

To make the reviewing session go more smoothly, you may want to write your reviewing team ID and password on a sticky note or index card to give to the reviewer(s).

Be sure that you access the work to review by clicking the Projects to Review link, instead of entering your own practice case.



1. Briefly share your unit's topic, learning objectives, and overall concept with your reviewing team. Have your reviewing team share the basic information about their unit. Ask each other if any aspects need specific feedback. What type of feedback would you expect from student teams?
2. Provide each other with the login information so that both can log on as a reviewing team to view the case and make comments. (See Overview page vii or the Login Information document.)
3. Log on to the *Showing Evidence* Student Workspace as the student reviewing team at: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence) Teaching Tools, Showing Evidence Tool Skill 3.2)
4. Open the project you want to review. (See Teaching Tools, Showing Evidence Tool Skill 3.4)
5. The team's current work is displayed. You cannot make changes to the work, but you can add comments as a reviewing team on the evidence, the evidence rating, the support rating, and the claim. (See Teaching Tools, Showing Evidence Tool Skills 3.31)
6. Prepare to discuss the *Showing Evidence* case and overall project ideas with your reviewing team in the next step.



Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.2: Logging in as a student
- Showing Evidence Skill 3.4: Opening a Showing Evidence project as a student reviewer
- Showing Evidence Skill 3.31: Adding a comment to a claim, link, rating, or evidence

## Considering the Showing Evidence Tool for Your Unit

### Step 2: Reflecting on Your Case



After reviewing each other's case, return together to discuss the *Showing Evidence* cases and overall concept of your projects. Consider whether your practice cases support and begin to provide answers for the overall questions of each respective unit. Use the Reflection Checklist below and the Project Rubric on pages 2.18–2.19 to help guide your discussion. Use the *Comments* section in the checklist to note any needed revisions.

#### Showing Evidence Project Reflection Checklist

Reflection Checklist	Comments
<input type="checkbox"/> The project description is focused and clear. The description provides background and/or context for how the use of the <i>Showing Evidence Tool</i> fits in the unit.	
<input type="checkbox"/> The project description defines what the students will be trying to solve, produce, respond to, test, recommend, or find out.	
<input type="checkbox"/> The prompt requires students to analyze a controversial issue, debatable topic, moral or ethical dilemma, social issue, or challenge to an existing opinion.	
<input type="checkbox"/> The project's questions are engaging, thought-provoking, age-appropriate, and open-ended.	
<input type="checkbox"/> The practice case contains supporting and opposing evidence of sufficient quantity and quality to adequately answer the prompt.	
<input type="checkbox"/> Evidence is rated consistently, and the explanations and rationale are clear.	
<input type="checkbox"/> The use of the <i>Showing Evidence Tool</i> helps students meet the learning goals of the unit.	
<input type="checkbox"/> The overall project idea meets the highest ratings of the Project Rubric on pages 2.18–2.19.	



**Note:** This checklist is available in the *Thinking Tools, Showing Evidence Tool* folder on the Curriculum Resource CD.



## Considering the Showing Evidence Tool for Your Unit

### Activity 4: Revising Your Project

After the discussion with your colleagues, you may realize you need to modify the scope of your project. Use this time to either edit the project in the Teacher Workspace and/or revise the student sample case.

#### Step 1: Editing Your Project

If you need to edit your project or want to practice editing a project, follow the directions below:



1. Open *Showing Evidence* from your Favorites and log on to the Teacher Workspace. ([www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence))
2. Open and edit your project. (See Teaching Tools, Showing Evidence Tool Skills 3.6 and 3.10)  
**Note:** If you have assigned teams to the project, you cannot change pre-populated evidence or claims, nor add any new evidence or claims. (If you must make changes, you have two choices. You can either unassign the teams on the team page and return to edit the project, which will delete the work completed in your student project, OR you can create a new project and copy the project details from the old project into the new one, including copying the student work.) (See Teaching Tools, Showing Evidence Tool Skills 3.16 and 3.8)
3. Add or edit team information as needed. (See Teaching Tools, Showing Evidence Tool Skills 3.13 and 3.14)



Refer to the following skills in the *Help Guide* for this section:

- Showing Evidence Skill 3.2: Logging in as a student
- Showing Evidence Skill 3.3: Opening a Showing Evidence project in the Student Workspace
- Showing Evidence Skill 3.8: Creating a new Showing Evidence project
- Showing Evidence Skill 3.6: Opening a Showing Evidence project in your Teacher Workspace
- Showing Evidence Skill 3.10: Editing a project
- Showing Evidence Skill 3.12: Adding a new student team
- Showing Evidence Skill 3.14: Viewing or editing team information
- Showing Evidence Skill 3.16: Unassigning teams from a project

#### Step 2: Revising Your Case

Use any new ideas from your colleagues to revise your case. Use the Internet to research your evidence to eliminate, validate, or add to your initial case ideas.

If you logged on as a teacher to edit your project, log out and click the **Go to Student Sign In** link at the bottom of the Teacher Workspace to log in as your sample student team to revise the practice case. (See Teaching Tools, Showing Evidence Tool Skills 3.2 and 3.3)

---

---

---

---

---

---

---

## Considering the Showing Evidence Tool for Your Unit

### Activity 5: Revisiting Your Unit Plan

During this activity, you discuss ways to implement and manage projects that use the *Showing Evidence Tool*, and you continue working on your Unit Plan.

#### Step 1: Understanding Best Classroom Practices

**Start small.** Consider using the simplified version of *Showing Evidence* first to help your students get used to the tool and the basics of making an argument.

**Try out your ideas.** Practice with your project before assigning it to your students. Gather evidence yourself to be sure that your project ideas will work.

**Establish project expectations.** Before starting work with *Showing Evidence*, make expectations clear. Discuss your expectations of the kinds of evidence students can use, how to rate the evidence, and what can be done with the claim. You may want to provide some additional scaffolds, such as rating rubrics, a requirements checklist, vocabulary definitions and examples, basic tool instructions, or a working document for gathering research (including the topic, prompt, claim focus, and questions needing answers to support the claim).

**Set up teams to succeed.** Consider assigning certain roles for the team and have students rotate through them. For instance, one student could use the computer to enter new evidence items, while another gathers evidence from print references or Web sites. Remind students that only one team member can be logged on to the workspace at a time. If instant messaging is approved for use in your school, it can be an effective way to transfer information from a researcher using online sources to the student logged into the project.

### Considering the Showing Evidence Tool for Your Unit

**Assign teams and reviewers.** Give some thought to how you assign teams. Sometimes, you may want to assign like-minded students to the same team to facilitate the decision making process. Other times, try creating teams where the students will need to negotiate their claims. If you will be assigning different topics for each team, consider having two teams per topic. You can then assign teams with the same topics to act as each other's reviewing teams. Peer-reviewing teams would then have the content knowledge to comment effectively. If you are doing a joint project with another class, you will need to set up one project and assign teams from both classes. You can then assign reviewing teams from the other class. Be sure to provide your teacher login information to the other teacher, as well. Consider assigning an expert or outside reviewer to work with your students, especially in the case of an independent science research project.

**Consider creating an initial set of sources for evidence.** To help students use research time effectively, you may want to give them a resource list of suggested Web sites, other electronic media (such as encyclopedias), and print resources. This will be particularly important for younger students. After they have exhausted your list, you may want to give them more time to conduct research using other sources.

**Consider a practice case.** After discussing the parts of an argument, you may want to demonstrate each part of *Showing Evidence* and then have your students work briefly on a practice case. Create a practice project that requires very little prior knowledge and/or supply easily accessible evidence. Students should work through the case from beginning to end to learn how to use the Student Workspace, see the difference between a claim and evidence, understand how to rate evidence, and practice looking at a body of evidence to come to a conclusion. Consider the following prompts for practice projects:

- Should parents pay their kids to do chores?
- Should a curfew be enforced on school nights for kids under 16?
- Should junk food be sold at school?
- Should students be required to wear school uniforms?
- What new meal should be served in the cafeteria?
- What theme should we use for the prom?

---

## Considering the Showing Evidence Tool for Your Unit

### Use Multiple Methods of Assessment throughout the Project

Assess students using multiple forms:

- Multiple assessors—such as the students themselves, peers, the teacher, and mentors
- Multiple units of assessment—such as individual students, groups, the whole class
- Multiple formats—such as written work (formal assignments and informal journal entries), observations (of group activities and individual work), presentations, informal discussions and questions, project designs, and the final product

During the project, focus on assessing your students' thinking and the quality of their arguments. Ongoing student assessments could include:

- Preplanning documents
- Reflection logs or daily journals
- On-task behavior/participation points
- Major assessment points as students develop ideas (collection of evidence, identification of a viable claim, final case)
- Quality of peer review
- Self- and peer-evaluation
- Observation of student discussions and development of ideas while students use the *Showing Evidence Tool*

Consider how students will develop and present answers to the significant questions and issues of the project as a whole, beyond the use of the *Showing Evidence Tool*. Students should use the information learned through the use of *Showing Evidence* to create an outcome that demonstrates their understanding. Some ideas include:

- Have students create a final project, such as a presentation, report, essay, or publication that analyzes, evaluates, and proposes a solution, verdict, conclusion, or new action
- Set up a role-play, experiment, scenario, or other hands-on activity to assess skills and knowledge
- Use debates, interviews, mock trials, or other oral presentations to uncover the depth of students' understanding and comprehension

### Considering the Showing Evidence Tool for Your Unit

Some of the information above is modified from:



#### **Rubric to Assess a PBL (Project-Based Learning) and Rubric**

[www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)\*

#### **Project Based Learning with Multimedia**

Originally from: <http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html>\* (link no longer active)

### Step 2: Revisiting the Unit Plan

Considering the information in the previous step and what you have learned through your practice student *Showing Evidence* case, revise your ideas for your unit. Step back from just the use of the *Showing Evidence Tool* and sketch out the larger picture of the overall unit. If you are not going to use *Showing Evidence* in your unit, continue working on other parts of your Unit Plan that need completion.

1. Open your Unit Plan.
2. Revise the *Showing Evidence Title*, *Project Description*, and *Prompt*, if needed.
3. Consider whether additional standards or learning objectives could be targeted in your unit. Revise the *Standards* or *Learning Objectives*, if necessary.
4. Review your *Curriculum-Framing Questions* and revise if necessary.
5. Consider the ideas on the previous two pages about ongoing assessment. In the *Assessment Summary* section of the *Student Assessment Plan*, add your ideas for how you might assess learning during the unit. Revise the *Timeline* section, if needed.
6. In the *Procedures* section, draft the activities that will occur in the classroom that lead up to, include, and follow the use of the thinking tools and assessments.
7. Draft or outline the *Unit Summary* by briefly describing your ideas for the overall unit. Include your general concept of the whole unit, not just the activity that will use the *Showing Evidence Tool*. Explain the main task, scenario, or challenge you will use to engage your students.



8. Save your work.

---

## Considering the Showing Evidence Tool for Your Unit

### Activity 6: Sharing Your Results

If you are using a wiki, create another entry to reflect on and share your experience with the *Showing Evidence Tool*. Review and provide feedback for one or two other colleagues' projects that you have not reviewed earlier. If you are not using a wiki, share in small groups.



1. Go to the wiki site for this course and log on.

**Note:** The URL and login information may be written on Overview page vi or in your Login Information document.

2. Use the following questions to help you reflect on your use of *Showing Evidence*:
  - Did you try an idea for your main unit or for a different project idea?
  - Considering your test results, do you think you will keep this tool in your Unit Plan?
  - How do you see the use of the *Showing Evidence Tool* fitting in with the objectives and standards you are trying to target—and your overall plan for your unit? How will the use of this tool help students meet those requirements?
  - How do you see the *Showing Evidence Tool* enhancing your students' higher-order thinking skills, as well as collaboration and communication in your classroom?
  - What questions do you still have about this project's design, implementation, or assessment?



3. Save your wiki page.

4. Review one or two other wiki entries from your colleagues, preferably from authors you have not reviewed before.



5. Provide suggestions and feedback on your colleagues' ideas, concerns, or questions.

### Considering the Showing Evidence Tool for Your Unit

#### Extension Activity: Finalizing Your Showing Evidence Project

The following activities and resources are available to you as a self-study course enhancement or an optional extension in your course.

If you anticipate that this *Showing Evidence* project will be implemented for your unit because it is a good fit for the unit's objectives, complete any unfinished elements of your *Showing Evidence* project. Include appropriate references, comments, and analysis in your student sample that you would expect your students to include in their *Showing Evidence* projects. Make any necessary edits to the project itself, if necessary.



1. Go to: [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
2. Click **Teacher Workspace** or **Student Log-In** depending on whether you need to edit the project parameters or your sample student project.
3. Enter the login information, which may be written down on Overview page vii or in your Login Information document.
4. Make any necessary additions or changes.

---

## Considering the Showing Evidence Tool for Your Unit

### References

Assessing student work with project-based learning. (1997–2001). *The multimedia project: Project-based learning with multimedia*. Retrieved from San Mateo County Office of Education Web site: <http://pblmm.k12.ca.us/PBLGuide/AssessPBL.html>

Rubric to assess a PBL and rubric. (n.d.). Retrieved from Innovative Designs for Education Web site: [www.idecorp.com/assessrubric.pdf](http://www.idecorp.com/assessrubric.pdf)



**Note:** For additional resources on argumentation, view references in the *Thinking Tools, Showing Evidence* folder on the Curriculum Resource CD.



## Module 10

---

### Considering the Showing Evidence Tool for Your Unit

Use this summary to review this module's main points and check for understanding.

### Module 10 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

#### Module 10 Key Points:

- The *Showing Evidence* case should require students to analyze a controversial issue, debatable topic, moral or ethical dilemma, social issue, or challenge to an existing opinion.
- The case should contain supporting and opposing evidence of sufficient quantity and quality to adequately answer the prompt.

#### Accomplishments:

- Integrated the use of the *Showing Evidence Tool* into a unit or project idea
- Completed a practice case
- Used a wiki to document the evolution of my unit ideas and use of *Seeing Reason*
- Revised the project and overall unit based on feedback and reflection

In Module 11, you determine which thinking tools will be used in your unit to meet your learning objectives for your students, and you complete your Unit Plan.

## Activities

### Activity 1: Supporting Your Assessment Plan ..... 11.01

**Identify:** Documents to support your Assessment Plan

**Understand:** The strengths of different types of assessments

### Activity 2: Creating an Assessment ..... 11.05

**Create:** An assessment for your unit

### Activity 3: Finalizing Your Assessment Plan ..... 11.13

**Complete:** Your Assessment Plan

### Activity 4: Reflecting on Your Unit ..... 11.15

**Complete:** The Unit Reflection Checklist based on the Project Rubric

### Activity 5: Completing Your Unit Plan ..... 11.16

**Finalize:** Your Unit ideas

**Review:** Your Unit Plan

### Activity 6: Showcasing Your Unit ..... 11.20

**Share:** Your unit

**Review:** Units according to the Project Rubric

### Activity 7: Reflecting on the Course ..... 11.27

**Complete:** The Intel® Teach Thinking with Technology Course online evaluation

**Discuss:** Your thoughts about the course and teaching tools

**Accept:** Certificates of Completion

### Extension Activity: Enhancing Assessment in Your Unit ..... 11.29

**Review:** Assessment plans for assessment ideas

**Complete:** Assessment or create an additional assessment to support unit

### References ..... 11.30

### Module Summary ..... 11.31



## Module 11

# Completing Your Unit

**Description:** In this module, you complete your Unit Plan that integrates one or more of the online thinking tools. You analyze the effectiveness of the thinking tools in their support of unit objectives and standards, finalize your unit's Assessment Plan, and create one or more assessments for your unit using the *Assessing Projects* application. After reviewing and making adjustments to your unit, you use implementation questions to guide you in finalizing your unit. Lastly, you showcase your unit to colleagues and then evaluate the course.

## Activity 1 Supporting Your Assessment Plan

### Step 1: Considering Resources that Will Support Your Assessment Plan

Review the assessment methods and instruments in the following table and compare them with the draft assessment methods you outlined in your Unit Plan. Identify which types of assessment instruments could support your unit.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Module 11

### Completing Your Unit

Assessment Method	Assessment Instruments
<b>Strategies for Gauging Student Needs</b>	
Graphic Organizers	Concept maps, sequencing activities, classification charts, prioritized lists
Know-Wonder-Learn (K-W-L) Charts	Topic on chart paper or electronic whiteboard, journals
Think-Pair-Share	Questions or prompts, forms for recording summaries and questions
Brainstorming	Topic on chart paper or electronic whiteboard
<b>Strategies for Encouraging Self-Direction and Collaboration</b>	
Project Plan	Checklists, prompts, forms
Self-Assessment and Reflection	Checklists, prompts
Peer Feedback	Checklists, scoring guides or rubric, prompts, forms
Observation of Cooperative Groups	Checklists, questions, reflections
<b>Strategies for Monitoring Progress</b>	
Informal Observations and Anecdotal Notes	Comments on sticky notes or computer labels collected in individual or group folders, checklists to help focus expected behaviors
Learning Logs	Forms, prompts
Progress Checklists	Checklists with milestones, due dates and approval stages
Progress Reports	Forms, prompts
Project Meetings and Conferences	Agendas, goals, and process forms
<b>Strategies for Checking for Understanding and Encouraging Metacognition</b>	
Written Journals	Prompts for journal entries, journal review plans
Video and Photojournals	Outlines of photo sequences and topics (shot lists), schedules for video scenes
Informal Questioning	Questions
Written and Oral Tests and Quizzes	Test and quiz questions

Assessment Method	Assessment Instruments
<b>Strategies for Demonstrating Understanding and Skill</b>	
Products	Rubrics, scoring guides
Performances	Rubrics, scoring guides
Portfolios	Checklists, rubrics, scoring guides, reflection questions
Student-Led Conferences	Forms, prompts

## Step 2: Taking a Closer Look at Rubrics

Before deciding on the type of assessment you will create, consider the purposes of rubrics. Projects usually culminate with final products or performances. These demonstrations of learning are best assessed using rubrics that define *criteria* and have a scale of quality *indicators*. Rubrics are distinguished from other scoring tools, like checklists, because they outline levels of quality with *descriptors*. Descriptions of quality work at each level give students and teachers common language for expectations of final work. Rubrics can be reviewed and fine-tuned in discussions with students as the product or performance is assigned—this creates mutual understanding of expectations.

Rubrics contain criteria that define quality for many aspects or *traits* of a product or performance. Rubrics, however, are not always the best assessment choice. A checklist or scoring guide may be more appropriate. Generally, products or performances that are complex, have a lot of variation, or involve subjective judgments are good candidates for rubric scoring. The main goal of a rubric is to define levels of quality and publicize the expectations to students, parents, and others.

Higher-order thinking is difficult to define and equally challenging to assess. Rubrics are perhaps the best assessment tool to define and assess the complex thinking processes that are demonstrated in products and performances. The following rubric shows how the trait of analytical thinking is rated at four levels of quality. The trait is written fairly generically and could be used in a rubric in multiple content areas and topics.

Completing Your Unit

Trait or Criteria	Quality Descriptor Level 4	Quality Descriptor Level 3	Quality Descriptor Level 2	Quality Descriptor Level 1
Analysis of Evidence	Analysis shows sophisticated understanding of how evidence relates to and supports or opposes claim.  Rationale of support/non-support reflects deep understanding.	Analysis shows basic understanding of how evidence supports or opposes the claim.  Rationale of support/non-support may not reflect depth of understanding.	Analysis shows vague understanding of how evidence relates to the claim.  Rationale of support/non-support reflects a superficial understanding.	Analysis shows no understanding of how evidence relates to the claim.  Relationship is nonexistent or inconsistent.  Rationale does not support rating.

Consider whether a rubric would best support your students in the development and assessment of their projects.

**Note:** More information on rubrics is available at:

[www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)

Click **Assessment Strategies**, click **Demonstrating Understanding and Skill**, and then click **Rubrics and Scoring Guides**.

**Notes:**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Activity 2: Creating an Assessment

### Step 1: Introducing the Assessing Projects Application

A variety of assessment instruments can assist with student assessment. *Assessing Projects*, one of the Intel® Education online productivity tools, aids teachers in both planning and creating effective assessments that align with the learning goals of their technology-enhanced units. The *Assessing Projects* application supports teachers in creating student-centered assessments that assess the difficult-to-measure skills and behaviors that are expressed in higher-order thinking.

The *Assessing Projects* application allows you to create three types of assessments:

- **Rubrics**—Rubrics are assessments that have a trait or collection of traits with specific criteria that clearly define, for both student and teacher, different levels of performance or product expectations.
- **Checklists**—Checklists are lists of items, steps, or elements needed for a task that are checked off as completed. Checklists are used by teachers for observation and analysis of student work and by students to monitor progress and self-assess.
- **Scoring Guides**—Scoring guides are assessments that have points attached to them and are used by teachers to assign a grade and by students to monitor progress and self-assess.

The *Assessing Projects* application provides access to a library of validated assessments. You can modify the assessments in the library to meet the needs of your particular project. The assessments can be printed or exported to a variety of formats.



Completing Your Unit

Heuristics—Problem-solving by trial and error: A method of solving a problem for which no formula exists, based on informal methods or experience, and employing a form of trial and error iteration (MSN Encarta\*).

**Step 2: Determining the Focus of Your Assessment(s)**

Using the table below—and your own Habits of Learning Taxonomy—what higher-order thinking skills, products, performances, or processes do you want to target in this assessment? The categories below are the assessment categories included in the *Assessing Projects* library. Indicate which categories you are interested in including in your assessment(s).

Thinking Skills	Products/Performances	Processes
<input type="checkbox"/> Critical thinking	<input type="checkbox"/> Artistic/creative performances	<input type="checkbox"/> Collaboration
<input type="checkbox"/> Analysis	<input type="checkbox"/> Brochures	<input type="checkbox"/> Communication
<input type="checkbox"/> Commitment	<input type="checkbox"/> Constructions	<input type="checkbox"/> Peer review
<input type="checkbox"/> Evaluation	<input type="checkbox"/> Essays	<input type="checkbox"/> Reading
<input type="checkbox"/> Generalization	<input type="checkbox"/> Lab processes	<input type="checkbox"/> Research
<input type="checkbox"/> Inference	<input type="checkbox"/> Multimedia presentations	<input type="checkbox"/> Self-direction/ self-management
<input type="checkbox"/> Interpretation	<input type="checkbox"/> Newsletters	<input type="checkbox"/> Self-evaluation
<input type="checkbox"/> Problem solving	<input type="checkbox"/> Oral presentations	<input type="checkbox"/> Teamwork
<input type="checkbox"/> Argumentation	<input type="checkbox"/> Persuasive speaking	<input type="checkbox"/> Writing
<input type="checkbox"/> Coping with complexity	<input type="checkbox"/> Persuasive, expository, expressive, and narrative writing	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Decision making	<input type="checkbox"/> Reports	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Identifying and describing problems	<input type="checkbox"/> Simulations	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Knowledge of heuristics	<input type="checkbox"/> Skill demonstrations	
<input type="checkbox"/> Application of mathematical reasoning	<input type="checkbox"/> Timelines	
<input type="checkbox"/> Reasoning	<input type="checkbox"/> Videos	
<input type="checkbox"/> Creativity	<input type="checkbox"/> Web pages	
<input type="checkbox"/> Elaboration	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Flexibility	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Fluency	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Risk-taking		
<input type="checkbox"/> Other: _____		
<input type="checkbox"/> Other: _____		
<input type="checkbox"/> Other: _____		

### Step 3: Planning an Assessment

Plan an assessment based on your current Assessment Plan. Regardless of the type of assessment you choose to build, be sure to include the following elements for a quality assessment.

#### Foundation of an Assessment

- Language that clearly communicates the quality required
- Higher-order thinking skills (view your Habits of Learning Taxonomy for ideas)
- Criteria that are content-specific to your unit
- Instructions to the student (if a self- or peer-assessment)
- Room for feedback

#### Previewing the Steps for Creating an Assessment

1. Choose the type of assessment you want to create.
  - a. **Rubric:** If you want to build a rubric to assess a product or performance, the following will need to be completed:
    - i. Choose the traits to be assessed.
      - Categories specific to an assessment are located in the column on the far left side of the assessments. Example: In an oral presentation—eye contact, pace, expression, and so forth.
      - Define 6–8 traits or aspects of the product or performance that have a clear definition of quality.
      - Incorporate higher-order thinking skills.
    - ii. Decide the number of scoring levels.
      - In a rubric, different levels of performance or product expectations are noted by 4, 3, 2, 1 or excellent, good, fair, poor.
      - The default number of levels created by the *Assessing Projects* application is four.
    - iii. Develop descriptors for each trait at each scoring level.
      - Criteria are standards, measures, or expectations on which a judgment or decision can be based.
      - The more specific the criteria, the easier students can determine the quality of their work.
      - Criteria should support targeted

## Module 11

---

### Completing Your Unit

- b. **Another Assessment:** If you want to create a different type of assessment than a rubric, such as a scoring guide or checklist, be sure to still include the elements identified as the foundation of an assessment.
2. To help focus on your assessment purpose, think about the following questions:
- What concepts, skills, and knowledge will be assessed?  
\_\_\_\_\_  
\_\_\_\_\_
  - How will the Curriculum-Framing Questions be assessed?  
\_\_\_\_\_  
\_\_\_\_\_
  - What higher-order thinking skills will be assessed?  
\_\_\_\_\_  
\_\_\_\_\_
  - What 21st century skills will be assessed?  
\_\_\_\_\_  
\_\_\_\_\_
  - At what level should your students be performing all of the identified learning goals?  
\_\_\_\_\_  
\_\_\_\_\_
  - What kind of assessment will best suit you and your students' needs?
    - Checklist
    - Rubric
    - Scoring guide

### Step 4: Using the Assessing Projects Application to Create an Assessment

In this step, you examine sample assessments in the *Assessing Projects* application that you can adapt for your unit. You can use the application to either create a new assessment or edit an existing sample assessment to match your purposes. The application allows you to select specific skills from an assessment and edit the traits and descriptors.

*Traits* are the terms identified in the left hand column. They describe the measurable objectives of performance, behavior, or quality. *Descriptors* describe the performance for each trait at several levels. In the self-direction rubric examples below, four levels of the Sets Goals trait might look like this:

Trait	Ratings			
	4	3	2	1
<b>Sets Goals</b>	Sets challenging, achievable goals.  Identifies and accesses the resources necessary to achieve goals.	Sets achievable goals.  Identifies and accesses some resources necessary to achieve goals.	Sets unrealistic goals.  Identifies but does not access some resources necessary to achieve goals.	Begins the task without setting goals.  Does not identify any resources.
	Descriptors			



As you review the traits and descriptors in the sample assessments, be sure to adapt them for your own purposes before applying any of them to your summative assessment.

### Completing Your Unit

Completing the following steps will help you as you create or adapt an assessment (Airasian, 1991):

1. Perform the task yourself (for example, create a student sample) so you can identify the traits that should be assessed.
2. Make sure the traits you identify meet your targeted goals.
3. Limit the number of traits, so they can all be observed during a student's performance or assessed from a product.
4. If possible, have colleagues and students help you think through the important traits included in the performance or product.
5. Write descriptors in terms of observable student behaviors or product characteristics in student-friendly language.
6. Avoid the use of ambiguous words that cloud the meaning of the descriptors.
7. Consider the order of your traits and make sure the order reflects your priorities.

