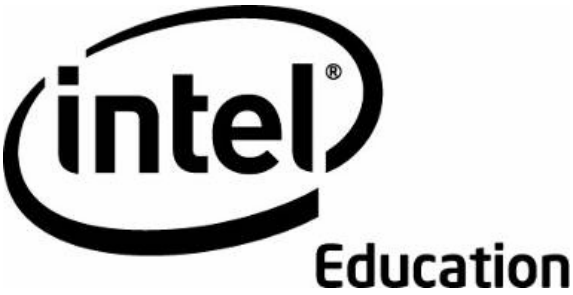


Intel® Education

Assessing Projects

Content Surround: Print Version

Overview and Benefits

Learning in the 21st Century

Assessing Projects is a resource designed for those committed to a student-centered classroom and who want to enhance instruction in 21st century skills. It provides descriptions of how these skills look in a variety of contexts and how different assessments can be adapted for use by teachers and students to assess their own thinking and the thinking of peers.

Students entering adulthood in the 21st century face tasks and challenges unimagined by their ancestors. Confronting a never-ending supply of digital devices and overwhelming amounts of information, individuals in today's society must be proficient in a variety of skills and strategies that were not critical for their grandparents' success. These 21st century skills include:

- **Accountability and Adaptability** — Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for one's self and others, tolerating ambiguity
- **Communication Skills** — Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts
- **Creativity and Intellectual Curiosity** — Developing, implementing, and communicating new ideas to others, staying open and responsive to new and diverse perspectives
- **Critical Thinking and Systems Thinking** — Exercising sound reasoning in understanding and making complex choices, understanding the interconnections among systems
- **Information and Media Literacy Skills** — Analyzing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media
- **Interpersonal and Collaborative Skills** — Demonstrating teamwork and leadership; adapting to varied roles and responsibilities; working productively with others; exercising empathy; respecting diverse perspectives
- **Problem Identification, Formulation, and Solution** — Ability to frame, analyze, and solve problems
- **Self-Direction** — Monitoring one's own understanding and learning needs, locating appropriate resources, transferring learning from one domain to another
- **Social Responsibility** — Acting responsibly with the interests of the larger community in mind; demonstrating ethical behavior in personal, workplace, and community contexts

Unfortunately, schools are not as effective as they could be at helping students develop these skills. Many of today's teachers have had minimal preparation in explicit strategies for teaching thinking and other 21st century skills, and even though they may be highly proficient in their own use of these skills, they often lack awareness of their own thinking processes and those of others. *Assessing Projects* can help teachers target the instruction and assessment of their students' thinking in ways that help them grow as thinkers and learners.

Assessing Thinking in Projects

All student-centered projects have the potential for embedding assessment of 21st century skills. Often, however, selecting specific skills to focus on in a project can be difficult. Furthermore, describing what a particular skill looks like in a specific context can be a challenge. *Assessing Projects* is designed to help with this process. It provides rubrics, scoring guides, and checklists that focus on 21st century skills and defines what these skills look like in the context of the project.

For example, the rubric for the project, *The Great Bean Race* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/GreatBeanRace/) an exemplary Unit Plan from *Designing Effective Projects,* breaks down the analysis of a science investigation into the following subtopics which are more precise and easier to observe and document:

- Successfully draws several conclusions based on evidence
- Considers additional variables when comparing findings with others to determine the best conditions for growing plants
- Compares previous knowledge about plants to the results of the experiment and describes new learning in detail

Narrow, specific descriptions of thinking skills, such as these, also provide teachers with useful information about specific types of thinking in which students need more support.

See 21st Century Learning Assessments for more examples of assessments that address 21st century skills.

Assessing Thinking Skills and Processes

When planning and assessing student learning, teachers often use general terms such as "critical thinking" or "problem solving" to describe their objectives. Such terms are difficult to assess because they include so many subskills. Broad descriptions do not provide the information necessary to collect accurate data on the thinking abilities of students.

Assessing Projects can provide useful information on the different subskills involved in thinking. For example, instead of assessing students on a general term like "creativity," a checklist on fluency in creativity in elementary grades lists the following skills which are easy to recognize in a variety of situations:

- Thinks of many different ideas
- Looks at things from different points of view
- Generates several possible solutions to a problem
- Thinks of several ways to reach a goal

A Thoughtful Classroom Environment

Students do not acquire and develop 21st century skills within a single lesson or even within a unit of study. These skills must be emphasized throughout all student learning experiences. To create a thoughtful classroom environment, teachers and students must develop a language of thinking, self-direction, and collaboration that they all use consistently. The assessments and background information in *Assessing Projects* provide the terminology teachers need to use when discussing project work. As students become more familiar with the language of thinking, they become more

metacognitively aware of their thinking processes and develop more control of their thinking, helping them become mature, strategic thinkers.

Ongoing Assessment

Teachers are constantly collecting informal and formal information about what and how their students are learning. They check student tests and assignments, listen to small-group activities, and observe students engaged in structured and unstructured activities. They use this information for a variety of purposes, ranging from communicating with parents to meeting standards and benchmarks. However, when teachers systematically collect the right kinds of information and use it effectively, they can help their students grow as thinkers and learners.

In some contexts, the terms assessment and evaluation are interchangeable. Here we use the term "assessment" to refer specifically to all kinds of methods and strategies that provide information about a student's learning. Formative assessment provides learners with feedback about how they are doing throughout the learning process. Summative assessment takes place at the end of a unit or project and gives students and teachers information about the skills and knowledge that students have acquired.