#### Using the Assessing Projects Application

Keeping the preceding steps in mind, create an assessment for your unit using the *Assessing Projects* application. Use the Intel® Education *Help Guide* if you need assistance in completing any technology skills identified below.



1. Go to *Assessing Projects*: [www.intel.com/education/AssessingProjects](http://www.intel.com/education/AssessingProjects)
2. Review the Try It section:
  - a. Click **Try It**.
  - b. View the **Demo**. (See Teaching Tools, Assessing Projects Application Skill 4.1.)
  - c. Go through the **Tutorial** if you need further instruction.
  - d. From either the Demo or Tutorial section, click the **Workspace** tab and log on to the Teacher Workspace. (See Teaching Tools, Assessing Projects Application Skill 4.2.)
3. Create an assessment to support your unit. Consider the following as you create your assessment:
  - If you want to browse sample assessments for ideas, search the Library categories. (See Teaching Tools, Assessing Projects Application Skill 4.3.)

**Note:** Review the categories you identified on page 11.06 as important elements to assess. You can search for assessments that specifically target those areas.

Refer to the following skills in the Help Guide for this section:

- Assessing Projects Application Skill 4.1: Learning about Assessing Projects
- Assessing Projects Application Skill 4.2: Logging In
- Assessing Projects Application Skill 4.3: Browsing the Assessment Library



## Completing Your Unit

- If you already have the content you want to include in the assessment and do not need additional content from the *Assessing Projects* Library, create a new assessment from scratch. (See Teaching Tools, Assessing Projects Application Skill 4.33.)
- You can use content from an existing assessment in the library to create your own assessment. Search and save an assessment from the library into your workspace so you can edit the assessment. (See Teaching Tools, Assessing Projects Application Skills 4.13, 4.22, and 4.6.)

**Note:** You may want to create a specific folder to save the assessment in your workspace to help organize your assessments. Consider creating a folder that references the unit you are creating (such as *Romeo and Juliet*), subject area it targets (such as language arts), type of assessment (such as Rubrics), class (such as English 1), and so forth. (See Teaching Tools, Assessing Projects Application Skills 4.9 and 4.12.)

- You can browse multiple assessments and pick and choose traits or items from each of the assessments to use in your own assessment. (See Teaching Tools, Assessing Projects Application Skill 4.37.)
- Edit the assessment's content or format to conform to your needs. Make changes such as:
  - Adding or deleting columns or rows (ratings and traits) (See Teaching Tools, Assessing Projects Application Skills 4.26, 4.27, 4.29, 4.30.)
  - Reordering traits (rows) or ratings (columns) (See Teaching Tools, Assessing Projects Application Skills 4.25 and 4.28.)
  - Changing rating levels from numbers to words such as *Excellent*, *Good*, *Satisfactory*, *Developing*, and so forth or changing rating levels to points possible (to create a scoring guide) (See Teaching Tools, Assessing Projects Application Skill 4.24.)
  - Modifying assessment title, instructions, and descriptors to make them specific to a particular unit and appropriate for the age group. (See Teaching Tools, Assessing Projects Application Skills 4.17, 4.20, and 4.24.)



4. When you finish editing, save the assessment. (See Teaching Tools, Assessing Projects Application Skills 4.31 and 4.32.)
5. Export your assessment in the desired format (word processing or spreadsheet) and save it into your Project Folder. (See Teaching Tools, Assessing Projects Application Skill 4.38 and 4.39.)

Refer to the following skills in the Help Guide for this section:

- Assessing Projects Application Skill 4.6: Copying an assessment into your Personal Library
- Assessing Projects Application Skill 4.9: Creating a Personal Library folder and subfolder
- Assessing Projects Application Skill 4.12: Organizing assessments in your Personal Library
- Assessing Projects Application Skill 4.13: Searching for assessments
- Assessing Projects Application Skill 4.17: Editing an assessment title
- Assessing Projects Application Skill 4.20: Editing instructions
- Assessing Projects Application Skill 4.22: Conducting a Quick Search
- Assessing Projects Application Skill 4.24: Editing traits, descriptors, ratings, and items
- Assessing Projects Application Skill 4.25: Moving a row
- Assessing Projects Application Skill 4.26: Adding a row
- Assessing Projects Application Skill 4.27: Deleting a row
- Assessing Projects Application Skill 4.28: Moving a column
- Assessing Projects Application Skill 4.29: Adding a column
- Assessing Projects Application Skill 4.30: Deleting a column
- Assessing Projects Application Skill 4.31: Saving a modified assessment

## Module 11

---

### Completing Your Unit

Refer to the following skills in the Help Guide for this section:

- Assessing Projects Application Skill 4.32: Saving a modified assessment with a different name
- Assessing Projects Application Skill 4.33: Creating an assessment from scratch
- Assessing Projects Application Skill 4.38: Exporting an assessment as a word processing document
- Assessing Projects Application Skill 4.39: Exporting an assessment as a spreadsheet
- Assessing Projects Application Skill 4.37: Combining traits from multiple assessments into a single assessment
- Word Processing Group 3: Changing the Look of Your Words
- Word Processing Group 7: Working with Tables
- Spreadsheets Group 5: Changing the Look of Information and Worksheets
- Spreadsheets Group 6: Organizing Information
- Assessing Projects Application Skill 4.8: Deleting an assessment from your Personal Library

6. Edit the exported assessment as needed.
  - If you exported as a word processing document:
    - You may change the appearance of your text. (See Word Processing Group 3.)
    - You may format your assessment by adding background colors, merging or splitting cells, rearranging columns or rows, resizing columns or rows, or adding or deleting columns or rows. (See Word Processing Group 7.)
  - If you exported as a spreadsheet:
    - You may change the appearance of your text and background. (See Spreadsheets Group 5.)
    - You may format your assessment by rearranging columns or rows, resizing columns or rows, or adding or deleting columns or rows. (See Spreadsheets Group 6.)
7. Delete any assessments that you will not be using. (See Teaching Tools, Assessing Projects Application Skill 4.8.)

**Optional:** If you have time, create any other assessments identified in your Assessment Plan. (See Extension Activity on page 11.29.) You may find relevant examples for additional assessments as you browse the library, so be sure to add assessments of interest to your online workspace for later use.

### Activity 3: Finalizing Your Assessment Plan

The following questions are provided to help you think through and edit your Assessment Plan. If desired, you may simply review the questions and then open your Unit Plan to finalize your Assessment Plan.

1. What methods will you use to gauge student readiness for the unit?

---

---

---

---

2. What reporting and monitoring methods will you use to encourage student self-management and progress during independent and group work?

---

---

---

---

3. How will you monitor student understanding and adjust if necessary?

---

---

---

---

---

4. How will you help your students reflect on their learning (metacognition)?

---

---

---

---



## Module 11

---

### Completing Your Unit

5. What product(s) or performance task(s) will engage your students and best demonstrate your intended learning goals and targeted thinking skills?

---

---

---

---

6. What methods will you use to assess final understanding and demonstration of learning? What will quality look like?

---

---

---

---

7. In what ways will you address and assess higher-order thinking in this unit?

---

---

---

---

8. If you chose to draft your ideas by writing your notes on these pages, open your Unit Plan now and revise your Assessment Plan.

**Note:** For additional samples of assessment timelines and summaries, see examples starting on Appendix D.



9. Save your work.



**Note:** You may also want to review the assessment strategies available at: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)  
Click **Assessment Strategies**, and then select a category of interest.

## Activity 4: Reflecting on Your Unit

Now is the time to take a critical look at your unit, noting any necessary revisions. Look at your unit and evaluate whether it supports the complexities of the concepts students will be studying. Additionally, consider whether the students' use of the online thinking tool supports and begins to provide answers for the Essential and Unit Questions. Use the Reflection Checklist below and the Project Rubric on pages 11.25 and 11.26 to help guide your evaluation process.

### Unit Reflection Checklist

Checklist	Comments
<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); background-color: #e0e0e0; padding: 5px; margin-right: 10px;">Overall Unit</div> <ul style="list-style-type: none"> <li><input type="checkbox"/> The unit, as a whole, investigates an open-ended, complex problem, system, or idea.</li> <li><input type="checkbox"/> The unit contains authentic applications outside of the classroom.</li> <li><input type="checkbox"/> Unit goals are in alignment with and support curricular standards and the Curriculum-Framing Questions.</li> <li><input type="checkbox"/> From the knowledge gained by developing ideas with the thinking tools, students conduct additional research. From this research, they make further plans of action, decisions, or conclusions to answer the larger questions of the unit.</li> <li><input type="checkbox"/> Activities in the unit require students to use higher-order thinking skills—apply, analyze, synthesize, and/or evaluate information.</li> <li><input type="checkbox"/> Multiple authentic assessment strategies are incorporated into the unit.</li> </ul> </div>	



**Note:** This checklist is available in the *Unit Assessment* folder on the Curriculum Resource CD.

**Notes:**

---



---



---



---

## Activity 5: Completing Your Unit Plan

### Step 1: Finalizing Your Unit Ideas

Use the following questions to help you develop ideas for the Instructional Procedures section of your Unit Plan. These directions will help guide your implementation plans for any project that uses an online thinking tool.

1. What activities will introduce the project to students? How will students develop the knowledge-level understanding they will need for the higher-order thinking in the project? What activities will help students draw on prior knowledge and skills for the project?

---

---

---

---

---

---

---

---

---

2. Based on the reflections in the previous modules, which thinking tools best target the learning objectives in your unit? Which tools will you actually use in this unit? How does the tool (or tools) specifically support student learning and higher-order thinking in this unit?

---

---

---

---

---

---

---

---

---

3. When using the thinking tools, thinking becomes not only visible, but discussible. Think about the best configuration for your students to ensure each group member is actively involved in discussions and contributing to the decision-making process. How will you organize and monitor groups? What ground rules will you establish? What roles will be established?

---



---



---



---



---

4. How will you ensure that student teams have sufficient time and access to work on their rankings, maps, or cases and conduct Internet research? How will you schedule computer time? How will you ensure equal access?

---



---



---



---



---

5. Think about the overall scope and sequence of your unit. Where in your unit will the thinking tools be most beneficial? What will the cycle of revision and reflection look like? How many opportunities will students have to revise their ideas? What reflection activities will be built into the project? How much time will students have for research activities? What resources will they use?

---



---



---



---



---

Completing Your Unit

6. Will you include any outside participation in this project? Describe how you could incorporate participation from others outside the classroom, including guest speakers, mentors, other students, community members, parents, and so forth.

---

---

---

---

7. The end result of this project is for students to be able to communicate their conclusions and analyses of a problem or system, which will be based—in part—on their use of the thinking tool(s). How will students develop and present answers to the other significant questions and issues of the unit? What will be the final project, outcome, or presentation?

---

---

---

---

8. How are the Curriculum-Framing Questions answered by the end of the unit?

---

---

---

---

9. How will you accommodate the different learners in your classroom? What accommodations will you need to make so that all students can be successful?



**Note:** You may also want to review the section on differentiated instruction and assessment available at: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)

Click **Overview and Benefits**, and then click **Formative Assessment**.

---

---

---

---

## Step 2: Revisiting Your Unit Plan

Using the implementation ideas from the previous step, revise your Unit Plan. Be sure to include a clear explanation of the instructional cycle.

1. Open your Unit Plan.



2. Remove information for any thinking tool that you will not be including in your Unit Plan. You can simply delete the text or delete the rows of the table. (See Word Processing Skill 2.3 or 7.6.)



**Note:** If you want to keep a copy of the project details for the tool that you are deleting from your Unit Plan, you may copy the information into the appropriate Project Idea document located in the *Thinking Tool* folder, applicable tool subfolder on the Curriculum Resource CD.

3. Revise any of the previously edited sections, if necessary.

4. Using the information from the previous pages, edit the Procedures section. Summarize the activities that will occur in the classroom that lead up to, include, and follow the use of the online thinking tools and assessments. Include any cyclical learning that will occur. You may want to include the following:

- a. Overview or introduction of the project to your students
- b. Project management ideas, such as:
  - How student teams will be formed and organized
  - How student teams will be provided with Internet access
  - Inquiry questions you may ask the students
- c. Student activities or tasks, such as:
  - Student pre-planning activities (such as brainstorming, discussion)
  - Hands-on activities
  - Research process
  - Reflection activities
  - Ongoing assessment by peers, the teacher, or themselves

5. Complete the **Materials and Resources** section.

6. Review all other sections of your Unit Plan and, if needed, modify or complete them.



7. Save your work.

Refer to the following skills in the Help Guide for this section:

- Word Processing Skill 2.3: To erase or delete words or text
- Word Processing Skill 7.6: To remove or delete a row or many rows


## Activity 6: Showcasing Your Unit

During this activity, think about the benefits of showcasing student projects, consider how you can manage a project showcase in your classroom, and prepare your unit for a showcase with your colleagues.

### Step 1: Considering Showcase Options for Student Projects

You can use events like a showcase to allow the greater community to provide input to your students and to celebrate your students' achievements. When students realize that a wider audience than just their teachers and peers will view their work, they tend to invest more time in product development, often resulting in higher quality projects.

Showcasing products created with technology tools often demands different methods of facilitation than showcasing products created without technology. Some ideas for showcasing projects include:

- **Small Group:** Create small groups of four or five. Give students time to share their projects with the small group, and allow additional time for group members to provide written feedback.
- **Rotation Stations:** Have half of the students stand at their computers, while the other half, and any other observers, rotate and give feedback. Then, have the two groups switch. Follow this activity with a full group discussion.
- **Whole Group:** Allow each student to use a projection device to present his or her project to the whole class.
-  ▪ **Pair and Share:** Use some method to pair students for sharing. Follow the pair and share with a whole class discussion. View the Activities for Pairing Students document in the *Showcase* folder of the Curriculum Resource CD for additional ideas on how to pair students.
- **Virtual Showcase:** Have students upload their products to a wiki. Peers can provide feedback by filling out printed forms, uploading files to the presenter's wiki, or creating new subpages in the wiki for comments.

## Step 2: Preparing for the Showcase

You have the option of using a wiki to showcase your unit. Facilitating a showcase through a wiki means that the files are easily accessible to participants and observers during and after the showcase. If students use online thinking tools, a wiki makes accessing the projects easier. If you decide not to use a wiki, use this time to organize your files and open your student sample thinking tool project.



1. Go to your wiki site and log on.
2. Create a new subpage for your showcase.
  - a. Add a title for your page starting with your first name (for example, Claire's Showcase).
  - b. Include the following details on your wiki page.



**Note:** You can copy and paste most of these items from your Unit Plan. (See Word Processing Skill 2.6 and 2.8.)

- Your Unit Plan's title
  - A brief summary
  - Your Curriculum-Framing Questions
  - An active link to the thinking tools login page (<http://educate.intel.com/workspace/student/login.aspx?LID=en>)
- c. Upload the following files for your showcase. (You may want to rename the files, or provide a description, so they are clearly identified for your reviewers.)
    - Unit Plan
    - Assessment(s)
    - Any other documents you would like to share



**Note:** You may be able to upload your Unit Plan with the other files embedded in it if the overall file size is not too large. (See Word Processing Skill 10.7.)

3. You have several options for collecting feedback as you present your Unit Portfolio. Your colleagues can:
  - a. Provide feedback on a subpage of your wiki
  - b. Upload completed Showcase Feedback Forms to your wiki
  - c. Fill out printed Showcase Feedback Forms by hand

If you have problems accessing or using the wiki, you can create a presentation to showcase your unit.

Refer to the following skills in the Help Guide for this section:

- Word Processing Skill 2.6: To copy words or text
- Word Processing Skill 2.8: To paste words or text in a new place
- Word Processing Skill 10.7: To insert another document as an object

If you or your facilitator chooses to use printed feedback forms for the showcase, these forms need to be printed ahead of time. The Showcase Feedback Form is available in the *Showcase* folder on the Curriculum Resource CD.



### Completing Your Unit

#### Step 3: Showcasing Your Unit

The goal of this showcase is to share your final products with your colleagues and to see their units. You also give and receive feedback about the highlights of your unit and areas in which you can improve.



Begin your showcase by sharing a brief summary of your unit. When sharing your sample thinking tool project, first share the assessment and then present your sample to help your audience better understand and identify the learning objectives. Be sure to leave time at the end of your presentation for questions and feedback from your audience.

Follow these guidelines to ensure a successful showcase experience.

#### Presenting at the Showcase

- Share the general information for your unit (grade level, subject area, and so on) and provide a brief summary of the unit.
- Highlight your unit's Curriculum-Framing Questions as well as your unit's targeted standards and objectives.
- Share your Assessment Plan and any assessments you created.
- Present your student sample project(s) or provide the student sample login information to your reviewers so they can access your thinking tool project(s).
- Use the Project Rubric and Showcase Feedback Form on the following pages to help facilitate feedback.
- Be sure to leave time at the end of your presentation for questions and feedback from your audience.

#### Providing Feedback at the Showcase



- Use the prompts on the Showcase Feedback Form (located in the *Showcase* folder on the Curriculum Resource CD) to guide your discussions. Focus on content, not just the technology.
- Ask questions.
- Provide both positive feedback and specific suggestions on how to enhance the unit and student learning.
- Provide concrete examples in your comments—give specific examples of what is effective or specific ideas of how an area could be enhanced.
- Even if all participants do not have completely finished Unit Portfolios, the feedback process is important and will still be valuable.

When providing feedback to a wiki showcase, you can use one of the following methods:

- Record your thoughts on a subpage in the presenter’s wiki:
  1. Create a subpage with your name in the title (such as, Michael’s Feedback).
  2. Copy the text from the Showcase Feedback Form (located in the *Showcase* folder on the Curriculum Resource CD) as a prompt.
  3. Paste the text into your subpage.
  4. Record your thoughts on the wiki subpage in response to the prompt.
  5. Save your subpage.



- Type your feedback into the Showcase Feedback Form document and then upload it to the presenter’s wiki:



1. Open the Showcase Feedback form located in the *Showcase* folder on the Curriculum Resource CD.



2. After you record your feedback, save the form as a new file with a unique name. Be sure to include your name in the filename (such as, Michael’s Feedback).
3. Upload the document to the presenter’s wiki.

**Note:** If editing and uploading to the same page, participants must take turns uploading feedback forms.

Following the showcase, list ideas for revising your unit.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Module 11

### Completing Your Unit

#### Showcase Feedback Form

Component	Comments
Overall Unit Concept	Highlights
	Ideas for Improvement
Integration of Technology	Highlights
	Ideas for Improvement
Project Approach to Learning	Highlights
	Ideas for Improvement
Assessment	Highlights
	Ideas for Improvement



**Note:** This form is available in the *Showcase* folder on the Curriculum Resource CD.

Completing Your Unit

4	3	2	1
<b>Instructional design addresses standards and objectives.</b>			
My Unit Plan clearly shows how the work my students do will help them meet the standards and objectives.	My Unit Plan shows how the work my students do will help them meet the standards and objectives.	My Unit Plan shows that some of the work students do addresses standards and objectives.	My Unit Plan shows that very little of the work students do addresses standards and objectives.
<b>Instructional design addresses 21st century skills.</b>			
In my Unit Plan, I provide instruction, modeling, and multiple opportunities for students to refine and develop relevant 21st century skills.	In my Unit Plan, I provide instruction and modeling to help students refine and develop relevant 21st century skills.	Students practice 21st century skills during the unit, but they receive little instruction to support their development of these skills.	Students rarely use 21st century skills during the unit.
<b>Instructional design incorporates Curriculum-Framing Questions (CFQs).</b>			
My unit integrates CFQs to focus student learning on important concepts and big ideas throughout the unit.	My unit uses CFQs to focus student learning on important concepts and big ideas multiple times in the unit.	The use of CFQs in my unit is superficial because they are not used to focus student learning.	My unit does not address CFQs.
<b>Instructional design uses project approaches.</b>			
In my unit, students have many choices about how they demonstrate their learning. They create authentic products and performances developed through connected tasks and activities.	In my unit, students have some choices about how they demonstrate their learning. They create products and performances developed through connected tasks and activities.	In my unit, students have few choices about how they demonstrate their learning. They complete discrete activities that do not connect to final products or performances.	My students do not demonstrate their learning through products or performances.
<b>Instructional design addresses student differences.</b>			
My unit provides well-defined and thoughtful accommodations to support diverse learners.	My unit provides accommodations to support diverse learners.	My unit provides minimal accommodations to support diverse learners.	My unit does not provide any accommodations to support diverse learners.
<b>Technology integration supports content learning.</b>			
In my unit, students use technology to enhance conceptual understanding and develop content specific skills and strategies.	In my unit, my students use technology to understand important content concepts and develop content specific skills.	In my unit, my students use technology to explore content concepts.	In my unit, my students' use of technology is superficially related to content.
<b>Thinking Tools support 21st century skills.</b>			
The use of thinking tool(s) creatively develops students' research, higher-order thinking, collaboration, and communication skills.	The use of thinking tool(s) develops students' research, higher-order thinking, and/or communication skills.	The use of the thinking tool(s) only moderately develops students' research, higher-order thinking, collaboration, or communication skills.	The use of the thinking tool(s) does not develop students' research, higher-order thinking, collaboration, or communication skills.

(Continued)

## Module 11

### Completing Your Unit

4	3	2	1
<b>Technology integration meets student and classroom needs.</b>			
In my unit, my students use technology that is appropriate for all ability levels and interests, providing challenging experiences that build technology proficiency.	In my unit, my students usually use technology that is age appropriate and meets the needs of diverse learners.	In my unit, my students occasionally use technology that is age appropriate.	In my unit, my students seldom use technology, and when they do use it, the technology is often inappropriate for their ability levels or interests.
The technology used in my unit is reasonable and feasible given the specific circumstances of my teaching situation.	The technology used in my unit is reasonable although somewhat difficult given the specific circumstances of my teaching.	The technology used in my unit takes a great deal of effort on my part.	Given the specific circumstances of my teaching situation, the technology used in my unit is not feasible.
<b>Assessment strategies address standards and objectives.</b>			
My assessments clearly and thoroughly address all targeted standards and learning objectives, emphasizing content and processes over traits such as organization and appearance.	My assessments address all targeted standards and learning objectives and emphasize content learning.	My assessments address some targeted standards and learning objectives.	My assessments address few targeted standards and learning objectives.
<b>Assessment strategies are student-centered.</b>			
In my unit, students contribute to the creation of assessments and frequently assess themselves and peers.	In my unit, students may contribute to the creation of assessments and assess themselves and peers.	In my unit, students may assess themselves and peers.	In my unit, students have little or no involvement in their assessment process.
The assessments in my unit have specific criteria that define quality. My assessments make it easy for students to measure their work against expectations.	The assessments in my unit have criteria that define quality. Students can use my assessments to measure their work against expectations.	The assessments in my unit lack clear criteria for my students to measure their work.	Students cannot use my assessments to measure their work.
<b>Assessment strategies are varied and ongoing.</b>			
In my unit, a variety of informal and formal methods are used throughout the instructional cycle to meet all five assessment purposes.	In my unit, informal and formal methods are used throughout the instructional cycle to meet most of the five assessment purposes.	In my unit students are assessed infrequently and in traditional ways to meet some assessment purposes.	Students are assessed in traditional ways at the end of the unit.

## Activity 7: Reflecting on the Course

During this activity, you reflect on the course and share your impressions, ideas for improvement, and overall assessment.

### Step 1: Evaluating the Course

The online evaluation is part of an external evaluation of the Intel® Teach Thinking with Technology Course. The survey is designed to collect information about your experience and how prepared you feel to integrate technology-related activities in your classroom.

The survey should take less than 15 minutes to complete. The data will be used in statistical summaries, and individuals will not be identified.



1. Log on to the Intel® Teach Thinking with Technology Course evaluation site at: [www.intel.com/education/teachfuture/eval](http://www.intel.com/education/teachfuture/eval)
2. Enter your **Class ID** number and your Master Teacher's **UserID**, and then click **login**.
3. Read the introductory letter, and then click **Begin Evaluation** at the bottom of the page.
4. Answer the questions by selecting buttons or typing in text boxes. Continue to the next page by clicking the **Next** button at the bottom of each page.

**Note:** The evaluation consists of several pages. You will not be able to click the **Back** button to modify your answers.

5. When you have completed the evaluation, click the **Finish** button.

Your facilitator will provide you with the Class ID and UserID. This login information is available from the class details on the Extranet.

### Completing Your Unit

#### Step 2: Reflecting on Lessons Learned

If you are using a wiki, create a final entry to reflect on and share impressions about using thinking tools with students, the usefulness of the *Assessing Projects* resource, and what you have learned from this course. If you are not using a wiki, discuss your thoughts in a large group discussion.



1. Go to the wiki site for this course and log on.
2. Create a new entry on your wiki page and use the following questions to help you reflect on your use of the online thinking tools.
  - What other classroom projects could benefit from the use of the online thinking tools?
  - How will the ideas and skills learned from this course affect your teaching practices?
  - Of everything you learned, what do you think will have the biggest impact on student learning?
  - What did you find most valuable about the course?



**Note:** You may want to review the *Benefits of Thinking Tools* available at:  
[www.intel.com/education/tools/benefits.htm](http://www.intel.com/education/tools/benefits.htm)



3. Save your wiki page.



4. Share your thoughts with the class.

## Extension Activity: Enhancing Assessment in Your Unit

The following activities and resources are available to you as a self-study course enhancement or an optional extension in your course.

Use the resources in *Assessing Projects* to learn more about integrating ongoing assessment in your unit. Continue your work using the *Assessing Projects* application to enhance or complete the assessment you started in Activity 2 or to create an additional assessment for your unit.



1. Go to: [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)
2. Click **Assessment Plans** and select either **Elementary** or **Secondary Assessment Plans**.
3. Browse the assessment plans for additional ideas for incorporating ongoing assessment in your unit.
4. Click **Workspace** and log on with your Teacher login information.
5. Revise your existing assessment or create a new assessment using the resources in the library.



### References

Airasian, P. W. (1991). *Classroom assessment*. New York: McGraw-Hill.

Heuristics. *Encarta World English Dictionary* (North American Edition). (2007). Redmond, WA: Microsoft Corporation. Retrieved from <http://encarta.msn.com/encnet/features/dictionary/DictionaryResults.aspx?refid=1861617730>

## Module 11 Summary

Review the central ideas in this module and the plans or materials you created to help improve student learning.

Use this summary to review this module's main points and check for understanding.

### Module 11 Key Points:

- Some common assessments used in a project approach to learning are rubrics, scoring guides, and checklists.
- Rubrics are distinguished from other scoring tools, like checklists, because they outline levels of quality with descriptors.
- The main goal of a rubric is to define levels of quality and “publicize” these expectations to students, parents, and others.
- You can use events like a showcase to allow the greater community to provide input to your students and to celebrate their achievements.

### Accomplishments:

- Completed my Assessment Plan and created one or more assessments using the *Assessing Projects* application
- Completed a Unit Plan that integrates *Visual Ranking*, *Seeing Reason*, and/or *Showing Evidence* tools
- Showcased my Unit Plan, assessment tool(s), and student sample project(s)
- Received and provided feedback on my showcased unit
- Completed the Intel® Teach Thinking with Technology Course!



# Appendix

<b>System Requirements</b> .....	<b>Appendix A</b>
System Requirements .....	<b>A.01</b>
Having Trouble Registering? .....	<b>A.02</b>
<b>Curriculum-Framing Questions</b> .....	<b>Appendix B</b>
Sample Elementary Grade Questions .....	<b>B.01</b>
Sample Middle School Questions .....	<b>B.04</b>
Sample High School Questions .....	<b>B.07</b>
<b>A Project Approach to Learning</b> .....	<b>Appendix C</b>
Sample Topic Ideas .....	<b>C.01</b>
Sample Project Descriptions, Questions, and Prompts .....	<b>C.03</b>
Sample K-3 Unit Plan with Three Thinking Tools: Birds, Birds, Birds! .....	<b>C.24</b>
<b>Assessment Resources</b> .....	<b>Appendix D</b>
Sample Assessment Plan: Fraction Quest .....	<b>D.01</b>
Sample Assessment Plan: Storm Watch .....	<b>D.03</b>
Sample Assessment Plan: Great Thinkers .....	<b>D.06</b>
Sample Assessment Plan: World War I: The War to End All Wars? .....	<b>D.10</b>
<b>Visual Ranking Tool Resources</b> .....	<b>Appendix E</b>
Sample Project Idea: River City Water .....	<b>E.01</b>
Sample Unit Plan: Grow a Business .....	<b>E.05</b>
<b>Seeing Reason Tool Resources</b> .....	<b>Appendix F</b>
Sample Unit Plan: Ecology Explorers .....	<b>F.01</b>
<b>Index</b> .....	<b>Appendix G</b>



# Appendix A

## System Requirements

To take advantage of the online thinking tools, the following system configurations and tests are recommended:

### Connection Speed

- 56K modem or faster

### Screen Resolution

- 800 x 600 screen resolution

### Testing the Computers

Test the *Try the Tool* page for the *Visual Ranking Tool* ([www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)) on each computer to ensure the required, free plug-ins are installed and working. **Do not skip this test!**

Macintosh*	Microsoft Windows*
<p><b>Hardware</b></p> <ul style="list-style-type: none"> <li>▪ PowerPC*-based Macintosh computer for each participant</li> <li>▪ Apple System Software version OS 8.6* or later</li> <li>▪ 64MB or more RAM</li> </ul> <p><b>Browser</b></p> <ul style="list-style-type: none"> <li>▪ Microsoft Internet Explorer version 6.0 Macintosh Edition* or higher.</li> <li>▪ Netscape Navigator 6.2* or later version</li> <li>▪ Mozilla Firefox* 2.0 or later version</li> </ul> <p><b>Plug-ins</b></p> <ul style="list-style-type: none"> <li>▪ The online thinking tools use Macromedia Flash Player 7.0* or higher. The newest version of the Flash Player will install automatically if Flash Player 7.0 or higher is not installed. If for any reason you are not able to load the Flash Player, the tools will attempt to run in Java*. If a plug-in needs to be installed, be sure that you are logged in as an administrator.</li> </ul>	<p><b>Hardware</b></p> <ul style="list-style-type: none"> <li>▪ Intel® Pentium® processor 200MHz (performance level or better) or compatible processor for each participant</li> <li>▪ Microsoft Windows 98*, Windows 2000*, or Windows XP* operating system</li> <li>▪ 64MB RAM (128+ recommended)</li> </ul> <p><b>Browser</b></p> <ul style="list-style-type: none"> <li>▪ Microsoft Internet Explorer 5.0* or later version (Download it at: <a href="http://windowsupdate.microsoft.com/">http://windowsupdate.microsoft.com/</a>)</li> <li>▪ Netscape Navigator 6.2 or later version</li> <li>▪ Mozilla Firefox* 1.0.6 or later version</li> </ul> <p><b>Plug-ins</b></p> <ul style="list-style-type: none"> <li>▪ The online thinking tools use Macromedia Flash Player 7.0 or higher. The newest version of the Flash Player will install automatically if Flash Player 7.0 or higher is not installed. If for any reason you are not able to load the Flash Player, the tools will attempt to run in Java. If a plug-in needs to be installed, be sure that you are logged in as an administrator.</li> </ul>

(Continued)

## Appendix A: System Requirements

---

For the course, the following items are also required:

Macintosh*	Microsoft Windows*
<b>Software</b> <ul style="list-style-type: none"><li>▪ Microsoft Word 2001 for Mac* or above</li><li>▪ Microsoft Excel 2001 for Mac* or above</li><li>▪ Microsoft PowerPoint 2001 for Mac* or above</li><li>▪ Adobe Reader 5.0* or above</li><li>▪ Archive or file compression software</li></ul>	<b>Software</b> <ul style="list-style-type: none"><li>▪ Microsoft Word 2000* or above</li><li>▪ Microsoft Excel 2000* or above</li><li>▪ Microsoft PowerPoint 2000* or above</li><li>▪ Adobe Reader 5.0* or above</li><li>▪ Archive or file compression software</li></ul>

### Having Trouble Registering at the Intel® Education Web Site?

#### Are you trying to use a Login ID that is already being used?

The Login ID must be a name that has not been used by anyone who has signed up for any of Intel's services. Try entering your email address as your Login ID on the Registration page. You can change your Login ID at a later time, if desired, by clicking the **Edit Sign In Profile** link on the *Your Projects* page when you are logged in.

#### Have you registered with Intel before?

If you have registered with another Intel program or newsletter, you may already be registered to use the Intel® Education online tools. If you remember your password from that registration, just enter your email address as your Login ID on the Login page. If you do not remember your password, ask for your password to be mailed to your email address, using the **Recover your Password Now** link in the Instant Help section of the Login page.

#### Have you forgotten your Login ID?

You can enter your email address as your Login ID on the Login page. After you have signed in, you can retrieve your Login ID by clicking the **Edit Sign In Profile** link on the Your Project page. You can also select the **Recover your Login ID Now** link in the Instant Help section of the Login page to have your Login ID emailed to you.

#### Have you forgotten your password?

If you have forgotten your password, click the **Recover your Password Now** link in the Instant Help section of the Login page. After you receive your password, either enter your Login ID or enter your email address as your Login ID on the Login page. If you are in a location where you cannot retrieve your email, you may need to register again using a different email address.

Copyright © 2008 Intel Corporation. All rights reserved.  
Intel, the Intel logo, Intel Education Initiative, and the Intel Teach Program are trademarks of Intel Corporation in the U.S. and other countries. \*Other names and brands may be claimed as the property of others.

## Appendix B Curriculum-Framing Questions

# Sample Elementary Grade Questions

Essential Questions	Unit Questions	Content Questions
What is the price of life?	<p>If you were an African animal, which one would you most like to be and why?</p> <p>Are all animals worth protecting?</p> <p>If you could talk to "your animal" and understand everything it had to say, how would it describe itself and its life in Africa?</p>	<p>How are living things connected in their habitat and in what ways do they need each other to survive?</p> <p>How do animals in Africa adapt to their environment?</p> <p>What do African animals need to survive?</p> <p>What are the characteristics of African animals?</p>
Why do people say "there is no place like home"?	<p>What makes Arizona a state worth visiting?</p> <p>How has Arizona's past affected what it is like today?</p>	<p>What makes the regions and counties in Arizona unique?</p> <p>What important landmarks and geographic features are in Arizona?</p> <p>How have people adapted to life in Arizona?</p> <p>How have people changed what Arizona is like today?</p>
What's your story?	<p>How does the way an author writes make a story more interesting?</p> <p>Why aren't my favorite books your favorite books?</p>	<p>What are the elements of a story?</p> <p>What are the six+1 traits of writing?</p> <p>What traits of writing does the author use?</p>
Does accuracy really matter that much?	<p>Are fractions important or would we be better off without them?</p> <p>How are fractions used on the job and are they needed to get the job done right?</p> <p>How can understanding fractions make your life easier?</p>	<p>What is a fraction?</p> <p>How do you add, subtract, multiply and divide fractions?</p> <p>What is the difference between a numerator and a denominator?</p> <p>How do you change a mixed numeral into an improper fraction?</p>
Who will help today?	<p>Why do we need community helpers?</p> <p>Which community helper would you most like to be and why?</p>	<p>Who are our community helpers and what do they do?</p> <p>Who should you call for help?</p>



## Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
How does an organism's structure enable it to survive in its environment?	<p>What is special about frogs that helps them survive?</p> <p>What are some ways that frogs are different from me and like me?</p>	<p>What are the basic structures of the frog?</p> <p>What adaptations do frogs have that allow them to live in their environment?</p> <p>What are amphibians?</p> <p>What kinds of frogs are there?</p>
How do I get from here to there?	<p>Why use a map, if I can still get lost?</p> <p>Is one route always better than another? How do I decide which route to take?</p> <p>What can maps tell us about people, places, and environments?</p>	<p>Where in the world am I?</p> <p>What symbols and location identifiers are found on a map?</p> <p>How does each one help you to read a map?</p> <p>How do you measure using a map?</p> <p>What is the difference between a map, an atlas, and a globe?</p>
How can we make a difference?	<p>How can humans and endangered species share a region?</p> <p>What can our school do to help save an endangered species?</p>	<p>What makes an animal an endangered species?</p> <p>How is an owl different from other birds?</p> <p>What is needed in your owl species' habitat?</p> <p>Where in nature would we find your owl?</p>
Are you prepared?	<p>Can I go outside and play today?</p> <p>Should we believe the weather report?</p> <p>Where in the world can the best weather be found?</p>	<p>Where does rain come from?</p> <p>What causes the seasons of the year?</p> <p>What are some of the destructive forces of nature and what weather conditions can you expect with each?</p> <p>What are some things people do to prepare for different weather conditions?</p>
How can something so small be capable of so much?	<p>Should we be afraid of bugs?</p> <p>Are insects more helpful or harmful?</p> <p>Do we really need insects?</p>	<p>What makes an insect an insect?</p> <p>How are insects the same and different?</p> <p>How do insects grow and change?</p> <p>What are some ways that insects can be helpful and harmful?</p>
What changes do you see?	<p>What can shadows tell us?</p>	<p>What causes a shadow?</p> <p>How do you measure your shadow?</p> <p>How does your shadow change?</p> <p>What causes your shadow to change?</p>

## Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
Where can we find order and patterns?	Is it time to rhyme? Why rhyme?	What is rhyme? What words sound the same? How can you tell words that rhyme?
Is it possible to conquer the impossible?	Without magic beans, what would it take to grow a bean stalk to the giant's house? What are the perfect conditions for growing a bean plant?	What are the different parts of a plant? What does a plant need to live? What are the functions of different plant structures? What is photosynthesis?
Where's it going?	Could a volcano erupt in my backyard? What type of mountain would make the best building site and why?	What are the different layers of the earth? What are three different types of volcanoes? How are mountains made? How do we know that a volcano is dormant?
Is there such a thing as happily ever after?	Of all the fairy tales ever written, why has the story of Cinderella been the one to capture the hearts of so many generations and cultures? How would the Cinderella fairy tale change if a different character told the story? What would happen in a modern day Cinderella story?	What are the elements of a fairy tale? What is point of view? What is the moral of the Cinderella story? In what ways are all of the Cinderella stories from around the world similar? In what ways are the main characters in the various versions of Cinderella the same, and in what ways are they different?

# Sample Middle School Questions

Essential Questions	Unit Questions	Content Questions
How does music reflect history, society, and culture?	How do the times in which a composer works affect his or her music? How much does music change throughout time?	Who were some famous composers from different time periods and countries? What was your composer's life like? What are some different musical styles?
How has science made an impact on our lives?	Why is the Renaissance special? How does the Renaissance still impact us today?	Why was the time in which Leonardo Da Vinci lived called the Renaissance? What values were reflected in the Renaissance? What ideas, discoveries, and inventions happened in the Renaissance? What were Leonardo Da Vinci's accomplishments?
How has science made an impact on our lives? Why explore?	What can we learn from the experiences of the early explorers that is useful in modern times? Did the early explorers fail?	What motivated the Spanish and Portuguese explorations? What were significant people and events in the exploratory voyages of the 14th-16th centuries?
How can I help protect wildlife?	How can we reduce the impact of modern society on urban wildlife? How can statistics help us understand a problem?	What birds live in our community? What are the greatest risks to the birds in our community?
Is it worth the hassle and expense?	Where should we go this year and why? How do you select the best place? Where does "culture" come from?	What is the difference between a passport and travel visa? What large budgetary items need to be considered when planning a one to two week trip abroad? What monetary system is used in the region and what is the exchange rate?
What changes do you see?	Where does this rock in my hand fit into my life? Why are rocks and minerals important to us? Why look further than your own backyard?	What are igneous, sedimentary, and metamorphic rocks? How are different rocks formed? Where do they fit into the rock cycle? Why are rocks different? What are some properties of minerals?

## Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
Does my contribution to society make a difference?	What kind of contributions did feudal characters make?	Who were the major and minor characters of Feudal Society during the Middle Ages? What roles did they play in their society? What choices did they make on a daily basis?
Have things really changed that much?	Is our life anything like that of the Ancient Egyptians?	Why was the River Nile so important to the ancient Egyptian civilization? How were the religious beliefs of the ancient Egyptians reflected in their art and architecture? What religious traditional, cultural, and scientific contributions were established by the ancient Egyptians?
How is life replicated?	How is a cell like a system? How are cells different from one another?	What is a cell? What is a system? What are the parts of a cell? What are the differences between animal and plant cells?
Why is it important to learn from our past?	Can we live on another planet other than Earth? How can we conserve and maintain a planet's natural resources?	How does acid rain travel through the water cycle and what dangers does it pose? What affect does pH have on our water quality and aquatic life? What is ozone? What is causing the destruction of the Earth's ozone layer? What are some ways that population growth affects the world's ecosystems?
How do the choices we make now affect us later?	Is disease inevitable? How can a person living with a disease lead as normal a life as possible? Is prevention really the best medicine?	What are the functions and weaknesses of each of the body systems? How does food affect your body systems? What benefits do we get from exercise? What are diseases?
How do you measure quality?	Are the ponds in our community healthy? What makes a healthy pond?	What organisms exist in ponds? What are the components of a pond? How do we measure a pond's health?
What causes people to consider new alternatives to solve old problems?	Should solar energy be considered as an alternative to fossil fuels? How can you capture the energy of the sun?	What are the factors that limit the use of solar heat? What effect does solar energy have on different materials and how can we make use of these effects? How is heat transferred? How do the earth's rotation and the sun's position affect heat and temperature on earth?

## Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
Does my contribution to society make a difference?	What kind of contributions did feudal characters make?	Who were the major and minor characters of Feudal Society during the Middle Ages? What roles did they play in their society? What choices did they make on a daily basis?
Have things really changed that much?	Is our life anything like that of the Ancient Egyptians?	Why was the River Nile so important to the ancient Egyptian civilization? How were the religious beliefs of the ancient Egyptians reflected in their art and architecture? What religious traditional, cultural, and scientific contributions were established by the ancient Egyptians?
How is life replicated?	How is a cell like a system? How are cells different from one another?	What is a cell? What is a system? What are the parts of a cell? What are the differences between animal and plant cells?
Why is it important to learn from our past?	Can we live on another planet other than Earth? How can we conserve and maintain a planet's natural resources?	How does acid rain travel through the water cycle and what dangers does it pose? What affect does pH have on our water quality and aquatic life? What is ozone? What is causing the destruction of the Earth's ozone layer? What are some ways that population growth affects the world's ecosystems?
How do the choices we make now affect us later?	Is disease inevitable? How can a person living with a disease lead as normal a life as possible? Is prevention really the best medicine?	What are the functions and weaknesses of each of the body systems? How does food affect your body systems? What benefits do we get from exercise? What are diseases?
How do you measure quality?	Are the ponds in our community healthy? What makes a healthy pond?	What organisms exist in ponds? What are the components of a pond? How do we measure a pond's health?
How can math help me understand my world?	Why might you need to know the metric system? What difference does it make if you use inches or centimeters?	What are the different metric measurements? How is measurement used in the real world? How is estimation useful?

# Sample High School Questions

Essential Questions	Unit Questions	Content Questions
What brings about the rise and fall of great civilizations?	What factors in Mayan society most contributed to its demise? What factors in present day Mayan society contribute to its continued survival?	What are the basic cultural institutions of a society? What factors may have led to the Mayas abandoning their cities before 900 A.D.?
Am I my brother's keeper, and who are my brothers?	Can famine be prevented? What should be the U.S. role in the prevention and relief of famine? How do different professional perspectives influence prevention and relief recommendations?	What is famine? What causes famine? What is currently being done by the U.S. and other countries to eliminate famine? How does famine in one country affect food resources in another country?
How do we know something exists if we cannot see it?	Must all things repeat in nature? Does our current use of waves make our lives better?	What is a wave? What is a transverse wave and what are its characteristics? What is a compressional wave and what are its characteristics? What is the relationship between the frequency and wavelength in a wave? What is the relationship between intensity and loudness and frequency and pitch?
How does your opinion matter?	What can polls tell us and how can they help us identify trends in public opinion? How can the numbers from one poll be interpreted in many different ways? In what ways can polls be misleading?	What are demographics and how do candidates use them to target voters? What are the steps in conducting a poll?
How can we harness the Earth's power?	Why is electricity important? How is electricity used on the job?	What is electricity? What are the parts of an electric circuit? What is Ohm's Law?
What does the past tell us about the future?	What variables limit or sustain the continuation of a trend? How does a trend affect people's choices? What will our quality of life be like in the future?	What is an exponential regression, a curve of best fit, and a correlation coefficient? What are the advantages and limitations of linear regression for analysis of data?

## Appendix B: Curriculum-Framing Questions

Essential Questions	Unit Questions	Content Questions
Is a picture worth a thousand words?	<p>What can photographs tell us?</p> <p>How can photographs help us to interpret the past?</p> <p>How can a single photograph communicate many different messages?</p> <p>How can photojournalism impact a nation's views?</p>	<p>When viewing a photograph how do you differentiate between positive and negative space?</p> <p>What is one of the rules of composition and how is it applied to photography?</p>
How does literature help us better understand ourselves?	How does Shakespeare still speak to a 21st century audience?	<p>How do you read and understand Shakespeare's Elizabethan English?</p> <p>What are some important things to know about Shakespeare's time period?</p> <p>Who are the characters in <i>Romeo and Juliet</i> and how do they contribute to the deaths in the play?</p> <p>What is imagery?</p> <p>What is iambic pentameter?</p>
What makes a leader great?	<p>What was the impact of conquest on the ancient world?</p> <p>What effect did empires have on daily life in the ancient world?</p>	<p>What did your historical figures have in common?</p> <p>How were they unique?</p> <p>How did your historical figures become so famous?</p> <p>What were their accomplishments?</p>
What are the advantages and limitations of defining situations mathematically?	Can all cyclical situations be defined mathematically?	<p>What do sine and cosine equations show you?</p> <p>What is the general form of a sine/cosine function?</p> <p>What are parameters and are they calculated?</p> <p>Where do you find cyclical situations?</p>

## Appendix C A Project Approach to Learning Sample Topic Ideas

Discipline	Subject	Content Topic that Could Benefit from Online Thinking Tools
The Arts	Art	Inspiration of artists Art and culture Political artwork Fashion and culture
	Film	Movies' effect on culture Reality TV shows
	Music	Influence of protest songs Inspiration of musicians Importance of folk music Bootleg music
Health	Health	Substance abuse Vaccines (e.g., smallpox) Herbal remedies Diet aids / Eating disorders Cosmetic practices Accidents
Language Arts	Reading	Plot development Character development Biographies—evolution of human knowledge Mysteries An author's influence (e.g., Shakespeare)
	Writing	Commonalities of languages & their people Piracy and counterfeiting Phenomena
Math	Economics	Stock market trends Economic cooperation Entrepreneurship Budgeting and expenses Marketing
	Analysis	Attitudinal differences Population trends

(Continued)



## Appendix C: A Project Approach to Learning

---

Discipline	Subject	Content Topic that Could Benefit from Online Thinking Tools
Science	Earth Science	Geologic formations Climate change Extreme weather Space travel Global warming
	Physical Science	Fuel for the future Energy conservation Elements of the future Chemical safety Water quality Aerodynamics Health risks of bigger, faster roller coasters
	Life Science	Analysis of globalization Developing ocean resources Air pollution Solid waste issues Water usage/pollution Illnesses Genetics/cloning Adaptations/evolution
Social Studies	Geography	Human-Environment interactions Movement Phenomena
	History	Wars Prejudice/Racism/Intolerance Progress Traditions of a culture Middle East peace project Civil Rights Movement Tourism

# Sample Project Descriptions, Questions, and Prompts

The following projects include a *Visual Ranking* Prompt, a *Seeing Reason* Research Question, and a *Showing Evidence* Prompt. This does not mean that all tools would be used in that project. Instead, these examples are provided to show how each of the online thinking tools could be integrated into each project.

## The Arts

### Learning Objectives

- Identify and assess what influences the style of artists
- Select and defend an art form
- Construct a piece of modern art that embodies a previous artistic period

### Project Description

Art conveys meaning and emotion, often reflecting society. In understanding the history and style of any period of art, we have to understand the balance between the issues and developments of that particular era. Each and every period is affected by the history before it, which includes the previous philosophies, social and economic conditions, as well as the political, spiritual, and artistic influences. Create a piece of modern art that shows the influence of a previous artistic period and write an editorial on the impact of that period on a specific modern artist.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the following influences on an artist from most influential to least. OR, rank the following artists as to those who were most influential on modern art.

**Seeing Reason Question:** How has the \_\_\_\_\_ artistic period influenced modern art?

**Showing Evidence Prompt:** Which art form has contributed most to the current culture in this country?

### Civics

#### Learning Objectives

- Measure the importance of volunteers to the community
- Debate the use of volunteers to provide essential services
- Persuade a targeted audience to volunteer in their local community

#### Project Description

There are over 65 organizations in our county that rely on volunteers to provide help to those in need. Why should we give up our free time to help others? Can one person really make a difference anyway? Determine the effects volunteering can have in your community, then create a brochure explaining the needs and benefits of volunteering in order to encourage people to volunteer locally.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the reasons for volunteering in relationship to their effects on the community.

**Seeing Reason Question:** How does volunteer effort impact my community?

**Showing Evidence Prompt:** Would paid workers be a better way to ensure quality staffing of nonprofit organizations?

#### Learning Objectives

- Examine factors that affect voter turnout and rank the impact of each
- Research the impact of allowing voters to affect complex policy
- Persuade a particular section of the population to vote

#### Project Description

Voter turnout across the globe rose steadily between 1945 and 1990—increasing from 61% in the 1940s to 68% in the 1980s. But post-1990, the average has dipped back to 64%. Since 1945, Western Europe has maintained the highest average turnout (77%), and Latin America the lowest (53%); North America and the Caribbean have the third lowest turnout rate. Since voting is one of the cornerstones of a democracy, why is it that people do not vote? What can be done to improve voter turnout? Create a presentation and/or brochure directed to different segments of society to encourage participation in the voting process.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the following in order of those items that have the most impact on whether people vote.

**Seeing Reason Question:** What affects voter turnout?

**Showing Evidence Prompt:** Should voters be allowed to vote on complex policy issues?

### Learning Objectives

- Assess community needs
- Debate the possible uses of public land
- Propose a plan for a park that meets community needs and addresses safety

### Project Description

As urban growth continues, the need for parks and recreation areas increases. Planning commissions must look at many different things when planning a park. They must design the park to meet the needs of the community. They must keep safety in mind and devise a set of rules for the park. You and your group must set up a proposal for the community leaders regarding the new park that will be built in your community.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the items you think are most important to be in your new community park.

**Seeing Reason Question:** How should we plan a park so it is safe and fun?

**Showing Evidence Prompt:** Should we use public land for golf courses which return dollars to the community?

### Learning Objectives

- Identify and assess rules in society that are essential to keeping people safe
- Weigh the balance between personal rights and societal laws

### Project Description

We live with rules all around us—in our homes, at school, in our community. Some rules are determined by age limit, some by association in a group. Think about all the rules that impact your life right now. How will these rules change as you get older? What rules are necessary to help a community to function well and keep everyone safe? You are part of a committee that will propose rules for a new community that is going to be created on the planet Mars. Determine the problems or dangers that can occur in a community, and then suggest the appropriate rules to help keep people safe.

### Possible Question or Prompts

**Visual Ranking Prompt:** List the rules, from most important to least important, that you think are necessary to have in your community to keep people safe.

**Seeing Reason Question:** How do rules help keep us safe?

**Showing Evidence Prompt:** What legal activity on Earth should be banned on Mars?

## Appendix C: A Project Approach to Learning

---

### Economics

#### Learning Objectives

- Identify and assess items necessary to a successful and safe work environment
- Propose solutions to improve substandard migratory work practices

#### Project Description

Migrant workers often labor for very long hours, often under hazardous conditions, living in substandard conditions, and receiving very little pay. Throughout the years, many social activists have organized protests to bring to light the migrant worker conditions. You have been assigned to a task force to examine the issue of substandard working and living conditions for migrant workers in your assigned county. You must evaluate the reasons for these conditions and put together a proposal to help bring about a better living and working environment for these workers.

#### Possible Question or Prompts

**Visual Ranking Prompt:** List the items that are necessary for a good working environment, from most to least important.

**Seeing Reason Question:** What generates migratory work and produces the current practices/conditions associated with it?

**Showing Evidence Prompt:** Should employers be responsible for the living conditions of migrant workers?

#### Learning Objectives

- Understand how competition, demand, profit, and loss are involved in a company's decision making process
- Recommend ways to improve working conditions in various industries

#### Project Description

A basic tenet of our labor laws is that workers should earn a living wage in a safe, decent work environment. Many countries around the globe either do not have strict labor laws or do not enforce them. Many workers, especially in the garment industry, work long hours for little pay in substandard working conditions. Social advocate groups have raised the level of concern regarding these issues. Should we continue to buy garments and other items from companies that knowingly produce their products in "sweatshops"? How can we help to bring about positive change for these workers?

### Economics (Continued)

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the following in order of their influence on how a company runs its factories.

**Seeing Reason Question:** What influences how and where factories are located?

**Showing Evidence Prompt:** Should we continue to buy garments and other items from companies that knowingly produce their products in “sweatshops”?

### Foreign Language

#### Learning Objectives

- Formulate, investigate, and evaluate all aspects surrounding world languages
- Understand the differences and similarities among Francophone countries
- Examine patterns and structures to formulate generalizations

#### Project Description

Most people want to travel at some time in their lives. Now it's our turn! We have all learned so much French and now we want to put it to good use! We need to figure out which Francophone region we want to visit. Through this project, you will be working as a travel agent. You have many important decisions to make so that we have a successful trip. Your job as a travel agent is to advise others on where they should travel and why. Research the ten Francophone destinations, based on your understanding of that region, as well as the goals of your client to make executive decisions on the destination.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the ten Francophone countries from most to least desirable destination based on your understanding of that region and the goals of your client.

**Seeing Reason Question:** Considering the diverse cultures of the Francophone countries, why do they continue to use the French language as one of their primary languages?

**Showing Evidence Prompt:** Could we ever have one universal language used throughout our world?

## Appendix C: A Project Approach to Learning

---

### Foreign Language (Continued)

#### Learning Objectives

- Identify reasons why bilingualism and/or learning a second language benefits them and society

#### Project Description

There are many purposes and uses of foreign languages. Some students study another language in hopes of an international or government career. Others are interested in deepening their understanding of other people and cultures. Many study a foreign language to fulfill a graduation requirement. In this project, you will explore reasons why it is important to study foreign languages and create a presentation to our School Board, sharing the results of your research. Determine what action you will request they consider, such as requesting that foreign language requirements be emphasized or increased in our school district.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Why is it good to be bilingual? Rank according to your assigned perspective.

**Seeing Reason Question:** What are the outcomes of learning a second language?

**Showing Evidence Prompt:** Does learning a second language increase student learning and achievement in other subject areas?

#### Learning Objectives

- Engage in conversations in Spanish in order to provide and obtain information, express feelings and emotions, and exchange opinions
- Understand and interpret written and spoken language in Spanish
- Understand the relationship between the practices and perspectives of the culture

#### Project Description

Hay muchas culturas en el mundo que hablan español. ¿Cómo son similares? ¿Cómo y por qué son diferentes? Utilice las Herramientas para el pensamiento para ayudarle a aprender estas culturas y a practicar el español. ¡Escriba sus respuestas y comentarios en español! [There are many cultures around the world that speak Spanish. How are they similar? What makes them different? Use the thinking tools to help you learn about these cultures and practice your Spanish. Be sure to write your answers and comments in Spanish!] Students will use the Spanish version of the thinking tools:

<http://www97.intel.com/cr/ThinkingTools/VisualRanking>

<http://www97.intel.com/cr/ThinkingTools/SeeingReason>

<http://www97.intel.com/cr/ThinkingTools/ShowingEvidence>

(Continued)

## Foreign Language (Continued)

### Possible Question or Prompts

**Visual Ranking Prompt:** Priorice los alimentos más importantes para una típica familia española. Defienda con explicaciones sus elecciones de cada alimento. [Rank the foods that are most important to a traditional Spanish family. Provide reasons for each food's position.]

**Seeing Reason Question:** ¿Por qué es única la cultura mexicana? [What makes the Mexican culture unique?]

**Showing Evidence Prompt:** Todos estos países de habla español (México, Cuba, la Republica Dominicana, Puerto Rico y España) tienen culturas distintas. ¿Son más semejantes estos países a sí mismos o más semejantes a otros países cuyas lenguas vienen del latín? ¿Piensa Ud. tal vez que haya otros elementos más significantes que la lengua común? Explíquese. [All Spanish-speaking countries (such as Mexico, Cuba, Dominican Republic, Puerto Rico, and Spain) have distinct cultures. Are their cultures more similar to each other than to other countries with a Latin-based language? Or are the other elements of culture more significant than a common language?]

## Geography

### Learning Objectives

- Identify and analyze population migration and growth
- Assess geographical characteristics in areas of early settlements
- Plan a new city based on geographical elements

### Project Description

Alexandria, Egypt; Athens, Greece; and Shanghai, China are a few cities that were early settlements in their areas and continue to be important cities today. Of all the wide open spaces available, why did people choose to build homes and businesses in those locations? In this project, you will choose a major city with historical significance and write a report that discusses the geographical reasons as to why the city was founded in that location. You will apply that knowledge by creating a model of a new city in a location that would be most beneficial to its growth and prosperity.

### Possible Question or Prompts

**Visual Ranking Prompt:** Why do you think your location is best for your city? Rank the reasons for choosing this location that would be most beneficial to its growth and prosperity.

**Seeing Reason Question:** What affects a city's location, selection, and growth?

**Showing Evidence Prompt:** What is the most important factor in locating a new city in this century?



### Health

#### Learning Objectives

- Identify and assess important safety rules
- Identify factors that affect bicycle safety
- Persuade a targeted audience to wear bicycle helmets

#### Project Description

In 2002, 660 people were killed in bicycle accidents across the United States. Eighty-five percent of these bicyclists reportedly weren't wearing helmets. Another alarming statistic is that bicycle deaths are highest among 14 year-old males. Many of these deaths could have easily been prevented. What can we do to keep ourselves safe when riding our bicycles? Create a presentation, drama, or storybook for students in lower grades to educate them on how to be safe when riding their bicycles.

#### Possible Question or Prompts

**Visual Ranking Prompt:** In communicating bicycle safety, what are the most important rules to remember? Rank the following rules with the most important listed first.

**Seeing Reason Question:** What factors affect bicycle safety?

**Showing Evidence Prompt:** Does the safety factor of requiring helmets justify restricting a cyclist's freedom?

### History

#### Learning Objectives

- Understand the events that brought about social and political change in the 1960s and how it continues to impact us today
- Evaluate social progress

#### Project Description

The '60s was a decade of social and political turmoil. When looking back at this decade, we find that many of the social issues of that time are still being dealt with today, such as civil rights, women's rights, the peace movement, and others. Have we made any progress in the last 40 years? Prepare a commentary explaining how a specific social issue of today is a reflection of issues from the 1960's and how these issues have resolved, changed, or stayed the same.

### History (Continued)

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the following social issues in order of their importance today.

**Seeing Reason Question:** What prompted the \_\_\_\_\_ movement/issue of the 1960s and how has that movement/issue continued to impact our lives today.

**Showing Evidence Prompt:** Have we made any progress in the last 40 years?

#### Learning Objectives

- Assess the impact of revolutions based on their population growth
- Compare and contrast the impact of the Agricultural and Industrial Revolutions
- Examine the causes and effects of the Agricultural and Industrial Revolutions

#### Project Description

Two of the greatest changes in the use of the earth's resources that have had a significant effect on the world population were the Agricultural and the Industrial Revolutions. The Agricultural Revolution made large-scale agricultural production possible. The Industrial Revolution, beginning in the 18th century in Europe and still happening in many parts of the world today, provided mass production of consumer goods. One of the differences between these two revolutions was their impact on population growth and distribution. Write an essay that compares and contrasts these important stages that have shaped today's world.

#### Possible Question or Prompts

**Visual Ranking Prompt:** List the following inventions/processes that were created in the 18th century in order of their impact on population growth and distribution.

**Seeing Reason Question:** What initiated the Neolithic (Agricultural) revolution and how has it influenced our world today? What initiated the Industrial Revolution and how has it influenced our world today?

**Showing Evidence Prompt:** What revolution had the most impact on the people of that time period—the Agricultural Revolution or the Industrial Revolution?

### History (Continued)

#### Learning Objectives

- Analyze events, literature, and philosophies that influenced the start of the American Revolution
- Present evidence and reasons logically in order to persuade an audience

#### Project Description

The Boston Tea Party was a dramatic event that “started” the American Revolution; but surely, there must have been more than a simple tax on tea that caused early America to start down the road to a bloody war. In teams, present a debate staged in 1773 as to whether America should break its ties with Britain.

#### Possible Question or Prompts

**Visual Ranking Prompt:** List the correct chronological order of events of the American Revolution.

**Seeing Reason Question:** What were the factors that led America into war with Britain?

**Showing Evidence Prompt:** Should the American colonies break their ties with Britain?

#### Learning Objectives

- Examine and assess the causes of World War II
- Identify the important events of World War II and argue their impact
- Analyze wars in modern times and generalize and appraise their justification

#### Project Description

When World War I ended, an estimated 10 million were dead and 20 million wounded. The immense suffering from this war gave rise to a general revulsion to any kind of war. Many thought the need to fight a similar war would never come again. Yet a short twenty years later, World War II began. What could possibly have happened to plunge the world into another, even more devastating, world war? How can understanding the causes of World War II help us work toward a more peaceful world?

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the most significant events of World War II that made an impact on the outcome.

**Seeing Reason Question:** What were the causes of World War II? [Each group will investigate a segment of this question: economic, political, social, nationalistic, etc.]

**Showing Evidence Prompt:** Are any wars justified?

## Language Arts

### Learning Objectives

- Analyze human nature in light of fictional literature
- Compare and analyze the roots of violence in literature with that found in history and modern day

### Project Description

The incomprehensible brutality in WWII, the bombing of Japan, and the following Cold War made many people wonder about the true nature of humankind. In *Lord of the Flies*, William Golding paints a bleak representation of the world. Over fifty years later, similar atrocities continue. Are we destined to live in a world of violence? Do the characters in *Lord of the Flies* represent us?

### Possible Question or Prompts

**Visual Ranking Prompt:** List the events in order of their impact on the boys' descent into savagery.

**Seeing Reason Question:** What causes the breakdown of civilized behavior in *Lord of the Flies* and what are the consequences?

**Showing Evidence Prompt:** Do the characters in *Lord of the Flies* represent us?

K-3  
Idea

### Learning Objectives

- Analyze the impact of a character's actions on the story
- Explain how the actions of one character affect another
- Predict how character actions could alter the outcome of the story

### Project Description

Characters in [book title] make decisions throughout the course of the story. These decisions can have negative, positive, or no affect on other characters in the story. Select a main character from the book and write a letter to this character describing how his/her actions affected someone else in the story.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the actions that made the most impact in the story.

**Seeing Reason Question:** How does a character's words or actions impact others?

**Showing Evidence Prompt:** Would the world [community, family] be different today had the character made the opposite choice?

### Language Arts (Continued)

#### Learning Objectives

- Determine what impacts school safety
- Deliberate what effect requiring uniforms would have on a school
- Persuade an audience using well-reasoned evidence

#### Project Description

A safe and disciplined learning environment is the first requirement of a good school. Students who have to worry about wearing the right colors so as not to be affiliated with a gang or the latest fashion in order to fit in are not in a “safe” environment in which to learn. In response to the need for student safety, many parents, teachers, and school officials are calling for uniforms. Does requiring students to wear uniforms directly affect school environment? You are on a panel that is presenting recommendations to your local school board regarding the possibility of instituting school uniforms at your school.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the following in order of their impact on school safety.  
**Seeing Reason Question:** What would be the effects of requiring school uniforms?  
**Showing Evidence Prompt:** Should students be required to wear uniforms?

#### Learning Objectives

- Assess current school needs
- Analyze a school issue
- Recommend ways to address controversies

#### Project Description

Many problems and issues affect schools all over our country. Debates about installing computers vs. funding the arts, solving teacher shortages, allowing school prayer, dealing with school violence, ensuring equality, and providing school vouchers are just the tip of the iceberg when it comes to the issues facing today’s schools. Choose a school issue and evaluate its positive and negative aspects. You will serve on a panel of experts to suggest ways of addressing some of these controversies.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the expenditures most needed by your school, from most needed to least needed.  
**Seeing Reason Question:** What are the causes and effects of \_\_\_\_\_ in our schools?  
**Showing Evidence Prompt Examples:** Should student athletes be required to be academically successful in order to play? OR Should we have school vouchers?

Language Arts (Continued)



Learning Objectives
<ul style="list-style-type: none"> <li>▪ Restate facts and details in text to clarify and organize ideas</li> <li>▪ Read and understand grade-level-appropriate material</li> <li>▪ Analyze text to make generalizations and recommendations</li> </ul>
Project Description
<p>Doctor DeSoto is a mouse who refuses to treat “dangerous” animals or animals who like to eat mice. One day, a fox shows up and begs for help because he has a tooth that is hurting him. Doctor DeSoto and his wife must figure out how to treat the fox without being eaten by the fox. Your job is to decide whether or not the DeSotos should treat the fox. You will then participate in a mock trial to figure out whether the DeSotos discriminated against the fox by refusing to treat him or whether the fox is guilty of secretly wanting to eat the DeSotos.</p>
Possible Question or Prompts
<p><b>Visual Ranking Prompt:</b> From the dangerous animal list that we generated as a class, list the animals in order from least dangerous to most dangerous using your different perspectives (adult, dog, cat, baby, mice).</p> <p><b>Seeing Reason Question:</b> What makes animals dangerous?</p> <p><b>Showing Evidence Prompt:</b> Should Doctor DeSoto treat the fox? Would you accept cats and other dangerous animals as patients if you were Doctor DeSoto?</p>



Learning Objectives
<ul style="list-style-type: none"> <li>▪ Analyze text to make generalizations and recommendations</li> <li>▪ Read and understand grade-level-appropriate material</li> <li>▪ Write fairy tales based on given criteria</li> </ul>
Project Description
<p>Fairy tales are a part of our lives growing up. All around the world, fairy tales are used to delight and instruct children. You will be an author deciding what is important to include in your next best-selling fairy tale. Use the thinking tools to help you think through the most important elements of a fairy tale in order to write your own.</p>
Possible Question or Prompts
<p><b>Visual Ranking Prompt:</b> What are the most important things to include in a fairy tale? Rank them from the most important to the least important.</p> <p><b>Showing Evidence Prompt:</b> Is the number three important to have in every fairy tale?</p>

### Language Arts (Continued)

K-3  
Idea

#### Learning Objectives

- Apply safety rules to life skills
- Understand the importance and purpose of school rules

#### Project Description

Students will brainstorm the importance of school rules. They will apply these school rules to their school day. They will also understand the consequences when rules are broken.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the order of importance of these school rules. Think about which ones are most important for keeping you safe. Explain why the rule helps to keep you safe.

**Seeing Reason Question:** How do school rules keep me safe?

**Showing Evidence Prompt:** Choose a school rule. Does this school rule really help to keep you safe?

K-3  
Idea

#### Learning Objectives

- Use evidence from text to support an argument
- Write to defend a point of view about a character
- Use Venn Diagrams to analyze fairy tales

#### Project Description

Now that we have read the traditional story of The Three Little Pigs and the wolf's version, do you believe the wolf? Why were the pigs so afraid of the wolf? Was the wolf framed or not? You are detectives in search of the truth! You will need to find evidence from the story and then come to agreement as a group as to which opinion you will support. Using the information from both stories, you will rewrite the story again as to what really happened—from the point of view of an unbiased narrator.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the evidence against the wolf from the strongest to the weakest.

**Seeing Reason Question:** What causes the three little pigs to fear that the wolf wants to eat them?

**Showing Evidence Prompt:** Was the wolf framed in the original story of The Three Little Pigs?

## Mathematics

### Learning Objectives

- Use linear regression to create a linear function
- Fit linear models to data
- Use the correlation coefficient and residuals to measure the “goodness of fit”
- Use regression lines and the standard error of estimate to answer questions about data

### Project Description

You have been hired as a data analyst team to help various companies make marketing and business decisions based on data. In order to do this you will need to analyze the data, make predictions as to whether or not there are linear growth patterns, and make recommendations to your clients. First, using the class data of each student’s shoe size and height, plot the pair (height, shoe size) as a point on the grid. Then use the *Showing Evidence Tool* to evaluate whether it would be reasonable to sell shoes by a person’s height. Use the *Visual Ranking Tool* to help you think about the relationship between a given independent and dependent variable. You will be ranking relationships according to how linear or non-linear (exponential or quadratic) they are. You will then use your graphing calculator to check your answers. After your experience with a variety of scenarios, you will analyze what variables affected your ability to make accurate predictions from data using the *Seeing Reason Tool*. Using this information, you will provide recommendations to your client.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the order of the following relationships from the most linear to the least linear. Provide a brief explanation of why you think the given pair of variables is related linearly or non-linearly.

**Seeing Reason Question:** What variables affect your ability to make accurate predictions from data?

**Showing Evidence Prompt:** Do you think it would be reasonable to sell shoes by a person’s height?



### Mathematics (Continued)

#### Learning Objectives

- Use strategies, skills, and concepts in finding solutions
- Articulate reasons for choices for selecting problem solving strategies
- Identify ways to improve problem solving skills

#### Project Description

In this project, you will evaluate your problem solving skills in mathematics. The final goal of this project is a Development Plan in which you will create a 4-week plan, involving a family member and peers, to improve your problem solving skills in specific ways. Your plan and results—along with recognition for accomplishing your goals—will be presented at an awards night and Open House.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Based on your previous problem solving experiences, rank the following strategies in order of their value to you in solving mathematics problems.

**Seeing Reason Question:** What are the causes and effects of being an effective problem solver in mathematics?

**Showing Evidence Prompt:** Does using different problem solving strategies increase learning and achievement in mathematics?

#### Learning Objectives

- Itemize factors that affect one's ability to save
- Construct a savings plan
- Apply mathematical concepts to understand the growth of savings

#### Project Description

There are many options when it comes to money that you receive. Deciding what to do isn't always easy. Should you spend your money right away on that piece of candy, or put your money in a piggy bank to save for something you may need in the future? If you spend all your money right away, what will happen when you see something you want? Investigate further why saving is important, and create your own savings plan.

#### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the factors that affect how much you can save, from the most influential to the least.

**Seeing Reason Question:** What determines how much I can save?

**Showing Evidence Prompt:** Should you be allowed to spend your own money as you please?

## Mathematics (Continued)

Learning Objectives
<ul style="list-style-type: none"> <li>▪ Collect data, graph results, find line of best fit, slope and equation of the line</li> <li>▪ Identify dependent and independent variables</li> <li>▪ Apply understanding of slope to real-world applications</li> </ul>
Project Description
<p>What makes roller coasters exciting? There are many factors that could be considered, including speed, drop (including slope), force, and car type. You have been asked to give input on a roller coaster for a new theme park. Before doing so, however, you will learn how to collect data and graph results; find the line of best fit, slope, and equation of the line; and identify dependent and independent variables. [See <i>It's a Wild Ride: A Roller Coaster Design Project</i> (<a href="http://www.intel.com/education/projects/wildride">www.intel.com/education/projects/wildride</a>) for more ideas.]</p>
Possible Question or Prompts
<p><b>Visual Ranking Prompt:</b> What are the most important characteristics of a roller coaster?</p> <p><b>Seeing Reason Question:</b> How do speed, drop (including slope), force, and car type influence the thrills associated with a roller coaster?</p> <p><b>Showing Evidence Prompt:</b> What limitations should be placed on the development of new roller coasters to ensure safety?</p>

## Physical Education

Learning Objectives
<ul style="list-style-type: none"> <li>▪ Identify the factors that impact one's physical fitness</li> <li>▪ Analyze the food sold at a school for nutritional value</li> <li>▪ Create a personal physical fitness plan</li> </ul>
Project Description
<p>Since 1980, the rate of obesity in adults has doubled in the U.S. The number of overweight children and teens has doubled in the past two decades. Obesity can lead to serious health problems. Should we care about being physically fit? Why should you have a personal fitness plan? Create a presentation answering these questions, plus submit a personal fitness plan to improve your overall fitness and health.</p>
Possible Question or Prompts
<p><b>Visual Ranking Prompt:</b> List the most persuasive arguments for encouraging someone to become physically fit, from the most to least persuasive.</p> <p><b>Seeing Reason Question:</b> What factors impact your physical fitness?</p> <p><b>Showing Evidence Prompt:</b> Should we be selling unhealthy foods at school?</p>

### Science: Earth Science

#### Learning Objectives

- Research ways to prepare for a hurricane
- Understand the causes and effects of hurricanes
- Inform others how to stay safe in a hurricane

#### Project Description

Hurricanes are nature's greatest storms. History tells us that lack of education and preparedness for hurricanes often spells disaster. Hurricane preparedness can be used to save lives at work, home, while on the road, or on the water. Your job as a meteorologist is to inform the public about all the issues surrounding hurricanes so that if they ever find themselves in a hurricane situation, they will know what to do.

#### Possible Question or Prompts

**Visual Ranking Prompt:** What are the most important ways to prepare for a hurricane? Rank the list from most important to least important.

**Seeing Reason Question:** What are the causes and effects of a hurricane?

#### Learning Objectives

- Understand the relationship between humans and the environment
- Identify and weigh the damaging factors affecting seashore environments
- Persuade the public to change current practices and preserve sea life

#### Project Description

People, through their actions, often cause damage to seashore environments. You have been appointed to an Environmental Protection Team to teach people about ways they can protect and preserve the environments of the beach, the shallows, and the coral reef. You will create a presentation to educate and encourage the public to change their dangerous actions.

#### Possible Question or Prompts

**Visual Ranking Prompt:** What damages seashore environments—from the most damaging to least damaging?

**Seeing Reason Question:** What are the causes and effects of damage to the seashore environments?

### Learning Objectives

- Rate the impact of various recycling efforts
- Analyze the costs and benefits of recycling
- Identify pollution in the community and make a plan to lessen its impact

### Project Description

Many places around the world are littered and polluted. Nearly everything we do leaves behind some sort of solid waste. This can affect the water we drink, the air we breathe, and the food we eat. As your city's new Environmental Management Director, you are responsible for a new program that encourages citizens and businesses to recycle and reduce waste. Create and present a plan for action to help lessen the pollution problem in your community.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the recycling efforts that have the most impact on the environment.

**Seeing Reason Question:** What impact can recycling have on a community?

**Showing Evidence Prompt:** Is recycling worth it?

### Learning Objectives

- Apply understanding of the elements and interconnections of the earth's biomes in a persuasive argument
- Present correlations between rainforest destruction and negative world impact

### Project Description

The earth is composed of a variety of biomes. Together these biomes create a delicate balance of give and take for the survival of this living planet. The rainforest biome has been impacted by human needs and wants. Working within a team of specialists, your task is to educate and persuade others to help save the rainforests. Within your presentation, submit solutions to the destruction of the rainforest.

### Possible Question or Prompts

**Visual Ranking Prompt:** Rank the factors that contribute to rainforest devastation with those with the greatest impact listed first.

**Seeing Reason Question:** How does the destruction of the rainforest impact the world?

**Showing Evidence Prompt:** What is the right balance of conservation for the world's rainforests, considering the economic, political, and environmental concerns?

### Science: Life Science



#### Learning Objectives

- Know and understand the characteristics and habitats of bats
- Compare factual information with people's misconceptions and emotional responses
- Use developmentally appropriate strategies to express original ideas

#### Project Description

Many people are afraid of bats because they have wrong information. You are a member of the "Friends of the Bats" club. The first thing you will need to do is try to understand why people are afraid of bats. Secondly, you will help others learn what bats are really like.

#### Possible Question or Prompts

**Visual Ranking Prompt:** What are the greatest benefits for having bats around? Rank them from most to least important.

**Seeing Reason Question:** What increases people's fear of bats?

**Showing Evidence Prompt:** Should we be afraid of bats?

### Science: Physical Science

#### Learning Objectives

- Identify the obstacles associated with prolonged space travel and the effects of zero gravity on living things
- Propose ways to extend space travel

#### Project Description

Medical risks, both physical and psychological, are a significant concern for those people who are interested in traveling beyond Earth's orbit. Travel for short durations is not as big a concern as long duration missions, such as extended time in space stations or possible long distance trips to other planets. Is extended space travel realistic for human beings? What conditions would be necessary in order for humans to safely spend time in space? These are questions that need to be answered before the development of future long-term space travel. Your mission is to present a presentation along with recommendations on whether—and how—humans will be able to adapt to space travel.

#### Possible Question or Prompts

**Visual Ranking Prompt:** What are the biggest obstacles to prolonged space missions? Rank the list with the greatest obstacle first.

**Seeing Reason Question:** What are the effects of zero gravity on the human body?

**Showing Evidence Prompt:** Should we continue to explore space?

# Sample K-3 Unit Plan: Birds, Birds, Birds!

Unit Overview
Unit Summary
As a year-long study, kindergarten students will become ornithologists who will study bird trends over time. They will focus on classification, counting, patterns, animal behaviors, and weather on a daily basis as they record data either in a database or spreadsheet. At the end of every season, the students will study the data to see which birds came to eat at the birdfeeder most often, how many birds came, and determine how weather might have affected visitation. Periodically, the students will develop improvement plans for the area around the birdfeeder to increase the possibility of more visiting birds. Throughout the project, the students will be doing arts and crafts, songs, theme days, life cycle study—all about birds—to enrich the unit. Students will present their findings at the end of the year through the creation of a brochure and collaborative story.
Subject Area
Science, Mathematics, Language Arts
Grade Level
K-2
Approximate Time Needed
This is a year long project-based unit covering all of the seasons.
Unit Foundation
Habits of Learning Taxonomy
Knowledge, Gathering Data Through All Senses, Application, Learning Continuously, Acquisition and Integration of Knowledge, Questioning and Posing Problems, Listening to Others
Targeted Content Standards and Benchmarks
<p><b>Kansas K-4 Environmental Education Standards</b></p> <p>1.3 Describe the climate of their region. Example: Construct a simple weather station, or utilize existing equipment, to gather data for identifying trends and patterns, e.g., record daily weather, graph and compare weather characteristics.</p> <p>2 Learners demonstrate an understanding of the relationships and interactions between organisms and the environment.</p> <p>2.1.2 Classify or group plants and animals according to structures and basic needs (food, water, shelter, space, air, and sunlight). Example: Classify birds by foot type (e.g., webbed, clawed, taloned, etc.).</p>

### Unit Foundation (Continued)

#### Targeted Content Standards and Benchmarks

- 4.1 Learners demonstrate scientific questioning skills.
    - 4.1.1 The students will express a simple question in a way that can be investigated.
  - 4.2 Learners demonstrate scientific inquiry skills.
    - 4.2.4 Gather and record data related to an investigation using appropriate data displays.
    - 4.2.5 Form conclusions based on the data collected.
    - 4.2.6 Demonstrate a willingness to modify opinions based on evidence.
  - 1.1 All students will be involved in activities that develop skills necessary to conduct scientific inquiries. These activities will involve asking a simple question, completing an investigation, answering the question, and presenting the results to others.
    - 1.1.1 The students will identify characteristics of objects.
    - 1.1.2 The students will classify and arrange groups of objects by a variety of characteristics.
    - 1.1.3 The students will use appropriate materials and tools to collect information.
    - 1.1.4 The students will ask and answer questions about objects, organisms, and events in their environment.
    - 1.1.5 The students will describe an observation orally or pictorially.
  - 3 LIFE SCIENCE: As a result of the activities for grades K-2, all students will begin to develop an understanding of biological concepts.
    - 3.1.3 The students will observe living things in various environments.
  - 4.3 All students will describe changes in weather. Weather includes snow, rain, sleet, wind, and violent storms.
    - 4.3.1 The students will observe changes in the weather from day to day.
    - 4.3.2 The students will record weather changes daily.
  - 5.1 All students will use technology to learn about the world around them. Students will use software and other technological resources to discover the world around them.
    - 5.1.2 The students will experience science through technology.
- Kansas K-2 Math Standards**
- 1.2 The student demonstrates an understanding of whole numbers with a special emphasis on place value in a variety of situations.
  - 4.1 The student applies the concepts of probability using concrete objects in a variety of situations.
    - 4.1.A1 The student conducts an experiment or simulation with a simple event and records the results in a graph using concrete objects or frequency tables (tally marks).
  - 4.2 The student collects, records, and explains numerical (whole numbers) and non-numerical data sets including the use of concrete objects in a variety of situations.
    - 4.2.A1 The student communicates the results of data collection from graphs using concrete objects and frequency tables.
    - 4.2.K1 The student records numerical (quantitative) and non-numerical (qualitative) data including concrete objects, graphs, and tables.
    - 4.2.K2 The student collects data related to familiar everyday experiences by counting and tallying (2.4.K1a,g) (\$).
    - 4.2.K3 The student determines the mode (most) after sorting by one attribute (2.4.K1a, g) (\$), e.g., color, shape, or size.

Student Objectives/Learning Outcomes		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>▪ Count and record the number of birds in a tally sheet and on a graph</li> <li>▪ Classify birds based on color, size, and diet</li> <li>▪ Gather data for identifying trends and patterns over time</li> <li>▪ Record daily weather and predict the number of birds that might visit based on the weather</li> <li>▪ Communicate the results of data to others</li> <li>▪ Develop an improvement plan for the bird feeders to increase the number of visiting birds</li> </ul>		
Curriculum-Framing Questions		
Essential Question	What can nature tell us?	
Unit Questions	How do the seasons and weather affect birds? How can we improve our feeder so more birds will visit?	
Content Questions	How many birds visited us today? What are the names of the birds? Do all birds eat the same food? How can we measure the amount of food the birds eat? How could we sort the birds that come to visit us? How could we graph the number of birds that come to visit us?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ <i>Visual Ranking Tool</i> activity to assess prior knowledge</li> <li>▪ Verbal discussions</li> <li>▪ Discussion of pictures</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bird graph</li> <li>▪ Color tally sheet</li> <li>▪ Seasonal Recording spreadsheet</li> <li>▪ Analysis of environmental factors using <i>Seeing Reason</i></li> <li>▪ Improvement plan brainstorming and ranking</li> <li>▪ Evaluation of data using <i>Showing Evidence</i></li> <li>▪ Verbal discussions</li> <li>▪ Discussion of pictures and stories</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class story and drawings</li> <li>▪ Checklist for self-assessment</li> <li>▪ Rubric to assess brochure</li> <li>▪ Presentation to parents and community</li> </ul>



## Appendix C: A Project Approach to Learning

---

Assessment Plan
Assessment Summary
<p>At the beginning of the unit, students will use the <i>Visual Ranking Tool</i> to assess students' prior knowledge of the types of birds in our community. Periodically, students will be assessed on the accuracy and completion of data on the Bird Graph Document and on the Color Tally Sheet. They will be assessed on their ability to count and record data, analyze the data, and their completion of art components. Throughout the unit, students will be assessed through their verbal discussions and analysis of bird classifications and actions. The students' improvement plans and rankings will be assessed for their understanding of bird activity and requirements. Students will be assessed on the accuracy and understanding of bird behavior and the effects of the seasons when creating a collaborative story and drawing. Students will have teacher assistance to self-assess their brochures using a checklist. Student brochures will be assessed with a rubric.</p>
Visual Ranking Elements—Project 1
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Feathered Friends Around Us
Project Description (For the <i>Visual Ranking</i> workspace)
<p>Work together to learn about birds that are common in our community all year. What birds do you think will come to the bird feeder most often? Using the <i>Visual Ranking Tool</i>, rank the birds you think will come to the feeder—from most to least.</p>
Prompt (For the <i>Visual Ranking</i> workspace)
<p>What type of bird do you think we are going to see the most at the bird feeder and why? Rank the list from the most to least number.</p>
Sorting List (For the <i>Visual Ranking</i> workspace)
Black, Birds, Blue Jays, Cardinals, Crows, Finch, Meadowlark, Sparrows
Visual Ranking Elements—Project 2
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Making it Homey
Project Description (For the <i>Visual Ranking</i> workspace)
<p>What should we do to attract more birds to our feeder? How can we make this area a nice place for the birds to hang out? Using the <i>Visual Ranking Tool</i>, rank the improvements you think we should make from most important to least important. Explain why you think that improvement will encourage more birds to come to the area around our feeder.</p>
Prompt (For the <i>Visual Ranking</i> workspace)
<p>Rank the improvements you think we should make to encourage more birds to come to our feeder. Rank the list from the most important to least important. Explain why you think it would help or not help.</p>

Sorting List (For the <i>Visual Ranking</i> workspace)
another feeder, bird bath, bird house, bushes, different food, ground feeder, higher feeder
<b>Seeing Reason Elements</b>
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)
In the Bird House
Project Description (For the <i>Seeing Reason</i> workspace)
A person who studies birds is called an ornithologist. This year, you will be an ornithologist! All year, you will study bird trends over time by watching them. You will focus on counting, classifying, and watching bird behaviors so you can gather and record the information. You will also record the weather on a daily basis to see how the weather might change the birds' actions. Use the <i>Seeing Reason Tool</i> to think about what might make birds stay away from the feeder and what might encourage them to come to the feeder.
Research Question (For the <i>Seeing Reason</i> workspace)
What affects whether birds will come to the feeder?
Practice Map (For your future quick reference)
<pre> graph TD     A[People at the window] --&gt; B[Birds at the feeder]     C[Lack of natural food] --&gt; B     D[Bad weather] --&gt; B     E[Food in the feeder] --&gt; B     F[Other birds] --&gt; B     G[Noise] --&gt; B     </pre>

## Appendix C: A Project Approach to Learning

Showing Evidence Elements (Complete this section if this tool will be used in the unit)	
Showing Evidence Project Name (For the <i>Showing Evidence</i> workspace)	
Here Little Birdie!	
Project Description (For the <i>Showing Evidence</i> workspace)	
At the end of each season, you will study your logs to see which birds came to eat most often, the times the birds came to eat (morning or afternoon), how many birds came to eat, and how the weather changed their habits. Use the <i>Showing Evidence Tool</i> to help you learn whether the number of birds that come to our feeder was affected by the season.	
Prompt (For the <i>Showing Evidence</i> workspace)	
Does the season affect how many birds come to eat at our feeder?	
Practice Case (For your future quick reference)	
Unit Details	
Prerequisite Skills	
None	
Instructional Procedures	
<b>Introduction</b> At the beginning of the year, introduce the year-long Essential Question, What can nature tell us? Use pictures and recorded sounds to assess students' prior knowledge of the natural world around them. Talk about how they will be learning about birds all year and they will become bird experts, which are called ornithologists. Introduce the unit questions that they will be working on all year: How do the seasons and weather affect birds? and How can we improve our feeder so more birds will visit? Post all three in the classroom. Brainstorm what kinds of things birds need to survive and make a list of what they as a class can do to help. Introduce how they will use a bird feeder to record information about the birds in their community.	

### Unit Details

#### Instructional Procedures

##### Using Thinking Tools to Set the Stage for Learning

Ask the students what kinds of birds they have seen in their yard, at the school, and around the community. Make a list to populate the *Visual Ranking Tool*. Have students work in pairs to discuss what birds they have seen, how often they see them, and whether they think the birds might come to their bird feeder. Have them rank the birds from what they think will be the greatest number to visit the feeder to the least. Use this information to assess students' prior knowledge of the birds in your community.

Go outside to survey possible locations for the bird feeder. Brainstorm what might affect whether or not a bird will come to the feeder. Have students use the brainstormed ideas as they make an initial *Seeing Reason* map that shows what might make birds stay away from the feeder and what might encourage them to come to the feeder. Be sure to have them save their maps into their portfolio. Read bird stories to them, have them look at age-appropriate bird books, and show videos to help them better understand bird behavior and habitat. Have students use that new information to update their *Seeing Reason* maps again (and save in their portfolio folder). From this new knowledge, have students plan the location and supplies they will need for the bird feeder.

##### Daily Calendar of Bird Activities

As the students do their daily calendar lesson, have them complete bird graphing activities. Students will look outside to count how many birds are at the feeder. They will record the data on the Bird Graph document and on the Color Tally Sheet. On the Bird Graph document, have the students shade in the boxes of the number of birds they see at the feeders both in the morning and afternoon. On the Color Tally Sheet, have the students mark a tally for the color of birds they see. For example, if they see a Cardinal at the feeder, they would put a tally next to red. If they see a bird with many colors, they will put a tally under each color they see. Using the Measurement Worksheet, have students track the amount of food added to the feeder on a daily and weekly basis. It will also allow them to track how many days it took for the birds to eat the feed.

At the end of the week, help the students calculate the totals. File the sheets away in a folder based on each season. For example, all of the sheets for the weeks of August through September 21 would be in a summer folder. All of the sheets from September 22 through December 21 would be in a fall folder. All of the sheets from December 22 through March 21 would be in a winter folder. All of the sheets from March 22 through the end of the school year would be in a spring folder.

At the end of the first week of recording bird data, introduce the *Showing Evidence* case. Working in teams of three, have students decide whether they think the seasons will affect how many birds come to their feeder. Have them use their prediction to create a claim. Include some pre-populated evidence that is appropriate for the current season. Have students create new evidence based on their other research.

## Appendix C: A Project Approach to Learning

---

### Instructional Procedures (Continued)

#### Analyzing the Data Each Season

At the end of each season, pull out the data logs and have the students make some conclusions based on the data. Create four sheets within a spreadsheet program—one for each season. Have the students use the Seasonal Recording Spreadsheet to record all the data by season.

Have the student teams evaluate their spreadsheet for evidence as to whether the numbers help to support their *Showing Evidence* claim or not. Have students create new evidence based on their data and other research and connect them to the claim. Some evidence will need to stay in the evidence bin (i.e., not be attached to the claim) until more data is recorded for the other seasons.

#### Improvement Plan

Near the end of the first season, remind students of one of the unit questions: How can we improve our feeder so more birds will visit? Discuss what they have done so far to improve the feeder area. Have students update their *Seeing Reason* map and determine whether they think they need to make any changes to help encourage birds to visit their feeder. Encourage them consider the weather associated with the upcoming season.

At the end of the third season, help students brainstorm some possible improvements, such as adding a bird bath, bushes, another feeder, ground feeder, different food, bird house. Have students use the *Visual Ranking Tool* to rank the improvements they would like to add to their bird feeder environment to increase the number of birds. Have a member of a local bird club also rank the list. Be sure students compare their lists and discuss the differences. Plan a bird habitat improvement day so students can implement the improvement plan. Be sure to take pictures!

#### Bringing It All Together

During the last season, assign the student teams a new team log-in so they can revisit their first *Visual Ranking* list of birds. Using the data from all year, have student teams rank the list again according to which birds frequented the bird feeder most. Instruct them to compare their new ranking with the ranking they did at the beginning of the year. Have students discuss the differences and what they have learned.

At the end of the last season, provide time for students to add their remaining evidence, connect it to the claim, and then make a conclusion as to whether or not their claim can be supported—in other words, has their claim been found to be true? Help students to reflect on all they have learned about birds this year. Revisit one of the unit questions in preparation of the creation of a class story about the adventures of a bird: How do the seasons and weather affect birds? Write the story together as a class and have each student draw a picture to illustrate one part of the story.

#### Communication with Community

Provide a self-assessment checklist and rubric to help students create a collaborative brochure to share their findings, improvement plans, and pictures with the community and parents. Wrap up with a discussion about what nature has been able to tell us this year.

Accommodations for Differentiated Instruction	
Resource Student	Present instructions in a variety of ways Provide assistance with counting and recording of data
Nonnative English Speaker	Use cooperative learning strategies to be immersed in the English language Provide resources in their target language
Gifted Student	Provide opportunities to conduct research on the birds that come to visit and suggest improvements specifically for them
Materials and Resources Required for Unit	
Printed Materials	<p><i>The Audubon Backyard Birdwatcher: Birdfeeders and Bird Gardens</i> ISBN: 1571451862</p> <p><i>Birds, Nests, &amp; Eggs (Take-Along Guide)</i> by Mel Boring ISBN: 155971624X</p> <p><i>The Burgess Bird Book for Children (Dover Science Books)</i> by Thornton W. Burgess ISBN: 0486428400</p> <p><i>Have You Seen Birds?</i> by Joanne Oppenheim, Joanne F. Oppenheim ISBN: 0590270303</p> <p><i>The Baby Beebee Bird</i> by Diane Redfield Massie, Steven Kellogg ISBN: 0060280832</p> <p><i>A Bird or 2: A Story About Henri Matisse</i> by Bijou Le Tord ISBN: 0802851843</p>
Supplies	Bird Feeder, Birdseed, Measuring Cups
Technology - Hardware	Computers for research and creation of brochures Digital Camera for taking pictures of birds and students Printer for brochures, graphs, and logs

## Appendix C: A Project Approach to Learning

Materials and Resources Required for Unit (Continued)	
Technology - Software	Spreadsheet program for entering data Word processing program for stories and brochures Image processing for digital pictures of birds Multimedia presentation software for parent meetings and open house
Internet Resources	<p><b>PBS Nature: Puzzles and Fun</b>  <a href="http://www.pbs.org/wnet/nature/fun/jigsaw_exbirds_flash.html">www.pbs.org/wnet/nature/fun/jigsaw_exbirds_flash.html</a>            Bird jigsaw puzzle</p> <p><b>E Nature: Bird Audio</b>  <a href="http://www.enature.com/birding/audio.asp">www.enature.com/birding/audio.asp</a>            Bird song audio sound files</p> <p><b>Bird Video Clips</b>  <a href="http://asiabird.com/birds_video_clips.htm">http://asiabird.com/birds_video_clips.htm</a>            Bird video files</p> <p><b>Cloud Forest Alive</b>  <a href="http://www.cloudforestalive.org/tour/hcam">www.cloudforestalive.org/tour/hcam</a>            Hummingbird Live Cam</p> <p><b>Colorado State University: The Warren and Genevieve Garst Photographic Collection</b>  <a href="http://lib.colostate.edu/wildlife/birds.html">http://lib.colostate.edu/wildlife/birds.html</a>            Bird image gallery</p> <p><b>Enchanted Learning: All About Birds</b>  <a href="http://www.enchantedlearning.com/subjects/birds">www.enchantedlearning.com/subjects/birds</a>            Information about birds; appropriate for lower elementary grades</p> <p><b>National Wildlife Federation Fun &amp; Games: Bonnie &amp; Chester Matching Game</b>  <a href="http://www.nwf.org/kidzone/kzPage.cfm?siteId=2&amp;departmentId=150">www.nwf.org/kidzone/kzPage.cfm?siteId=2&amp;departmentId=150</a>            Backyard buddies matching game</p> <p><b>National Wildlife Federation Ranger Rick</b>  <a href="http://www.nwf.org/kidzone/kzPage.cfm?siteId=3&amp;departmentId=77">www.nwf.org/kidzone/kzPage.cfm?siteId=3&amp;departmentId=77</a>            Bird brains online game</p> <p><b>Interactive Venn Diagram</b>  <a href="http://www.readwritethink.org/materials/venn">www.readwritethink.org/materials/venn</a>            Online interactive Venn diagram</p>
Outside Participation	Guest visit by a local bird expert; ranking participation by local bird club member or other community member
Other Resources	Field trip to the local nature center
Credits	
Renee Ewert and Dyane Smokorowski, participating in the Intel® Teach Program, developed the idea for this unit plan. A team of teachers expanded the plan into the example you see here.	

## Appendix D Assessment Resources

# Sample Assessment Plan: Fraction Quest

Unit Overview
Unit Summary
Students are assigned to a profession that uses fractions on the job. They research, summarize, draw conclusions, and present their findings to the class answering questions such as, <i>Does accuracy really matter that much?</i> and <i>How are fractions used on the job and are they needed to get the job done right?</i> Students learn to add, subtract, multiply, and divide fractions to help answer the Unit Question, <i>How can understanding fractions make your life easier?</i> As a culminating activity, students reflect on the importance of knowing fractions in the assigned profession and in their own lives both now and in the future.
Subject Area
Math
Grade Level
3-5
Higher-Order Thinking Skills
Problem Solving, Making Inferences, Generalizing
Key Learnings
Fractions, Problem Solving, Research Techniques
Unit Foundation
Targeted Content Standards and Benchmarks
<p><b>California Mathematics Standards for Grade 5</b></p> <ul style="list-style-type: none"> <li>▪ 2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions:</li> <li>▪ 2.3 Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.</li> </ul> <p><b>California Mathematics Standards for Grade 5 (Continued)</b></p> <ul style="list-style-type: none"> <li>▪ 2.4 Understand the concept of multiplication and division of fractions.</li> <li>▪ 2.5 Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.</li> </ul>



## Appendix D: Assessment Resources

Targeted Content Standards and Benchmarks (Continued)		
<p><b>National Educational Technology Standards</b></p> <ul style="list-style-type: none"> <li>Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.</li> <li>Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.</li> <li>Students use technology to locate, evaluate, and collect information from a variety of sources</li> </ul>		
Curriculum-Framing Questions		
Essential Question	Does accuracy really matter that much?	
Unit Questions	How are fractions used on the job? How can understanding fractions make your life easier?	
Content Questions	What is a fraction? How do you add, subtract, multiply, and divide fractions? What is a numerator? What is a denominator?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>Journal</li> <li>Collaboration Checklist</li> <li>Poster Checklist</li> </ul>	<ul style="list-style-type: none"> <li>Project Rubric</li> <li>Presentation Checklist</li> <li>Research Checklist</li> <li>Conferences</li> <li>Questioning</li> </ul>	<ul style="list-style-type: none"> <li>Presentation Checklist</li> <li>Project Rubric</li> <li>Chart Reflection</li> </ul>
Assessment Summary		
<p>Students answer prompts in their math journals related to the Unit Questions and the fraction activities. Students use the checklist to self-assess their poster and monitor their collaboration skills as they work together on the poster. Students use a project rubric to help guide them through the entire project. Students use a checklist and storyboard to help them through the researching, drafting, and writing phases of the presentation. The teacher uses the checklist to assess content integration and the overall effectiveness of the presentation. Teachers schedule individual conferences to assess the students' mathematical understanding, critical thinking, collaboration, and the research process. Students use the storyboard to plan and monitor work on the presentation. Teachers use the journal, checklists, storyboard, conference notes, and reflections to assess conceptual understanding using the project rubric as a guide. Teachers use questioning strategies to monitor student progress, probe for understanding, and engage students in higher-order thinking. Teachers also return to Curriculum-Framing Questions throughout the project to analyze student understanding. Students reflect on their learning by relating how knowing fractions helps them now and in the future. Teachers review final reflections to assess student growth in understanding.</p>		

# Sample Assessment Plan: Storm Watch

Unit Overview	
Unit Plan Title	Storm Watch
Unit Summary	This unit helps students understand the many factors that determine what the weather is like in a particular location, such as the angle of the sun's light rays, the tilt of the Earth's axis, and the proximity to water, winds, and elevation. Students conduct many scientific investigations to understand the complexities of weather systems. Throughout the unit, students are asked to ponder the Essential and Unit Questions, <i>How do people respond to change?</i> and, <i>How does weather affect our lives?</i> In a final presentation, students take on the role of weather forecasters and report on weather conditions in a city they would like to visit. They demonstrate their understanding about the factors contributing to weather that people throughout the world experience each day.
Subject Area	Science, Math, Language Arts
Grade Level	4-6
Higher-Order Thinking Skills	Cause and Effect, Analysis
Key Learnings	Measurement, Weather Changes, Patterns, Public Speaking
Unit Foundation	
Targeted Content Standards and Benchmarks	<p>Colorado English Standards for Grade 5-8</p> <ul style="list-style-type: none"> <li>write and speak for a variety of purposes such as conveying technical information, explaining concepts and procedures, and persuading;</li> <li>organize written and oral presentations using strategies such as lists, outlining, cause/effect relationships, comparison/contrast, problem/solution, and narration;</li> <li>select relevant material for speaking purposes;</li> </ul>

## Appendix D: Assessment Resources

---

### Targeted Content Standards and Benchmarks (Continued)

- paraphrase, summarize, organize, and synthesize information;
- give credit for others' ideas, images, or information; and
- use information to produce a quality product.

#### **Colorado Science Inquiry for Grade 5–8**

- ask questions and state hypotheses that lead to scientific investigations;
- make predictions based on prior experiences and understandings;
- use appropriate tools, technologies, and metric measurement units to gather and organize data;
- summarize data and communicate results of investigations in a variety of ways, including written reports, graphs, charts, data tables, and oral presentations; and
- work as a group to solve a problem.

#### **Colorado Standards - Earth's systems and the dynamics of the solar system and the universe for Grade 5–8**

- describe the atmosphere;
- observe changes in weather conditions;
- describe weather systems;
- explain how the sun affects atmospheric circulation; and
- investigate the occurrence of storms and explain their effects on human populations and the environment.

#### **Colorado Mathematics Standards for Grade 5–8**

- read, construct, compare, and contrast displays of data using appropriate techniques and technology; and
- gather data, formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis.

#### **National Educational Technology Standards**

- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- Students use technology to locate, evaluate, and collect information from a variety of sources.

Curriculum-Framing Questions		
Essential Question	How do people respond to change?	
Unit Questions	How does weather affect our lives?	
Content Questions	What are the reasons for the seasons? What are weather systems? What causes change in our weather? How does air pressure affect our weather?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ T-Chart</li> <li>▪ K-W-L Chart</li> <li>▪ Science Journal</li> </ul>	<ul style="list-style-type: none"> <li>▪ Science Journal</li> <li>▪ Conferences</li> <li>▪ Line Graph Rubric</li> <li>▪ Research Checklist</li> <li>▪ Multimedia Rubric</li> <li>▪ Peer Feedback</li> <li>▪ <i>Visual Ranking</i> Comments</li> <li>▪ Group Process Rubric</li> <li>▪ Oral Presentation Rubric</li> <li>▪ K-W-L Chart</li> </ul>	<ul style="list-style-type: none"> <li>▪ K-W-L Chart</li> <li>▪ Science Journal</li> <li>▪ Oral Presentation Rubric</li> <li>▪ Reflections</li> <li>▪ District Test</li> </ul>
Assessment Summary		
<p>Students create a T-Chart to compare and contrast fact from fiction in a story. The teacher uses it as a pre-assessment to determine readiness for studying weather. Students return to these throughout the unit to add additional questions and new learnings. Students make observations and keep notes in their science journal as they investigate weather systems. The teacher reviews during conferences to provide feedback, clarify misunderstandings and provide additional lessons if necessary. Students use a rubric to help them complete a line graph with data from their investigations. Students use a checklist to guide them through the research process. Teachers ask students to bring the checklist to conferences to monitor progress and allow students to ask questions. Students use a rubric to ensure they've met the expectations as they research a weather system and present their findings. Peers use the rubric to provide feedback to the presenters. Students rank the steps to take in a severe weather system. The teacher probes student understanding and reasoning through questioning, reviewing comments, and providing feedback. Students complete a test at the end of the unit; the teacher uses the test results to assess student's science content knowledge.</p>		
Credits		
<p>Jeanne Shirley participated in the Intel® Teach Program, which resulted in this idea for an assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at: <a href="http://www.intel.com/education/assessingprojects">www.intel.com/education/assessingprojects</a></p>		

# Sample Assessment Plan: Great Thinkers

Unit Overview
Unit Summary
This unit exposes students to great minds who have made a significant impact on the world. Students take on the role of a Great Thinker and through research they analyze how these "Great Thinkers" changed the world. After synthesizing their research information, students create "I AM" poems as well as diary entries from the perspective of their Great Thinker. As a culminating activity, students become their Great Thinker, presenting the life and accomplishments of a Great Thinker to the class. In a final reflection, students answer the Essential and Unit Questions, What does it take to change our world? and Which people have positively impacted our world?
Subject Area
Social Studies, Language Arts
Grade Level
6-8
Higher-Order Thinking Skills
Analysis, Synthesis
Key Learnings
Researching, Expository Writing, Public Speaking
Unit Foundation
Targeted Content Standards and Benchmarks
<p><b>Washington State Standards Reading</b></p> <ul style="list-style-type: none"> <li>The student understands the meaning of what is read.</li> </ul> <p><b>Writing</b></p> <ul style="list-style-type: none"> <li>The student writes in a variety of forms for different audiences and purposes.</li> <li>The student understands and uses the steps of the writing process.</li> </ul> <p><b>Communication</b></p> <ul style="list-style-type: none"> <li>The student communicates ideas clearly and effectively.</li> </ul> <p><b>Social Studies</b></p> <ul style="list-style-type: none"> <li>Understand and use inquiry and information skills required by citizens in a democratic society</li> <li>Understand and apply critical thinking and problem solving skills to make informed and reasoned decisions</li> </ul>

Curriculum-Framing Questions		
Essential Question	What does it take to change our world?	
Unit Questions	Which people have positively impacted our world?	
Content Questions	How did these “Great Thinkers” change the world? Who did their work impact? What obstacles did they overcome to change the world?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ Journal</li> <li>▪ Questioning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Research Quiz</li> <li>▪ Journal</li> <li>▪ Questioning</li> <li>▪ K-W-L Chart</li> <li>▪ Anecdotal Notes</li> <li>▪ Poem Scoring Guide</li> <li>▪ Peer Feedback</li> <li>▪ Diary Scoring Guide</li> <li>▪ Oral Content Scoring Guide</li> <li>▪ Oral Presentation Scoring Guide</li> </ul>	<ul style="list-style-type: none"> <li>▪ K-W-L Chart</li> <li>▪ Questioning</li> <li>▪ Oral Content Scoring Guide</li> <li>▪ Oral Presentation Scoring Guide</li> <li>▪ Reflection</li> </ul>
Assessment Summary		
<p>Students develop classroom and individual Know-Wonder-Learn Charts about Great Thinkers. The teacher uses the K-W-L initially to gauge readiness and interest in the topic and then during the unit to promote metacognitive skills as students revisit the charts and reflect on their learning. Students use journals to write down research notes and to answer reflective questions. The teacher reviews journals during conferences to provide feedback, clarify misunderstandings, and provide additional lessons if necessary. The teacher reviews journals at the end of the unit to assess analysis and synthesis skills. Students are given a short answer research quiz to check on their progress. Notes from observations and interactions with individuals and groups and from the conferences provide documentation for final assessment. Students use the poem scoring guide to monitor the quality of their work and to provide peer feedback during the writing, editing, and revising of the “I AM” poems. The teacher uses it to assess the final poems. Students write and deliver a speech as their Great Thinker, using the Speech Content Scoring Guide to help prepare for the content of the speech as well as to clarify questions during the practice sessions. Students reflect upon what they have learned in the unit, returning to the Essential and Unit Questions, “What does it take to change our world?”, and “Which people have positively impacted our world?” Students cite evidence from their research and their peers’ presentations. The teacher uses these reflections to assess students’ growth throughout the unit.</p>		
Credits		
<p>Joel Lang participated in the Intel® Teach Program, which resulted in this idea for an assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at: <a href="http://www.intel.com/education/assessingprojects">www.intel.com/education/assessingprojects</a></p>		

# Sample Assessment Plan: World War I

Unit Overview
Unit Plan Title
World War I: The War to End All Wars?
Unit Summary
High school history students begin a journey to discover the answer to the Unit Question: <i>Could this “war to end all wars” have been prevented?</i> by investigating the causes of World War I. They create a newspaper that answers the questions about the causes of WWI. The students then use the <i>Visual Ranking Tool</i> to rank which of the causes was the most influential in the start of the war and defend their position. After a class discussion on the causes of the War, students complete a map of Europe prior to the outbreak of the War using a paint program to label countries and color code them according to which side they were on. Students use information from primary sources written by WWI soldiers. Then they participate in a simulated trench warfare activity. Based on this experience, they write journal entries or letters to a family member as if they were soldiers in the trenches. Students then examine the objectives and tools of propaganda and do research on WWI propaganda from several different countries to study the impact that propaganda had on the home front. Students conclude this unit by creating a multimedia presentation analyzing how propaganda was used in different countries. Students use rubrics and checklists to plan and monitor their work. As a concluding activity, students compare the propaganda of World War I to the present day and discuss how propaganda has an influence on their lives today. To culminate this unit, students complete an essay test about World War I.
Subject Area
U.S. History
Grade Level
11
Higher-Order Thinking Skills
Cause-and-Effect, Decision-Making, Analysis
Key Learnings
Main Causes of World War I, Trench Warfare, US Entry into WWI, Propaganda, Treaty of Versailles

Unit Foundation		
Targeted Content Standards and Benchmarks		
<p>Kansas History Benchmark 1</p> <p>The student uses a working knowledge and understanding of individuals, groups, ideas, developments, and turning points in the era of the emergence of the modern United States (1890 - 1930).</p> <ol style="list-style-type: none"> <li>Analyzes the reasons for and impact of the United States' entrance into World War I.</li> <li>Analyzes how the home front was influenced by United States involvement in World War.</li> </ol>		
Curriculum-Framing Questions		
Essential Question	Why is there conflict?	
Unit Questions	Could the "war to end all wars" have been prevented? Is propaganda necessary?	
Content Questions	What are the four M.A.I.N causes of World War I? What is propaganda?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ Brainstorming</li> <li>▪ Discussion</li> <li>▪ Journals</li> <li>▪ World Map</li> </ul>	<ul style="list-style-type: none"> <li>▪ Newspaper Checklist and Rubric</li> <li>▪ Map</li> <li>▪ Anecdotal Observations</li> <li>▪ Collaboration Self- and Peer-Assessment Checklist and Rubric</li> <li>▪ Collaboration Reflection</li> <li>▪ Revised Map</li> <li>▪ Journal</li> <li>▪ Decision-Making Checklist</li> <li>▪ WWI Journal and Letters Rubric</li> <li>▪ Discussion</li> <li>▪ Propaganda Presentation Checklist and Rubric</li> <li>▪ Propaganda Presentation Peer Feedback</li> <li>▪ Informal Interviews</li> </ul>	<ul style="list-style-type: none"> <li>▪ Project Rubrics</li> <li>▪ Final Essay Test and Rubric</li> <li>▪ Final Reflections</li> </ul>



## Appendix D: Assessment Resources

---

### Assessment Summary

Students write in their journals throughout the unit to explore various WWI topics. The information from these journal entries is used to provide individual and group feedback as students work on their projects. Students color-code maps of the world identifying which countries participated in WWI and which side they were on. Students use a checklist to monitor their progress while conducting research and creating their newspapers and use a rubric to make sure their work is high quality. The rubrics are also used to assess the final product. After creating the WWI newsletter with their groups, students use their Collaboration Self-Assessment Checklist to reflect on how well they worked with others. Students use a rubric to organize their thoughts on the final essay question and to plan what they are going to write. It is also used to assess the final essay. In this end-of-unit reflection, students assess their own learning during the unit and set goals for future learning experiences. The teacher and students use this information to track learning throughout the year.

### Credits

Johanna Van Ness created the idea for this assessment plan. It has been modified and shortened for use in this appendix. The full Assessment Plan can be found at:  
[www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)

## Appendix E Visual Ranking Tool Resources

# Sample Project Idea: River City Water

Unit Overview
Unit Plan Title
River City Water
Unit Summary
In this environmental science unit, students participate in a variety of activities to help them understand how human actions affect the quality of nearby rivers. Students conduct in-depth research about specific environmental factors and learn how to measure water quality indicators. The <i>Visual Ranking Tool</i> helps students compare factors relating to water quality and narrow their focus for research projects.
Subject Area
Environmental Science
Grade Level
9-12
Approximate Time Needed
2 weeks (extended if field work is included)
Unit Foundation
Higher-Order Thinking Skills
Problem Solving, Evaluation, Cause and Effect, Decision-Making
Key Learnings
Water Quality, Interaction of Systems, Social Justice
Student Objectives/Learning Outcomes
<ul style="list-style-type: none"> <li>▪ Understand how ground water, river water, well water, tap water, and city water interact as a system</li> <li>▪ Understand how human actions affect the quality of nearby rivers</li> </ul>

## Appendix E: Visual Ranking Tool Resources

---

Curriculum-Framing Questions	
Essential Question	How do we affect our natural environment?
Unit Questions	What are the challenges of protecting a river ecosystem? How can a community develop in ways that use its water resources wisely?
Content Questions	How do you measure water quality? How do different water sources (ground, well, river, tap) interact as a system?
<b>Visual Ranking Elements</b>	
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)	
River City Water	
Project Description (For the <i>Visual Ranking</i> workspace)	
Based on the newspaper articles you've read and the experiments you've conducted, use <i>Visual Ranking</i> to arrange the industries in order of what development is the least harmful to the river and surrounding area and at the same time is the most beneficial to the community. Use the comment feature for each item to explain your reasoning on why you ranked the item where you did. Later in this project, your team will be assigned a role in a city council hearing that is evaluating proposed development projects. You will use the information from your ranking along with additional research to create a presentation to the city council.	
Prompt (For the <i>Visual Ranking</i> workspace)	
Which industries do you believe have the least negative effect on the river environment while at the same time providing the most benefits to the community?	
Sorting List (For the <i>Visual Ranking</i> workspace)	
<ul style="list-style-type: none"> <li>Fish hatchery</li> <li>Office building</li> <li>Shopping center</li> <li>Housing development</li> <li>Recycling Center</li> <li>Hydroelectric plants</li> <li>Parks and recreation</li> <li>Farms</li> <li>Factories</li> <li>Waste treatment plants</li> </ul>	

## Unit Details

### Instructional Procedures

#### Description

Ask the Essential Question: How do we affect our environment? Give students two minutes for a quick write in which they list as many factors that come to their mind. Have students evaluate their list and choose the one factor they think is the most critical environmental concern facing our earth. Instruct students to write their chosen factor on a poster board strip and assign a place in the classroom in which all the factors can be visible. With the students' help, group factors by similarities. Select a few students to share their rationale; use this to emphasize the process of sharing thinking and being influenced by others' logic and information. Ask students, Do you think you have enough information in which to make a decision about the one factor that is the most critical facing our world today?

Show a short video clip from the movie, *A Civil Action* (John Travolta, 1998): a true case involving contamination of a river that may have resulted in eight local children being diagnosed with leukemia. Cue the video at the beginning and stop when the lawyer is surveying the river by the factory. Pose the Unit Question: What are the challenges of protecting a river's ecosystem from human activities? Give students some quiet time to reflect on this question; they will answer it at the end of the next activity. Prior to the unit, collect a portfolio of newspaper, magazine and Internet articles reporting about environmental issues concerning rivers. Make copies and hand out different articles to student groups for discussion. Tell students to highlight the factors in the articles that contribute to the environmental concern. Clarify the meaning of factor, cause, effect, and correlation. Have one student from each group share a brief synopsis of their article for the class. As students are sharing, write down the factors they have identified from their article so the list is visible for the whole class. Discuss the factors and then group those that are similar. Now that students have been exposed to some background information, pose the Unit Question again for a free write: What are the challenges of protecting a river's ecosystem from human activities? Assess students' responses based on how well they are able to synthesize information from the articles to construct a response.

#### Use the Visual Ranking Tool

Based on the newspaper articles and prior experiences, have students decide on ten industries that benefit from being located on or near a rivers to conduct their business (such as fish hatchery, hydroelectric plants, parks and recreation, farms, factories, and waste treatment plants). Working in small groups, students use *Visual Ranking* to arrange the factors in order of what development is the least harmful to the river and surrounding area and at the same time is the most beneficial to the community—based on their current understanding and initial assessment. Instruct students to use the comment feature for each item to explain their reasoning on why they ranked the item where they did. In a whole class activity, student teams analyze the correlation numbers between their group's list to those generated by classmates and view their reasoning through the comments.

#### Classroom Activities

Assign each team one of the industries and explain that they are to investigate the factors that have a positive or negative effect on a river by this development. Have students use the Internet to find cases that relate to river quality. Students should show how industry and development have impacted the quality of their river and highlight the challenges of protecting

## Appendix E: Visual Ranking Tool Resources

---

### Unit Details

#### Instructional Procedures

a river ecosystem from human activities. Present classroom activities to introduce students to procedures and equipment used to test water quality and soil properties. At a minimum, students should demonstrate an understanding of how ground water, river water, well water, tap water, and city water interact as a system through classroom activities, lab work, discussions, and/or hands-on field work. Give students time to share findings of their research with the rest of the class through a presentation. As an enrichment, have students learn how to measure water quality and put their understanding to use by conducting field studies at local watershed sites.

#### Revisit the Visual Ranking Tool

After the presentations, have groups re-evaluate their *Visual Ranking* lists on the order of development factors by logging in with a second team ID. Using the comment boxes, direct students to explain how their thinking has changed by analyzing the errors, misconceptions, or limited understanding found in the original ranking. Tell students to compare their new lists with their original lists through the comparison button of the *Visual Ranking Tool*; have them also compare with the other groups' new lists in order to analyze other perspectives. As an assessment exercise, have groups pair with another group in which they had a low correlation. Explain that the two groups that are paired are to try and achieve a higher correlation through discussion and presentation of their research, rationale, and persuasive arguments.

An extended activity is to have teams participate in a simulation. One team takes on the role of city council and conducts a hearing to evaluate proposed development projects. Other teams come before the council to present the viewpoints of special interest groups, such as project investors, recreational fishermen, or hydropower plant owners. The city council team evaluates each proposal according to which project has the least negative effect on the river and provides the most benefits to the community.

Students could also answer the question: How can communities develop in ways that use their water resources wisely? by exploring a more global perspective. Have them evaluate how the 1972 Federal Water Pollution Control Act (Clean Water Act), the creation of the Superfund (created by the EPA to clean up the worst sites) and the World Water Forum have improved our world's water quality. Direct students to the following Web sites for more information on global solutions that affect the smallest of communities; this information can be incorporated into their proposed development project:

#### World Bank

[www.worldbank.org/depweb/english/modules/environm/water](http://www.worldbank.org/depweb/english/modules/environm/water)

#### Environmental Literacy Council

[www.enviroliteracy.org/subcategory.php/43.html](http://www.enviroliteracy.org/subcategory.php/43.html)

#### World Water Assessment Program

[www.unesco.org/water/wwap/case\\_studies/index.shtml](http://www.unesco.org/water/wwap/case_studies/index.shtml)

As a final journal assessment, pose the Essential Question again: *How do we affect our natural environment?* How has your thinking changed from your original quick write in the beginning?

# Sample Unit Plan: Grow a Business

Unit Overview	
Unit Plan Title	
Grow a Business	
Unit Summary	
<p>Fourth-grade students develop business skills by marketing flowers for Mother's Day. Students conduct market research, determine product potential, seek funding, and market and sell their product. They survey schoolmates to determine flower popularity and use their knowledge of market price and profitability to "grow a business" and reach their sales goal. The <i>Visual Ranking Tool</i> helps students to set priorities, debate differences, and make correlations in order to reach consensus about which flowers to sell.</p>	
Subject Area	
Social Science, Mathematics, Language Arts	
Grade Level	
3-5	
Approximate Time Needed	
8-10 class periods, 1 hour each	
Unit Foundation	
Habits of Learning Taxonomy	
<p>Analyzing perspective</p> <p>Problem solving</p> <p>Creative thinking</p> <p>Thinking and communicating with clarity and precision</p> <p>Analysis—debate, compare, order</p>	

### Unit Foundation (Continued)

#### Targeted Content Standards and Benchmarks

#### **Social Science-Economics (National Standards - Grade 4)**

##### ***NSS-EC.K-4.1 SCARCITY***

Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.

- People who make goods and provide services are called producers. People whose wants are satisfied by using goods and services are called consumers.
- Entrepreneurs are people who organize other productive resources to make goods and services.

##### ***Standard 7: Markets –Price and Determination***

Markets exist when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

- A price is what people pay when they buy a good or service, and what they receive when they sell a good or service.
- A market exists whenever buyers and sellers exchange goods and services.

##### ***Standard 14: Profit and the Entrepreneur***

Entrepreneurs are people who take the risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

- Entrepreneurs are individuals who are willing to take risks, to develop new products, and start new businesses. They recognize opportunities, like working for themselves, and accept challenges.
- Entrepreneurs often are innovative. They attempt to solve problems by developing and marketing new or improved products.

#### **National Council of Teachers of Mathematics: Grades 3-5**

##### ***Data Analysis and Probability***

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer.

- Design investigations to address a question and consider how data-collection methods affect the nature of the data set;
- Collect data using observations, surveys, and experiments;
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs;
- Recognize the differences in representing categorical and numerical data.

Develop and evaluate inferences and predictions that are based on data.

- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.

Understand and apply basic concepts of probability.

- Describe events as likely or unlikely and discuss the degree of likelihood using such words as certain, equally likely, and impossible;
- Predict the probability of outcomes of simple experiments and test the predictions;
- Understand that the measure of the likelihood of an event can be represented by a number from 0 to 1.

#### **National Council of Teachers of English Communication Strategies**

Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Targeted Content Standards and Benchmarks (Continued)		
Evaluating Data — Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.		
Student Objectives/Learning Outcomes		
Students will:		
<ul style="list-style-type: none"> <li>▪ Gather data by conducting a school wide survey to determine product popularity and sales potential</li> <li>▪ Summarize findings, draw conclusions, and rank items based on survey and research data</li> <li>▪ Present findings in a proposal letter to the school parent group</li> <li>▪ Use the <i>Visual Ranking Tool</i> to determine which flower students will sell</li> </ul>		
Curriculum-Framing Questions		
Essential Question	Why take the risk?	
Unit Questions	How do we grow a business? How do you convince others?	
Content Questions	What is the difference between a producer and a consumer? In what ways can surveys help us to make decisions? What is marketing? What is profit?	
Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ Questioning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Student Rubric</li> <li>▪ Questioning</li> <li>▪ Peer Review</li> </ul>	<ul style="list-style-type: none"> <li>▪ Summary of What We Learned</li> <li>▪ Student Rubric</li> <li>▪ Project Rubric</li> <li>▪ What I Learned</li> <li>▪ Questioning</li> </ul>
Assessment Summary		
<p>A variety of questioning strategies help to tap students' prior knowledge, prompt student thinking about making informed business decisions, and guide teaching. Students use the student version of the project rubric to help them guide the creation of their business plan and their marketing research, and self-assess their work. The project rubric assesses student team effort, writing, and mathematical reasoning. Students participate in a peer review to give and receive feedback while writing their persuasive letters. The summary of <i>What We Learned</i> assesses what students learned about the class average in comparison to their own <i>Visual Ranking</i> list. The <i>What I Learned</i> assessment assesses what students learned from their school-wide survey results.</p>		



## Appendix E: Visual Ranking Tool Resources

---

<b>Visual Ranking Elements</b>
Visual Ranking Project Name (For the <i>Visual Ranking</i> workspace)
Grow a Business
Project Description (For the <i>Visual Ranking</i> workspace)
Mother's Day is coming! Everyone has a hard time finding the perfect gift for his/her special mom. Our class needs to earn money for an upcoming field trip. Put the two together and what do you get? An opportunity! You will be involved in researching, planning, marketing, and selling flowers for Mother's Day. You, as a member of the class, are now a business partner and you have many important decisions to make so that your business is successful. Think carefully about all that is involved in this business venture so that we can make a profit. Let's grow a business!
Prompt (For the <i>Visual Ranking</i> workspace)
Which flower(s) should we sell for Mother's Day? Consider price, profit, and popularity as you rank them.
Sorting List (For the <i>Visual Ranking</i> workspace)
Carnations, Daffodils, Daisies, Irises, Lavender, Lilies, Mums, Orchids, Roses, Tulips
<b>Unit Details</b>
Prerequisite Skills
Addition and subtraction; basic word processing and desktop publishing skills; ability to enter data into a spreadsheet
Instructional Procedures
<b>Setting the stage</b> To set the stage for the project, inform students that Mother's Day is approaching and that this might be a great time to hold a class fund-raiser for an upcoming field trip (or other event/equipment desired).  Note: If you do not already have a specific item in mind, have students brainstorm their own list of classroom wants and needs and together decide what the goal item should be for the fund-raiser. (Although not a part of this particular project plan, deciding what to buy for the classroom by ranking options in order of class preference could be a way to introduce students to the <i>Visual Ranking Tool</i> .)  Tell students that in order to raise the money, they will be taking on the role of young entrepreneurs and their task will be to start up and successfully run their own company. Post the following Unit and Essential Questions: <i>How do we grow a business?</i> and <i>Why take the risk?</i>  Divide students into small discussion groups and have them brainstorm ideas on how to build and run a successful company. Assign one student to record responses. Bring the groups back together and have them share their answers with the entire class. Record and save these initial responses for later reflection and analysis.

### Instructional Procedures

Next, tell students that in order to grow a business they must first have a product or service to sell. Ask students to come up with gift ideas for Mother's Day. Divide the class into small groups and have them generate a list of things that "mothers like" (i.e., perfume, flowers, jewelry). After a few minutes of discussion, have the groups revisit their list and delete items that would not work well for a class fund-raiser.

After they have finished, bring the groups together and discuss the activity as a class. Ask questions to prompt student thinking, such as:

- How did your list change?
- How did you decide which items would or would not be good fund-raisers?

Then have each group share the final list with the whole class. Discuss similarities and differences among the lists. Although another product could be chosen when this unit is implemented in the classroom, for the development of this unit, we will assume students have chosen to sell flowers.

### Discuss Business Decisions

Discuss the concept of making informed business decisions and build a Web diagram to capture student thinking. Use questions such as these to stimulate discussion:

- How should group business decisions be made?
- How do you convince others?
- Does everyone have to agree?
- How do you know if you've made the right decision?
- What do producers need to know about consumers in order to make good business decisions?
- What else needs to be considered?

Discuss the challenge of making group decisions, especially ones that can affect an entire business. Remind students that poor decisions put companies out of business every day, and that you do not want that to happen to them and their fund-raiser.

### Create a Market Survey

Introduce the terms: producer, consumer, marketing, and profit. Define each using simple language that students can understand. To dig deeper into unit content and help students understand the importance of marketing research, post the Content Question: In what ways can surveys help us to make business decisions? Elicit and record student responses to the question. Next, tell students that they will be conducting their own marketing research to help ensure business success. Pass out the student version of the project rubric and discuss the criteria the students will be assessed on during this unit of study. Allow for questions and make sure that students understand all aspects of the rubric. Provide students with a list of flower choices available from local vendors. Distribute flower samples and have your students take digital photos of them. Together, create a market survey to use to poll the entire school. Photos help students understand what they are voting on. Make sure to include a question or two asking whether students will support your fund-raiser and buy flowers from your business.

## Appendix E: Visual Ranking Tool Resources

---

### Instructional Procedures (Continued)

#### Conduct a poll

Divide students into teams of 3–4 members and assign each team to poll one grade level using the market survey form. Make a spreadsheet template with fields or separate pages for each grade level. Make fields for the flowers and the classes at each grade level. When they complete the survey, show students how to tally the results and enter data into a spreadsheet. Have them create at least one chart or graph from their one grade’s data, and share their interpretations with the class. Once students input their data, combine the data into a single spreadsheet to show schoolwide results. Use this opportunity to demonstrate how spreadsheets can be sorted in order to interpret data. Sort total number of student votes in descending order and then discuss the results.

#### Understanding Cost and Profit

Have students use the *Seeing Reason Tool* to identify factors that might contribute to the cost of flowers. Then, invite a local florist to visit to talk about the flowers that were on the top of the survey list and discuss “wholesale” vs. “retail” and what is involved in setting those prices. Instruct students to take notes during the visit and to ask any additional questions before returning to update their causal maps.

#### Rank Priorities

Build a project in the *Visual Ranking Teacher Workspace* and create and distribute a What We Know handout that includes the number of schoolwide votes received, sale price, and profit margin for each flower they will be ranking. Have students log in to their *Visual Ranking* team space. Point out the prompt: Which flower(s) should we sell for Mother’s Day?

Consider price, profit, and popularity as you rank them. Have each team categorize the items with these criteria in mind. Have them use the Comments feature of the tool to explain why they placed the flowers in that particular order. Make sure teams refer to the What We Know handout as they rank and defend their choices. As students sort their lists, listen to their discussions and ask questions to help teams negotiate, make choices, and express their thinking.

#### Compare and Discuss

Once teams have finished ranking and commenting, have them compare their lists and read each other’s comments about why they placed items in that order. Suggest that they identify the teams that ranked items most and least like they did. Have similar and dissimilar teams meet to discuss their rankings and rationale behind the order. Some teams may want to revise their ranking based on what they learn from discussions with other teams.

Once teams finish ranking and discussing, meet as a class to reflect on the process by answering some of these questions:

1. How did your group decide ranking order? Was everyone in agreement? If not, how did you resolve the conflict?
2. How did your list compare with that of other groups, and what did you learn from it?
3. Was your group able to convince others to consider changing their ranking order or were others able to convince you to change yours? Why? How?

### Instructional Procedures (Continued)

4. When considering popularity, price, and profit, was one factor more important than the others in deciding your ranking order? If so, how might this same factor affect businesses if they, too, consider it the most important factor?

After comparing group lists and discussing learning outcomes, have students return to the *Visual Ranking Tool*. Give them a few minutes to adjust their ranking and comments as needed. Next, have each group compare its list with the "class average." Have them print a report of this comparison and attach it to a summary of what they learned. Their summary should communicate mathematical reasoning and what they learned from considering other teams' rankings. To assess each individual's ability to understand and interpret data representations, create a worksheet that contains a pie chart depicting the schoolwide survey results. (To make the data easier to read and interpret, include only the flower choices that students ranked.) The individual report should communicate mathematical reasoning and the student's explanation of their decision-making processes. Ask students to refer to the student version of the project rubric to help guide their writing. After students finish writing, gather together and discuss the pie chart and *Visual Ranking* class average. Revisit the Content Question: In what ways can surveys help us to make decisions? Help students draw conclusions and decide which flowers to sell.

### Inform and Persuade Others

Once you have decided what products you will sell and have determined a sales goal, have students write a letter to the parent group asking for start-up money to help launch the fundraiser. Begin the process by reminding students that before they can actually sell the flowers, they need to buy their inventory. Because they have no money to fund their business up front, they will need to borrow it. Let them know that the school parent group is willing to help, but they need to be convinced that your class fund-raiser is worthwhile and that there is very little risk involved in funding your business venture.

Post the Unit Question: How do we convince others? Ask students to come up with a list of ideas that should be mentioned in the letter. Main elements should include an explanation of your purpose, your funding needs, market research and analysis, sales goals, and expected profits.

Once you have a comprehensive list of what should be included in the letter, discuss how the letter should be organized and written. Discuss using persuasive language that will make it impossible for the parent group to refuse your request. Pass out a writing process rubric for the students to use as they write their letters and post the list of the main elements the class has decided to include. Give the students time to write, peer review, and then revise their letters into final draft form. Have the students share their completed letters in small groups. Ask the groups to combine the best pieces from the individual letters into one letter to send to the parent group. The individual letters can be assessed using the project rubric.

### Advertise and Sell

In addition to persuading the parent group to help fund their business, students also need to persuade their schoolmates to buy their product. Have students create flyers to distribute and post around the school to market their product. In advance, decide as a class on language and content for the flyer. Have students use desktop publishing software to create a professional-looking flyer or provide them with paper, markers, paint, and crayons for a more home-made effect. Prior to Mother's Day, have students put up their posters and promote their fund-raiser during the morning or afternoon announcements. Assign a different set of students and parent volunteers

## Appendix E: Visual Ranking Tool Resources

Instructional Procedures (Continued)	
<p>to be responsible for each day's selling. Allow time for students to practice giving correct change and tracking flowers sold. Finally, have students take turns staffing the flower booth and keeping track of money received. Make sure each day that the sales information is entered into a spreadsheet that will give the overall picture of profit/loss and types of flowers sold. Hold a celebration activity to reveal the results.</p> <p><b>Measure Success</b></p> <p>To wrap up the unit, revisit the Essential Question: <i>Why take the risk?</i> and the Unit Question: <i>How do you grow a business?</i> Together, review your original goals, business plan, research, funding efforts, marketing strategies and profit. Help students to draw their own conclusions about whether or not their efforts to grow a business paid off and were worth the risk.</p>	
Accommodations for Differentiated Instruction	
Resource Student	<p>Make classroom modifications as expressed in the student's IEP. Present instructions in a variety of ways.</p> <p>Include checkpoints and positive reinforcement throughout the unit and assigned projects.</p> <p>Select helpful class partners who can support his/her needs.</p> <p>Allow extra time to complete assignments.</p>
Nonnative English Speaker	<p>Enlist the help of bilingual students to help with translation and interpretation of concepts.</p> <p>Provide more templates and graphic organizers for students to fill in.</p> <p>Select class partners that are best suited to work with this student and address his/her language needs.</p>
Gifted Student	<p>Have them attend the next parent group meeting to deliver the class letter in person and present a short oral presentation to help persuade the group to consider your class proposal.</p> <p>Have them create a short commercial or jingle to promote your fundraiser and ask them to present it over the PA system during morning or afternoon announcements.</p> <p>Have them conduct research to locate local and/or Internet vendors who sell flowers. Have them create a spreadsheet listing possible items for your class to sell and comparing vendor prices.</p>

Materials and Resources Required for Unit	
Printed Materials	Flower catalogs and books
Technology - Hardware	<ul style="list-style-type: none"> <li>▪ Computer to access and utilize the <i>Visual Ranking Tool</i> in order to determine which flowers to sell, create marketing materials and parent letter, record and sort data, create graphs and charts</li> <li>▪ Digital camera to take photos of the flowers that will be included on the market survey form</li> <li>▪ Internet connection to conduct research and access the <i>Visual Ranking Tool</i></li> <li>▪ Printer to publish marketing materials, summaries of what they learned, and the parent letter</li> </ul>
Technology - Software	<ul style="list-style-type: none"> <li>▪ Desktop publishing to create flyers</li> <li>▪ Internet browser to conduct research</li> <li>▪ Spreadsheet software to record, sort, visually represent, and analyze data</li> </ul>
Internet Resources	<p><b>Floral Express</b> www.floral-express.com</p> <p><b>Grower's Box</b> www.growersbox.com/categories.php</p> <p><b>Online Wholesale Flowers</b> www.onlinewholesaleflowers.com/Thumbnailcatalog.html</p>
Outside Participation	Guest visit by a local florist; ranking flowers by principal; parent volunteers to help pick up flowers to sell
Other Resources	Walking field trip to local florist



## Appendix F Seeing Reason Tool Resources

# Sample Unit Plan: Ecology Explorers

Unit Overview	
Unit Plan Title	
Ecology Explorers	
Unit Summary	Students study problems that arise as wildlife and human habitats increasingly overlap in our shrinking world. Taking the role of wildlife conservationists, students become experts on an endangered animal or plant that is at risk in their region. They study the organism's needs and understand interdependencies in the ecosystem in which it lives. Using the <i>Seeing Reason Tool</i> , students model their developing understanding of the intricacies of a balanced ecosystem, and then map the human factors that influence that balance. Through a Webquest research project, they learn how human activity affects an organism's survival and consider ways to lessen human impact on local populations. They prepare a presentation for an authentic audience in which they describe their species' habitat needs and offer practical and economically feasible solutions to ensure its continued existence.
Subject Area	
Science, Language Arts	
Grade Level	
6-8	
Approximate Time Needed	
Four weeks, 20 - 50 minute class periods	
Unit Foundation	
Habits of Learning Taxonomy	
Analysis—connect, compare, appraise	
Synthesis—propose, plan, formulate	
Evaluation—predict, assess, support, defend	
Problem solving	
Thinking flexibly	



## Appendix F: Seeing Reason Tool Resources

Unit Foundation (Continued)	
Targeted Content Standards and Benchmarks	
<p><b>Benchmarks for Science Literacy - Benchmark 5 Level 6–8 and 9–12</b></p> <ul style="list-style-type: none"> <li>▪ Two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/prey, or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.</li> <li>▪ Ecosystems can be reasonably stable over hundreds or thousands of years. As any population of organisms grows, it is held in check by one or more environmental factors: depletion of food or nesting sites, increased loss to increased numbers of predators, or parasites. If a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one.</li> <li>▪ Like many complex systems, ecosystems tend to have cyclic fluctuations around a state of rough equilibrium. In the long run, however, ecosystems always change when climate changes or when one or more new species appear as a result of migration or local evolution.</li> <li>▪ Human beings are part of the earth’s ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. Kyrene School District Standards</li> <li>▪ A2.100.63 — Generalize about changes that may take place in organisms and populations of organisms within an ecosystem.</li> <li>▪ 2.100.64 — Describe the relationship between humans and the environment.</li> </ul>	
Student Objectives/Learning Outcomes	
<p>Students will:</p> <ul style="list-style-type: none"> <li>▪ Understand the importance of balanced systems</li> <li>▪ Distinguish between a food chain and a food web</li> <li>▪ Identify some interactions/relationships between organisms in an ecosystem</li> <li>▪ Explain limiting factors and their relationship to population density</li> <li>▪ Describe how succession can be caused by human actions</li> <li>▪ Identify current environmental issues and possible solutions</li> </ul>	
Curriculum-Framing Questions	
Essential Question	How can we all get along?
Unit Questions	How can people and animals coexist? What influences the biological success of a species?
Content Questions	What are limiting factors? What are the organisms within an ecosystem and how are they dependent upon each other? What makes a species endangered?

Assessment Plan		
Assessment Timeline		
Before project work begins	Students work on projects and complete tasks	After project work is completed
<ul style="list-style-type: none"> <li>▪ Analogy/manipulatives</li> <li>▪ Questioning</li> <li>▪ Webquest</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questioning</li> <li>▪ Science journal</li> <li>▪ <i>Seeing Reason</i> map detail</li> <li>▪ Scoring guide</li> <li>▪ Research paper outline</li> <li>▪ Self- and peer-review</li> </ul>	<ul style="list-style-type: none"> <li>▪ Science journal</li> <li>▪ Questioning</li> <li>▪ Webquest</li> <li>▪ Scoring guide</li> <li>▪ Research paper outline</li> </ul>
Assessment Summary		
<p>Have students use manipulatives (balancing nail activity) to help them understand the concept of interdependence. Through the questioning and discussion, assess and build upon their prior knowledge. Use the Oh Deer! activity and discussion to assess their understanding of limiting factors. Use the Webquest to help guide their learning, keep them on track, and find resources for their research. Assess the quality of their science journal entries and <i>Seeing Reason</i> maps (causal relationship explanations, sources, overall understanding of the ecological system) to monitor progress and understanding of content. Use questioning throughout the unit to help students develop their higher-order thinking skills and process content. Have students use the scoring guide to help them self- and peer-assess work prior to their report and presentation's completion. Use this same scoring guide and the details in the Webquest and research paper outline to assess and grade the final project.</p>		
Seeing Reason Elements		
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)		
Ecology Explorers: Overlapping Habitats		
Project Description (For the <i>Seeing Reason</i> workspace)		
<p>In preparation for your study of endangered species during the Webquest, research the relationships between humans and animals in general and identify what happens when their habitats overlap.</p>		

## Appendix F: Seeing Reason Tool Resources

Seeing Reason Elements—Project 1 (Continued)
Research Question (For the <i>Seeing Reason</i> workspace)
What happens when human and animal habitats overlap?
Practice Map (For your future quick reference)
Seeing Reason Elements –Project 2
Seeing Reason Project Name (For the <i>Seeing Reason</i> workspace)
Ecology Explorers: Species Success
Project Description (For the <i>Seeing Reason</i> workspace)
<p>In our growing world, wildlife and human habitats are bound to overlap. Human-wildlife interactions, which occur in both rural and urban areas, can upset the survival of a species, as well as have impact on the humans of the area. As a wildlife conservationist, you must be aware of the outcomes of human/wildlife interactions. Your responsibility is to identify an animal or plant that is at risk in your region. Your position requires you to know everything about that species including the human interactions that occur, and how this human activity affects the organism's survival. Prepare a presentation for the conservation board that includes practical and economically feasible solutions to ensure your species continued existence.</p>

Seeing Reason Elements—Project 2 (Continued)	
Research Question (For the <i>Seeing Reason</i> workspace)	
How does human activity affect your organism’s survival either directly or indirectly?	
Practice Map (For your future quick reference)	
<pre> graph TD     logging --&gt; road_building[road building]     logging --&gt; forest_development[forest development]     logging --&gt; catastrophic_wildfire[Catastrophic wildfire]     logging --&gt; recreational_activities[Recreational activities]     road_building --&gt; designated_habitat[designated habitat]     road_building --&gt; riparian_habitats[Riparian habitats]     forest_development --&gt; designated_habitat     forest_development --&gt; riparian_habitats     forest_development --&gt; catastrophic_wildfire     recreational_activities --&gt; catastrophic_wildfire     livestock_grazing[livestock grazing] --&gt; catastrophic_wildfire     designated_habitat --&gt; great_horned_owl[Great Horned Owl]     designated_habitat --&gt; mexican_spotted_owl[Mexican Spotted Owl]     riparian_habitats --&gt; great_horned_owl     riparian_habitats --&gt; mexican_spotted_owl     catastrophic_wildfire --&gt; great_horned_owl     catastrophic_wildfire --&gt; mexican_spotted_owl     </pre>	
Unit Details	
Prerequisite Skills	
Reading for information, basic research writing and presentation skills, basic knowledge on interdependencies of life	
Instructional Procedures	
<p><b>Prior to Instruction</b></p> <p>In advance of instruction, prepare the materials for the introductory “balanced systems” investigation. In individual plastic bags (one set for every four students), include:</p> <ul style="list-style-type: none"> <li>▪ 13 8-penny nails with flat heads (not finishing nails)</li> <li>▪ 1 block of wood, approximately 10 cm by 4 cm, with one of the above nails embedded in the center</li> </ul> <p>Provide science journals for each student to reflect on and respond to activities and questions throughout the unit.</p>	

## Appendix F: Seeing Reason Tool Resources

---

### Unit Details

#### Instructional Procedures

Review the Ecology Webquest. Make sure associated Web sites are active, and replace inactive sites if necessary. An alternative Webquest could be designed so that students research animals only from their local region, rather than worldwide—especially if you want the students to get involved in any community or regional action plans.

Consider how you could incorporate an authentic audience for your students' presentations. Contact local or state government officials, governing boards, wildlife specialists, community members, parent organizations, local clubs or organizations, etc. to set up a date and time when students can present their findings. If this is not possible, identify their audience as the (simulated) National Wildlife Conservation Board.

#### Setting the stage

Pose the Essential Question, *How can we all get along?* Prompt students to think about this question related to the world of science. Allow students time to write their thoughts in their science journals. Have students share their examples and thoughts in pairs. Turn the discussion back to the whole group and have individuals share what they've discussed. Chart student responses and save this chart to refer to throughout the unit. If some responses touch on ecosystems or other related topics, make sure to point out that this will be investigated further in the unit.

Begin the unit with an activity that focuses on the concept of balanced systems. Provide student teams with prepared sets of blocks and nails, and challenge them to create a "balanced" system by arranging the 12 loose nails so they all balance on the head of the one stationary nail that is embedded in the wood block. None of the loose nails can touch the wood or the ground. Allow plenty of time for exploration, and assure students that there is at least one solution, if not more.

After students complete the challenge, lead a discussion about the ways the nail-balancing activity serves as a model for concepts that govern all systems, natural and manufactured. Reinforce the idea that parts of one system also interact with parts of other systems. Encourage thinking with questions such as:

- What are the parts of this system?
- How does this system of nails balance? What forces and conditions influence this system?
- How do members of this system depend on other members?
- How many nails can be removed before the system fails and becomes unbalanced? What other actions could upset the balance?

In the natural world, overlapping systems all work together to achieve a balanced ecosystem. Chemical, biological, and physical conditions all influence systems. Discuss examples, and ask:

- What are some natural ecosystems? What features do they share?
- What parts of an ecosystem might the nails represent?
- What are some interactions and relationships between organisms in an ecosystem?
- How do natural ecosystems become unbalanced?

**Unit Details**

## Instructional Procedures

Discuss the interdependence of life, and review food chains and food webs. You may want to have students draw food webs from different biomes (for example, desert food web, temperate forest food web) in their journals, and have them identify producers; primary, secondary, and tertiary consumers; and decomposers. Discuss symbiosis and symbiotic relationships: parasitism, mutualism, and commensalism.

**Explore limiting factors**

Discuss the fundamental necessities of living things: food, water, shelter, and space in a suitable arrangement. Discuss how limiting factors (the availability of these necessities) influence animal and plant populations. Discuss how additional limiting factors, such as competition for resources, predation, and disease, also influence populations. To have students experience how changes in limiting factors change animal and plant populations, play Oh Deer! This simulation exercise is described at Teachers.net Gazette, and available in print in the Arizona Game and Fish publication *Project Wild*. Afterward, discuss how limiting factors in play during the game affect food webs. Give student pairs the population data collected during the game. Have them enter it into a spreadsheet and then build animal population graphs. Ask students to explain why the fluctuations in population occur, using data from the game. View limiting factors team sample. Once students have a good grasp of the concept of population fluctuations, pose the Content Question, *What makes a species endangered?* Have students discuss their ideas in small groups and then share their ideas with the whole group. Have students write about their ideas in their science journals and consider some initial answers to the Unit Question, *What influences the biological success of a species?*

**Discuss Plant Ecology**

In *Oh Deer!* and the activities relating to limiting factors, students focused on animals. Take time now to address plant ecology and the concept of succession, from initial colonizers to climax communities. Mention succession cycles due to short- and long-term natural events (fire, climatic change), but focus on how human actions influence succession.

**Study human-wildlife interaction**

To explore and answer the Unit Question, *How can people and animals coexist?*, assign students to teams of four. Introduce the Ecology Webquest. Explain each section of the Webquest and their roles as wildlife conservationists. Hand out the scoring guide for students to self-monitor their progress as they move through the project.

Discuss how human and wildlife habitats overlap and how interactions in both rural and urban areas can influence wildlife as well as humans. Discuss human-wildlife interactions in your community, such as wild animals encroaching on populated areas or the effect of roads and fencing on animal migration patterns.

Have students use *Seeing Reason* to help them understand what happens when human and animal habitats overlap. Before they start mapping, follow these steps to introduce *Seeing Reason* to your class.

## Appendix F: Seeing Reason Tool Resources

---

### Unit Details

#### Instructional Procedures

Have each group of four split into two teams. Have student teams log in to the *Seeing Reason* project, Ecology Explorers: Overlapping Habitats and map their response to the question, *What happens when human and animal habitats overlap?* Have students use the Webquest links to conduct research on this topic and provide evidence for their causal relationships. As students build their maps, circulate around the room. Look at maps, listen to conversations, and ask students to describe their map. Help students think through their map by asking questions such as:

- What other factors relate to this one?
- What is your evidence for the relationship you show between these factors?

Ask questions that prompt deeper thinking about the intricacies of the topic, such as:

- Why are animal homes so important? How do animals that live in the forest depend on trees?
- How is an animal's success affected by its direct or indirect interactions with humans?
- What do you think might be the long-term effects of these encounters on animal behaviors and social structures?

When maps are complete, show several maps from the teacher workspace using a projector. Ask teams to describe their maps and the thinking behind them. After discussion, ask students to refine their maps based on what they learned from their peers.

Have students write about their findings in their science journals and consider some initial answers to the Unit Question, *How can people and animals coexist?*

#### Review Research and Presentation Guidelines

Return to the Webquest and review the required tasks. Discuss the research and presentation assignment with the class, and teach necessary research skills, such as taking notes and citing references. Review the research paper outline and scoring guide to clarify expectations. You may need to help students locate specific statistics and other "buried" content in lengthy reports and understand how to read charts and tables. Encourage students to include interviews with people they may have contacted for information or opinions, such as ranchers, logging or mining company spokespeople, government officials, environmental groups, and people representing state wildlife organizations. Identify the audience for which each team is writing and/or presenting.

#### Create Causal Maps and Research Papers

Have students use the research paper outline and Webquest to guide them in conducting their research and planning the individual reports for their species. Ensure students engage in the writing processes of drafting, revision, peer review, and publishing. Students need to make sure their research applies to and can help them answer the Essential, Unit, and Content Questions.

As students are conducting research, have them share what they have learned regarding their endangered species within their group of four. Have them compare and identify similar situations that are affecting the various species they are reporting on. In groups of two, have student teams go to their *Seeing Reason* account and log on. They are to choose one of the two species they have researched—or they can choose both if they feel their species have similar issues—to

## Unit Details

### Instructional Procedures

construct a series of maps within the Ecological Explorers: Species Success project. Maps should address the question, *What influences the biological success of your species?*

As students create their maps, take the opportunity to gauge understanding and guide learning. Look at maps, listen to conversations, and ask students to describe their maps. Ask questions that prompt deeper thinking about the intricacies of the topic, such as:

- Can you compare the ways in which humans and animals have adapted to life in this habitat?
- In what ways might the presence of humans in this habitat affect animal behaviors?

Have students work with each other during the mapping, research, and revision process. Arrange a "gallery walk," where during several rotations, one partner in each team stays at the computer to explain the team's map, while others rotate from computer to computer to view and ask questions about different teams' maps. Allow time for students to reconsider and fine-tune their maps after this activity. Instruct students to use the information from their research and the creation of their map in the development of their research report and presentation on their group's species. Remind students to keep their targeted audience in mind as they research and write their report. Have students use the Webquest instructions, research paper outline, and the scoring guide to self- and peer-assess. Provide students a second revision phase after these assessments.

### Create Presentations

When reports are finished, have student teams begin developing their oral presentations and supporting multimedia. Remind students that the different presentation formats may include Web page, multimedia presentation, poster, video, a play, or other approved visual format. Remind them they have the role of conservationists, and that the purpose of their presentation is to inform the wildlife conservation board (or other assigned audience) about the group's species and give viable, research-based solutions that will ensure the continued existence of all their species. Approve an outline of the presentation before students develop multimedia elements. Remind students to abide by copyright rules when using pictures or video in their presentations. Require peer-review prior to the oral presentation.

### Present Proposals

As students complete their presentations, finalize arrangements for an event where they present their proposals to the (simulated) National Wildlife Conservation Board or their authentic audience. You may want to ask civic leaders, wildlife specialists, and community members to represent this "board." Give students sufficient time to practice their presentations in small groups before they present to the larger audience. Assess student reports and presentations using the scoring guide and the details in the Webquest and research paper outline.



## Appendix F: Seeing Reason Tool Resources

Unit Details	
Instructional Procedures	
<p><b>Wrap It Up</b></p> <p>Revisit the Essential Question, <i>How can we all get along?</i> Refer back to the chart created at the beginning of the unit and review student ideas. Create a new chart with student responses and discuss how ideas have changed or stayed the same based on what they've learned in the unit. Post the Essential and Unit Questions and allow students to choose one or more of the questions to reflect upon. This question can be used as a portfolio piece or as part of unit reflection in their science journals.</p>	
Accommodations for Differentiated Instruction	
Resource Student	<ul style="list-style-type: none"> <li>Narrow students' research focus by assigning specific topics to investigate. Some animal topics have more information available at a more basic level than others.</li> <li>Provide a report template with fill-in-the-blank topic sentences.</li> <li>Make heterogeneous groups so a variety of learning styles and abilities are represented in each group.</li> </ul>
Nonnative English Speaker	<ul style="list-style-type: none"> <li>Provide texts from language of origin.</li> <li>Encourage students to research their animals using native language sources.</li> <li>Enlist the help of students who speak the same language and have greater proficiency in English.</li> </ul>
Gifted Student	<ul style="list-style-type: none"> <li>Require more in-depth research and analysis on all aspects of their project.</li> <li>Add an interview with an expert to the research requirements.</li> </ul>
Materials and Resources Required for Unit	
Printed Materials	<ul style="list-style-type: none"> <li>Reference books: field guides, natural history texts, encyclopedias</li> <li><i>Project Wild: K-12 Curriculum &amp; Activity Guide</i> (2002). Council for Environmental Education. Houston: TX.</li> </ul>
Supplies	<ul style="list-style-type: none"> <li>13 8-penny nails with flat heads (not finishing nails)</li> <li>1 block of wood approximately 10 cm by 4 cm (or a big chunk of clay could substitute for the wood)</li> </ul>

Materials and Resources Required for Unit (Continued)	
Technology - Hardware	<ul style="list-style-type: none"> <li>▪ Computers for Internet research and creation of word processing document and multimedia products to support the oral presentation</li> <li>▪ Presentation equipment (projector and screen) for the oral presentations</li> <li>▪ Digital camera (optional) to take pictures of local habitat, animals, interviewees, and students' presentations</li> <li>▪ Video camera (optional) for interviews and student multimedia support (video clips) for their multimedia support of their oral presentation</li> </ul>
Technology - Software	<ul style="list-style-type: none"> <li>▪ Word processor for written reports, handouts for presentations, and other multimedia supporting documents</li> <li>▪ Multimedia presentation software for oral presentations</li> <li>▪ Multimedia atlas (optional) for research and image resources</li> <li>▪ Electronic encyclopedias (optional) for research and image resources</li> </ul>
Internet Resources	<ul style="list-style-type: none"> <li>▪ <b>United States Environmental Protection Agency Student Center</b> www.epa.gov/students Environmental concepts, activities, and tips for students in grades 5-8</li> <li>▪ <b>United States Fish and Wildlife Service Endangered Species Program</b> http://endangered.fws.gov Information on plants and animals on the threatened and endangered species lists</li> </ul> <p>The following are Internet resources for the teacher:</p> <ul style="list-style-type: none"> <li>▪ <b>Ecology: Interdependence of Life</b> www.rickhershberger.com/bioactivesite/ecology/ecology.pdf Explanations of ecology concepts</li> <li>▪ <b>Teacher.net Gazette</b> http://teachers.net/gazette/MAY02/stanimirovic2.html Offers description of <i>Oh Deer!</i> simulation</li> </ul>



## Appendix G

# Index

16 Habits of Mind .....	1.18
21st Century Skills .....	1.06
Assessing Projects	
Introduction .....	11.05
Use .....	11.10
Assessment	
Assessment Plan examples .....	Appendix D
Assessment Timeline .....	4.20
Strategies for Gauging Student Needs .....	4.03
Strategies for Encouraging Self-Direction and Collaboration .....	4.05
Strategies for Monitoring Progress .....	4.06
Strategies for Checking Understanding and Encouraging Metacognition .....	4.07
Strategies for Demonstrating Understanding and Skill .....	4.09
“Big Ideas” .....	3.12
Bloom’s Revised Taxonomy .....	1.12
Content Questions .....	3.08
Costa and Kallick’s 16 Habits of Mind .....	1.17
Course Evaluation .....	11.27
Curriculum-Framing Questions .....	3.08
Examples .....	Appendix B
Process for Writing Questions .....	3.20
Essential Questions .....	3.08
“Habits of Learning Taxonomy” .....	1.23
Learning Objectives .....	2.07
Marzano’s Dimensions of Learning .....	1.13
Module Checklist .....	Overview v
Online Thinking Tools	
Benefits of .....	5.02
Web site .....	1.02
Open Questions .....	3.04
Overarching Concepts .....	3.12
Project Assessment Vignettes .....	4.11
Project Rubric .....	2.18, 11.25
Project wizard .....	2.13
Projects	
Characteristics .....	2.09
Ideas .....	Appendix C
Priorities .....	2.20
Steps for Project Planning .....	2.02
Reflection Checklists	
<i>Seeing Reason Tool</i> .....	8.07
<i>Showing Evidence Tool</i> .....	10.07
<i>Visual Ranking Tool</i> .....	6.19
Unit .....	11.15

## Appendix G: Index

---

Registering, Intel® Education Web Site . . . . .	2.12
Rubrics	
Definition and use . . . . .	11.03
Developing . . . . .	11.07
Evaluation of Claim Rubric . . . . .	9.17
Project Rubric . . . . .	2.18, 11.25
Quality of Evidence Rubric . . . . .	9.12
Strength of Evidence Rubric . . . . .	9.14
Understanding rubrics . . . . .	11.09
Seeing Reason Tool	
Benefits . . . . .	7.13
Best practices . . . . .	7.31, 8.10
Cause and effect, Understanding . . . . .	7.07
Questioning techniques . . . . .	8.05
Reflection checklist . . . . .	8.07
Sample project ideas and research questions . . . . .	7.22, Appendix C.03, F.01
Uses of <i>Seeing Reason</i> as classified by Costa and Kallick's 16 Habits of Mind . . . . .	7.14
Showcase	
Methods for showcase . . . . .	11.20
Showcase feedback form . . . . .	11.24
Showing Evidence Tool	
Argumentation . . . . .	9.02
Benefits . . . . .	9.20
Best practices . . . . .	9.23, 9.41, 10.09
Reflection checklist . . . . .	10.07
Rubric . . . . .	9.11
Sample project descriptions and prompts . . . . .	9.29, Appendix C.03
Toulmin, Stephen . . . . .	9.02, CD
Uses of Showing Evidence classified by Marzano's Dimensions of Learning . . . . .	9.20
Spearman Correlation Coefficient . . . . .	6.13, CD
Standards . . . . .	2.04
Thinking Skill Vignettes . . . . .	1.34
Toulmin, Stephen . . . . .	9.02, CD
Unit Plan	
Reflection Checklist . . . . .	11.15
Template . . . . .	1.26
Topics and Ideas . . . . .	2.13, 2.14, Appendix C.01
Unit Questions . . . . .	3.08
Visual Ranking Tool	
Benefits . . . . .	5.07
Best practices . . . . .	6.21
Correlation . . . . .	6.13, CD
Reflection checklist . . . . .	6.19
Sample project descriptions and prompts . . . . .	6.03; Appendix C, E
Student benefits . . . . .	5.07
Uses of <i>Visual Ranking</i> Classified by Bloom's Taxonomy . . . . .	5.08

## Module 1

# Targeting Thinking in the Classroom

## Objectives

- Discuss the goals of the Intel® Teach Thinking with Technology Course and your expectations
- Discuss essential 21st century skills necessary for your students' futures
- Analyze different models of thinking
- Create a "Habits of Learning Taxonomy" for your own classroom
- Identify positive and negative influences that can affect thinking—from the perspective of a 21st century world citizen

## Tools

- Internet browser
- Word processing software
- *Seeing Reason Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

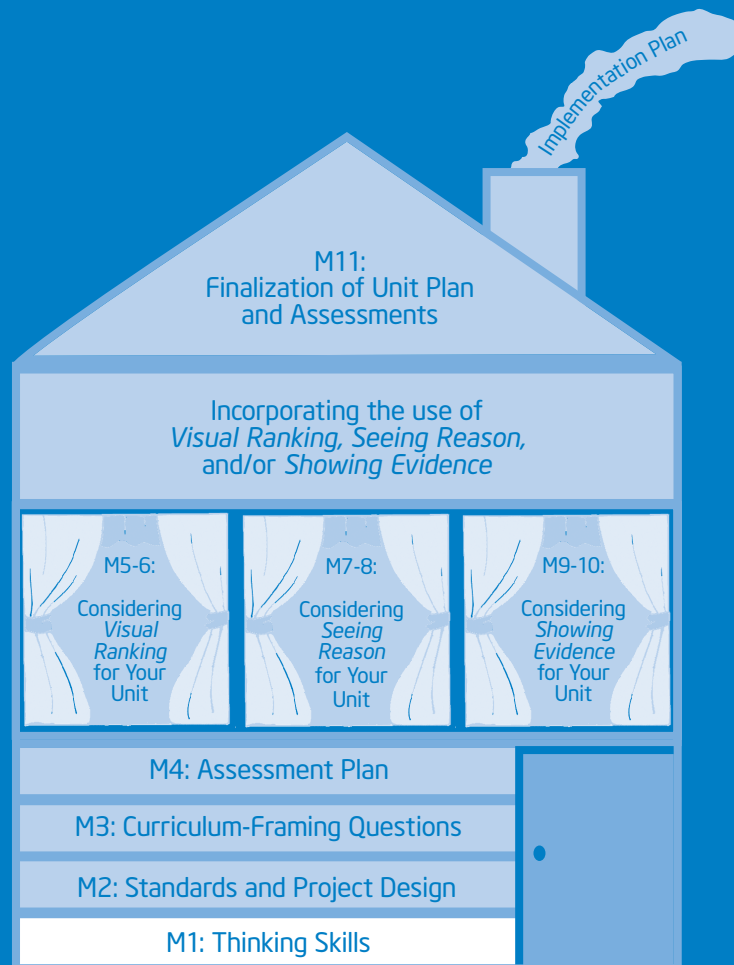
- [www.intel.com/education](http://www.intel.com/education)
- [www.intel.com/education/tools](http://www.intel.com/education/tools)
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- What does thinking look like?
- What thinking skills should I target for my classroom?



## Module 2

# Designing Standards-Based Projects

## Objectives

- View and discuss the steps for project planning
- Identify standards that target higher-order thinking skills
- Discuss ways to expand a unit to use a project approach to learning
- Understand the characteristics and benefits of the Intel® Education online thinking tools
- Set up the Teacher Workspace where you can create projects that use the thinking tools
- Discuss the Project Rubric
- Share and discuss project ideas
- Identify positive and negative influences that can affect thinking—from the perspective of a teacher

## Tools

- Internet browser
- Word processing software
- *Visual Ranking Tool*
- *Seeing Reason Tool*
- *Showing Evidence Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

- <http://edstandards.org/standards.html>
- [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
- [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)

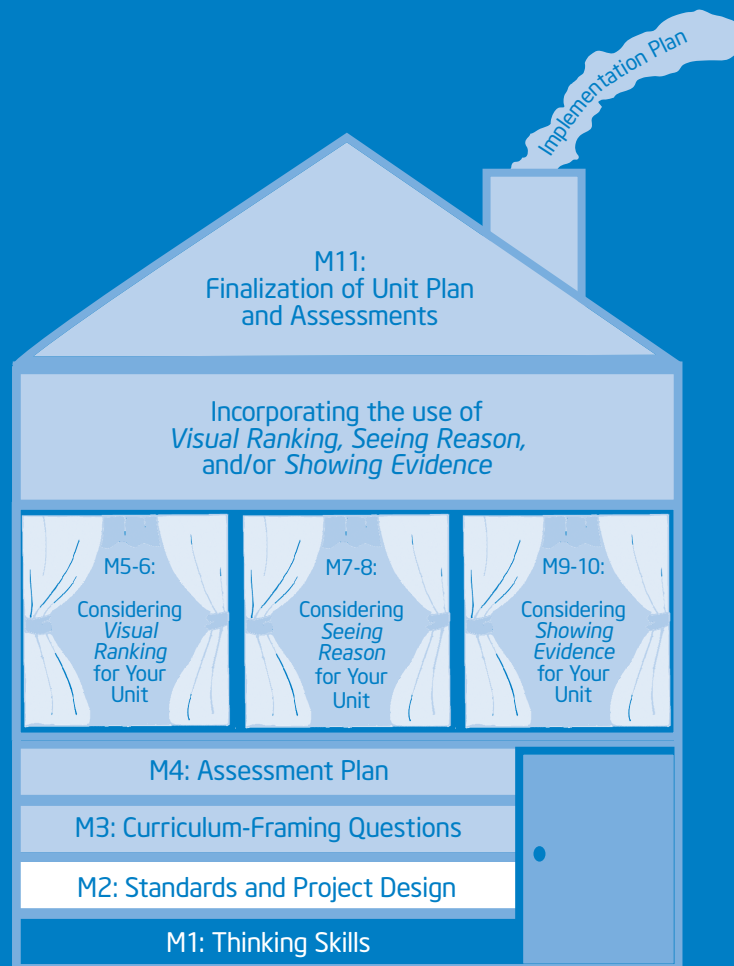


## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How can standards-based projects provide opportunities for deeper thinking?
- How can I design successful student-centered projects?



## Module 3

# Creating Curriculum-Framing Questions to Support Thinking Skills

## Objectives

- Rank questions according to their potential for generating deeper thinking in the classroom
- Understand the different types of questions used in the classroom
- Understand the use of Curriculum-Framing Questions
- Practice revising and creating Curriculum-Framing Questions
- Create a set of Curriculum-Framing Questions for your own classroom
- Identify positive and negative influences that can affect thinking—from the perspective of a student

## Tools

- Internet browser
- Word processing software
- *Seeing Reason Tool*
- *Visual Ranking Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

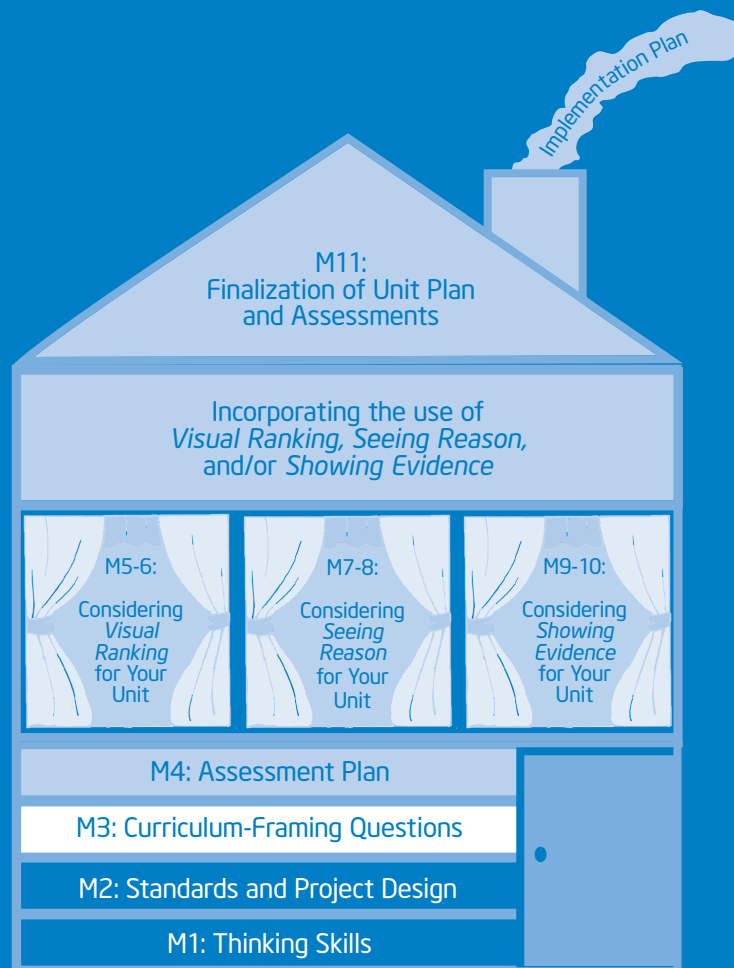
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
- [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
- [www.intel.com/education/designprojects](http://www.intel.com/education/designprojects)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How can questions help expand thinking in my classroom?
- What questions can I ask that will help focus thinking in my classroom?



## Module 4

# Planning Student-Centered Assessment

## Objectives

- Discuss assessment methods that can be embedded throughout a project
- Use the *Showing Evidence Tool* to evaluate Assessment Plan ideas
- Draft an outline for your Assessment Plan

## Tools

- Internet browser
- Word processing software
- *Showing Evidence Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

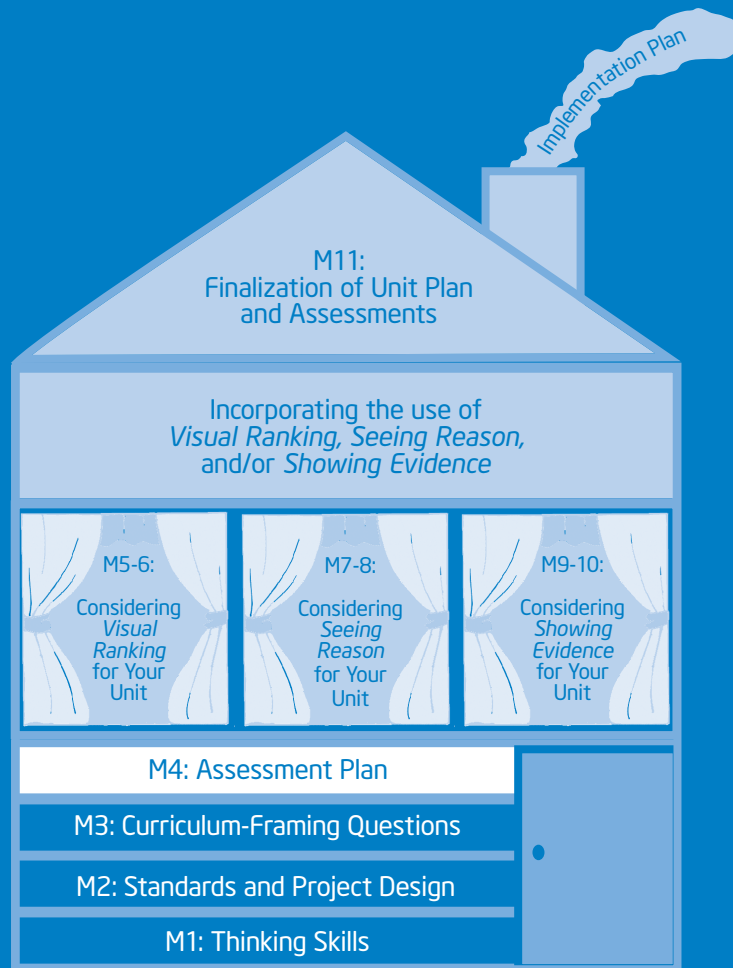
- [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- What assessment methods should I use in my unit?
- How do I plan for high quality assessment throughout my unit?



## Module 5

# Using the Visual Ranking Tool to Target Thinking Skills

## Objectives

- Review and discuss a unit in depth that integrates the use of the *Visual Ranking Tool*
- Discuss best uses of *Visual Ranking*
- View and discuss ideas for incorporating *Visual Ranking* into your unit

## Tools

- Internet browser
- Word processing software
- *Visual Ranking Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

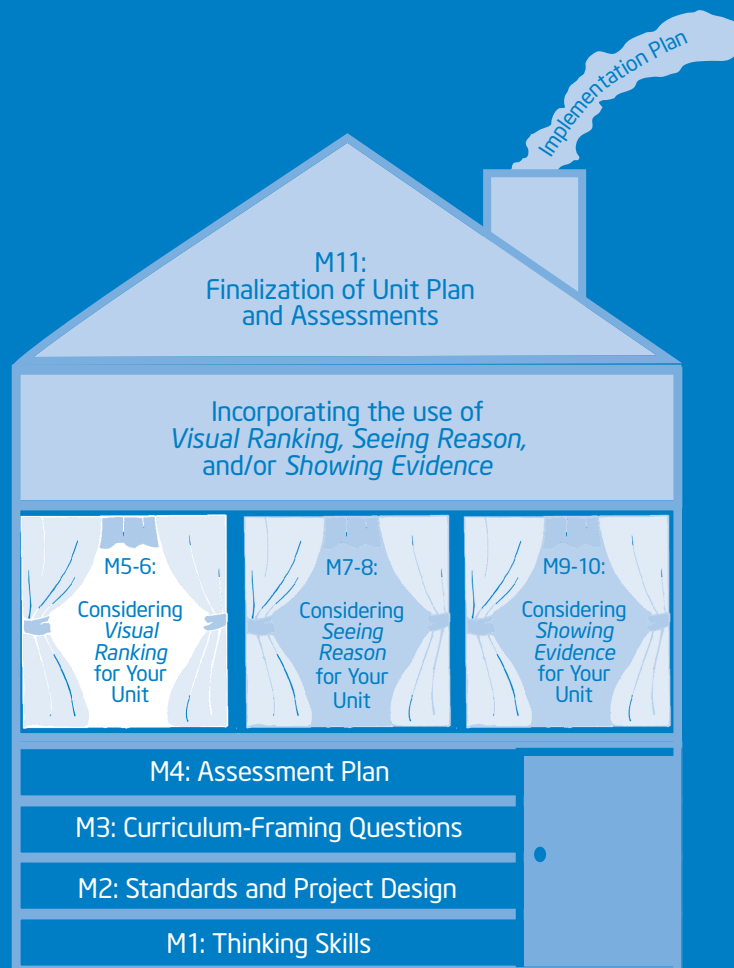
- [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How can I help my students understand other perspectives?
- How can *Visual Ranking* promote communication and collaboration in my classroom?



## Module 6

# Considering the Visual Ranking Tool for Your Unit

## Objectives

- Try out a project idea that incorporates the *Visual Ranking Tool* into your unit
- Create, share, and reflect on a practice ranking
- Revise your Unit Plan
- Share your experience using *Visual Ranking*

## Tools

- Internet browser
- Word processor software
- *Visual Ranking Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

- [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)

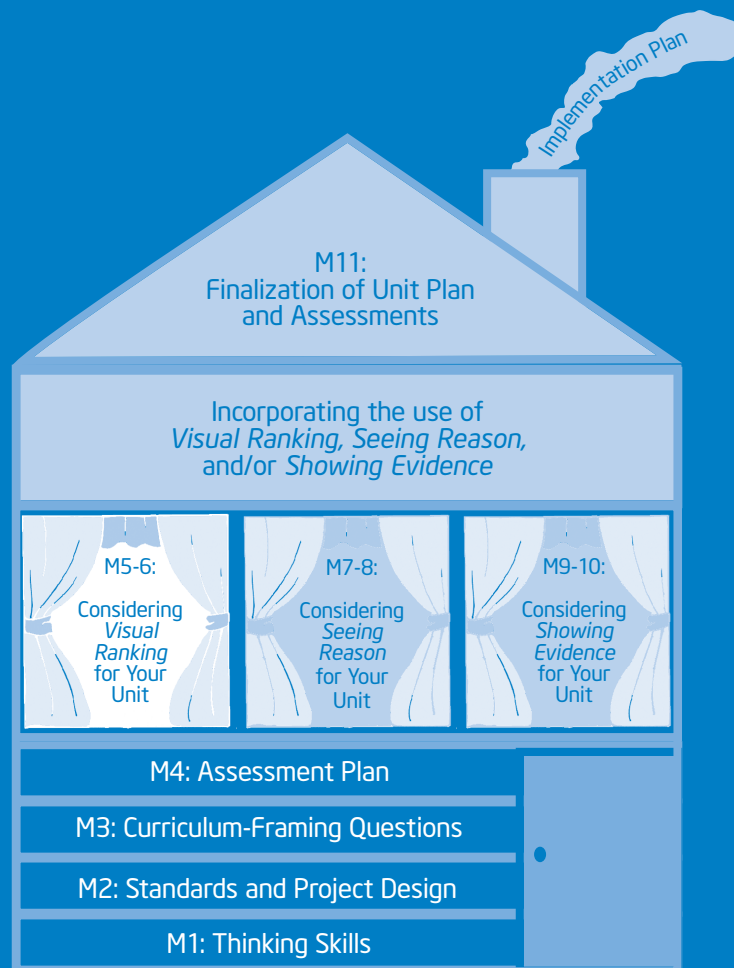


## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How do I develop a project that effectively integrates the *Visual Ranking Tool*?
- How do I ensure that students think deeply when using *Visual Ranking*?



## Module 7

# Using the Seeing Reason Tool to Target Thinking Skills

## Objectives

- Review and discuss a unit in depth that integrates the use of the *Seeing Reason Tool*
- Understand cause and effect and how to represent causal relationships visually
- Discuss best uses of *Seeing Reason*
- View and discuss ideas for incorporating *Seeing Reason* into your unit
- Develop and share a project idea that uses *Seeing Reason*
- Set up a *Seeing Reason* project online

## Tools

- Internet browser
- Word processing software
- *Seeing Reason Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

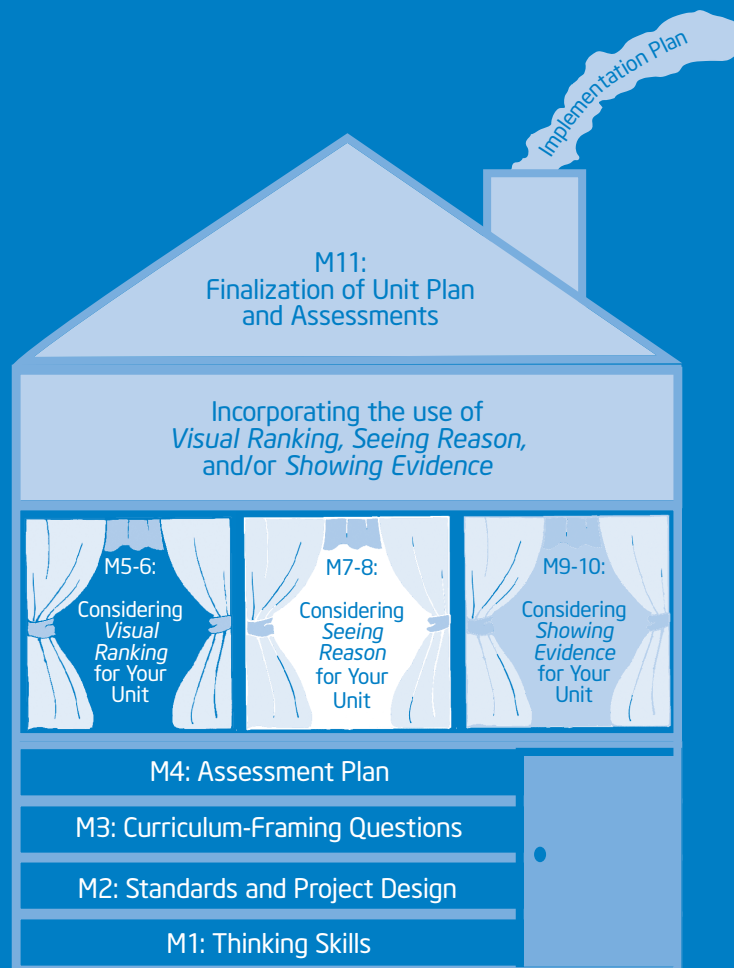
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How can I help my students understand complex systems that involve cause and effect?
- How can *Seeing Reason* promote communication and collaboration in my classroom?



## Module 8

# Considering the Seeing Reason Tool for Your Unit

## Objectives

- Create a practice *Seeing Reason* causal map
- Discuss and practice effective questioning techniques
- Provide and receive feedback on project ideas
- Revise your map
- Revise your Unit Plan
- Share your experience using *Seeing Reason*

## Tools

- Internet browser
- Word processing software
- *Seeing Reason Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

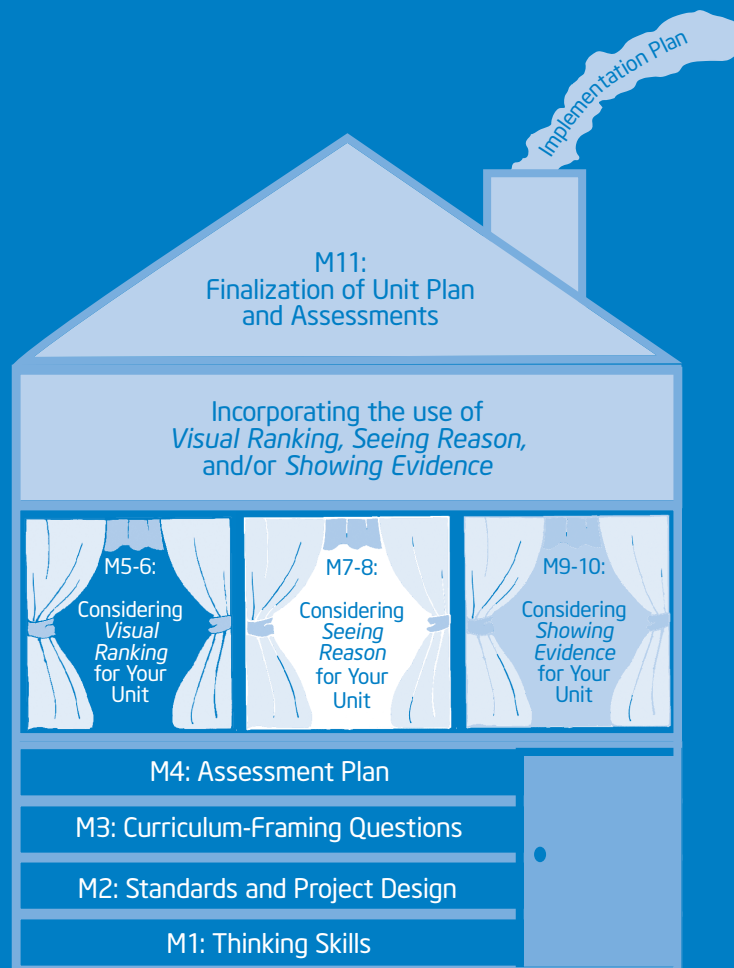
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How do I develop a project that effectively integrates the *Seeing Reason Tool*?
- How do I ensure that students think deeply when using *Seeing Reason*?



## Module 9

# Using the Showing Evidence Tool to Target Thinking Skills

## Objectives

- Review and discuss a unit in depth that integrates the use of the *Showing Evidence Tool*
- Understand the format of an argument and how *Showing Evidence* supports the argumentation process
- Understand how to review and rate evidence
- Discuss best uses of *Showing Evidence*
- View and discuss ideas for incorporating *Showing Evidence* into your unit
- Develop and share a project idea that uses *Showing Evidence*
- Set up a *Showing Evidence* project online

## Tools

- Internet browser
- Word processing software
- *Showing Evidence Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

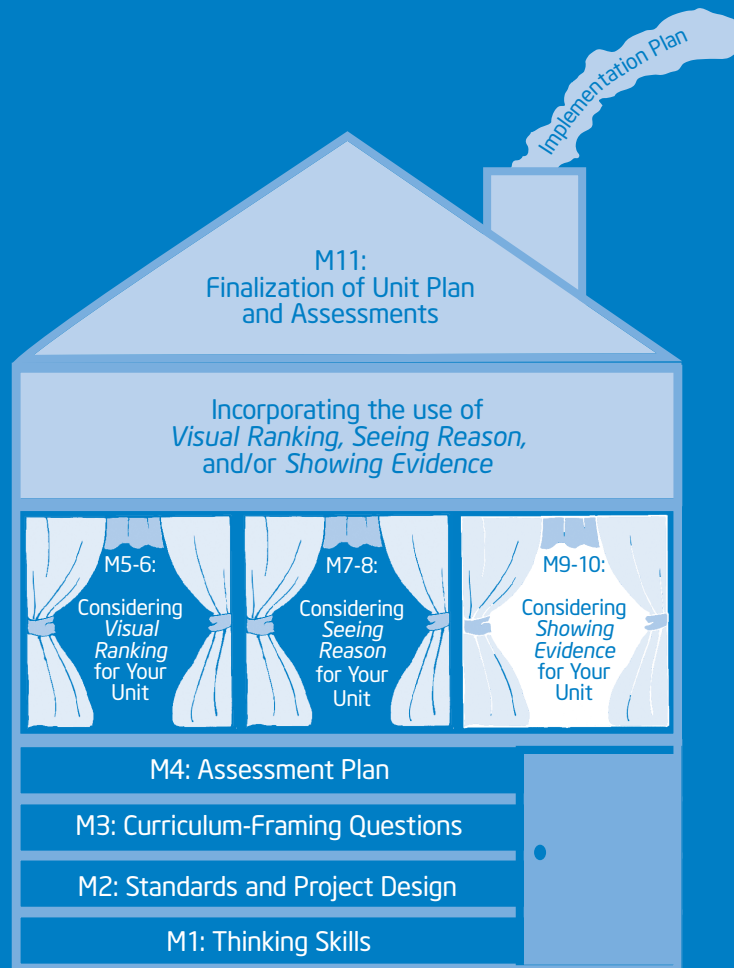
- [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How can I help my students build well-structured arguments?
- How can *Showing Evidence* promote communication and collaboration in my classroom?



## Module 10

# Considering the Showing Evidence Tool for Your Unit

## Objectives

- Create a practice *Showing Evidence* case
- Discuss and practice effective questioning techniques
- Provide and receive feedback on project ideas
- Revise your case
- Revise your Unit Plan
- Share your experience using *Showing Evidence*

## Tools

- Internet browser
- Word processing software
- *Showing Evidence Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

- [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)

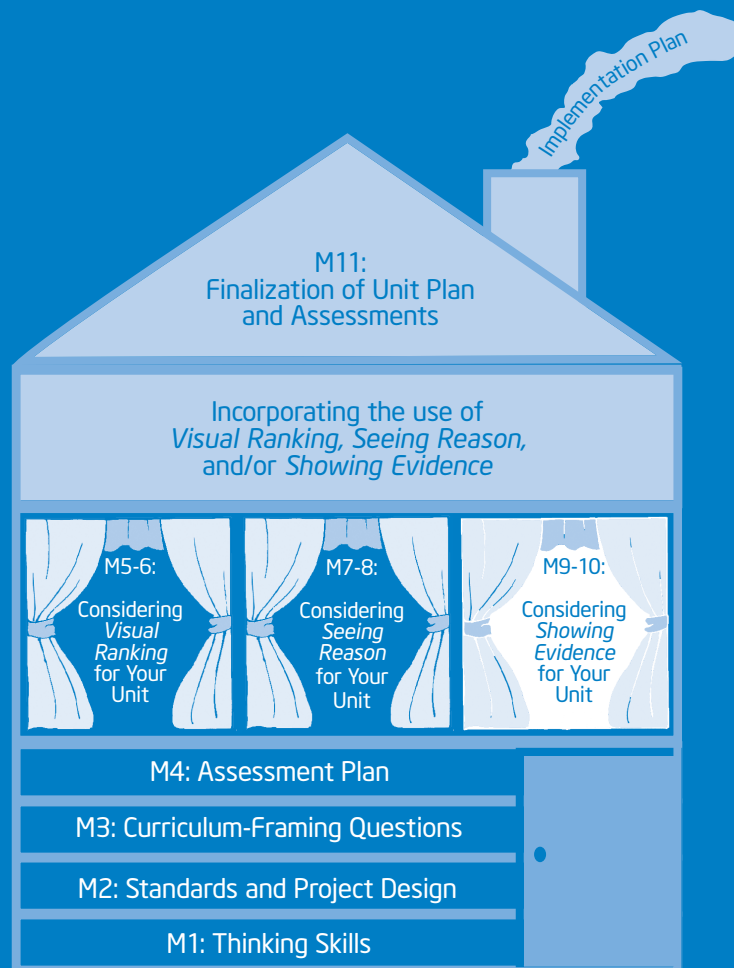


## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How do I develop a project that effectively integrates the *Showing Evidence Tool*?
- How do I ensure that students think deeply when using *Showing Evidence*?



## Module 11

# Completing Your Unit

## Objectives

- Review elements and uses of various assessments
- Create an assessment for your unit using the Assessing Projects application
- Complete your Unit Plan
- Showcase your unit
- Evaluate the Intel® Teach Thinking with Technology Course
- Reflect on lessons learned
- Receive Certificates of Completion

## Tools

- Internet browser
- Word processing software
- Assessing Projects application
- *Seeing Reason Tool*
- *Showing Evidence Tool*
- *Visual Ranking Tool*
- Curriculum Resource CD
- Intel® Education Help Guide

## Web Resources

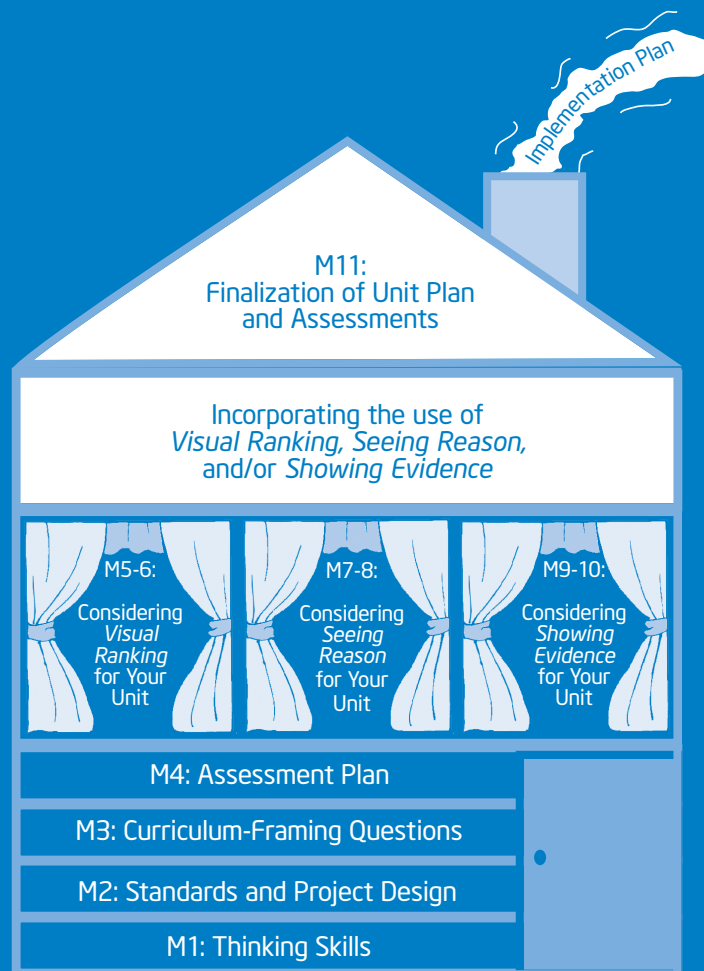
- [www.intel.com/education/assessingprojects](http://www.intel.com/education/assessingprojects)
- [www.intel.com/education/visualranking](http://www.intel.com/education/visualranking)
- [www.intel.com/education/seeingreason](http://www.intel.com/education/seeingreason)
- [www.intel.com/education/showingevidence](http://www.intel.com/education/showingevidence)
- [www.intel.com/education/teachfuture/eval](http://www.intel.com/education/teachfuture/eval)

## Essential Question

- How can I best design instruction that promotes thinking?

## Module Questions

- How do I create an effective assessment?
- How can I best provide constructive feedback?



# Appendix

# Appendix