Using a broader variety of ongoing assessment throughout the instructional cycle can provide much more valuable information to both the teacher and learners. Formative assessment can be used to:

- Gauge students' prior knowledge and readiness
- Encourage self-direction and collaboration
- Provide diagnostic feedback to teacher and student
- Monitor progress
- Check for understanding and encourage metacognition
- Demonstrate understanding and skill

The overarching purpose of assessment is to give teachers the information they need to provide quality instruction. and on-going assessment is at the heart of project-based learning and provides a way for students to show and discover what they know in different ways. With assessment integrated throughout a unit of instruction, teachers learn more about their students' needs and can adjust instruction to improve student achievement. McMillan (2000) explains, "When assessment is integrated with instruction, it informs teachers about what activities and assignments will be most useful, what level of teaching is most appropriate, and how summative assessments provide diagnostic information."

Assessment before Instruction

Before beginning a unit of study, a teacher assesses primarily to gauge students' needs. When teachers plan a unit, along with their curriculum and standards, they reflect on what they have learned about student learning from previous experience with the topic. They recall misconceptions that students often have and areas that have proven to be particularly difficult. Records of tests and quizzes give them useful information about the effectiveness of previous instruction. This kind of information is useful and important as a foundation for planning, but it is only the beginning.

Every teacher knows that all students are different and that all groups of students have their own strengths and personalities. Individual students also vary in the type of previous instruction they have had, as well as the understanding and interest they bring to a new topic.

By conducting discussions, asking students to fill out graphic organizers or write in journals, teachers can get a sense of students' understanding about a topic and their general attitude about the subject. Collecting information about individual student's understanding before beginning a unit helps teachers gauge students' needs and plan learning activities that increase their motivation to learn and help them succeed.

Assessment during Instruction

During the course of a unit, assessment serves three different purposes:

- To encourage self-direction and collaboration
- To monitor progress
- To check for understanding or to encourage metacognition

Through a variety of kinds of informal assessments such as learning logs, anecdotal observations, checklists, and conferences, teachers collect information about students' skill development and how their' thinking and understanding of the topic is progressing. This information helps the teacher differentiate instruction by making on-the-spot decisions, such as taking time out to review a concept before moving ahead with a scheduled activity or revising a sequence of activities to take advantage of student interest.

Knowing how students are thinking about a topic also helps the teacher to "make adaptations for individual learning differences to ensure that all students understand, practice, and master each component as they progress toward the final goal" (Guskey, 2005, p. 33). Through individual feedback and flexible grouping, teachers can help students grow from where they are to where they need to be. Instruction that meets students' individual needs gives them the confidence that they will learn and motivates them to become engaged in the topic and even to take risks with their learning.

Another important purpose of assessment is the development of thoughtful, independent, self-directed learners. In some classrooms, students only get feedback on their learning at the end of a unit through a test or final paper. Often by the time they find out how they did, the class has already moved on to another topic, and the student has little opportunity or interest in correcting any misunderstandings or improving their skills.

In a classroom where assessment occurs often in a variety of ways, students learn to understand what excellence looks like in the work associated with the topic. They may even have had a role in describing quality work on final products or performances. Parents and students receive frequent specific feedback on how students are doing and what they can do to improve. Students have learned strategies for assessing their own thinking and work in comparison to standards of excellence. They have opportunities to reflect individually and in groups on how well they work together to solve problems. When they use their assessments to set specific goals, they can take advantage of instruction to improve their work to be more like the exemplars (Shepard, 2005) and monitor their thinking and teamwork.

According to Black and his colleagues (Black, Harrison, Lee, & Marshall, 2003), "This ability to monitor one's own learning may be one of the most important benefits of formative assessment" (p. 67). Peer- and self-assessment help students become independent learners who understand their own strengths and needs and know how to set goals and monitor their own progress.

Assessment after Instruction

At the end of a unit, students need to show what they have learned and teachers need to know what students have learned and what they will take with them from one unit to the next. These assessments ask students to demonstrate understanding and skill.

Low-level knowledge about a topic can be assessed through a quiz or test, but assessing deeper understanding requires different kinds of tasks. When students plan and carry out performance tasks, they show how well they can apply what they have learned to authentic situations. These tasks must be carefully designed in order to elicit the students' level of understanding and to provide them with opportunities to demonstrate their learning. Tasks such as reports, essays, presentations, artistic performances, and demonstrations, allow students to show what they have learned about content, about working with others, about thinking, and about their own learning processes.

Other kinds of long-term assessments, such as portfolios and ongoing conferences, provide teachers and students with the opportunity to make connections among units of study, even different subject areas, and individual goals. They help students assess their own learning over a period of time and give teachers and schools important information for long-term planning.

Creating a Classroom Culture of Learning

Often teachers plan a unit of study thinking of what *they* are going to do, the lectures they will give, the activities they will plan, and the tests they will create and grade. When formative assessment is a daily occurrence, teachers begin to think more in terms of what their students are doing than in terms of what teachers are doing. Instead of thinking, "I'm going to explain simple machines to my third graders using a video and a demonstration," a teacher asks, "What kind of activity can I ask my students to do that will show me what they understand about simple machines?" Then after gauging students' preliminary understanding, the teacher thinks of ways to help students build their understanding, continually monitoring how they are learning. Teacher behaviors, in this kind of classroom, are only instructional as a means to an end, student learning.

In many classrooms, students often attend class every day with only one thought: "What will be on the test?" Assessment in these classes becomes a guessing game. The teacher wants students to learn what will be on the test without telling students exactly what will be there since the test items are merely a sample of the knowledge students are expected to learn. Students want to find out exactly what will be tested so they can do well and not have to learn any "unnecessary" information. A final grade on a test may be a total surprise and may not reflect accurately a student's understanding of a topic, thus perpetuating the idea that doing well on the test is about playing a complicated game with the teacher, not about learning.

When students receive frequent information about their progress, however, they focus more on learning. They know exactly how they will be assessed since the assessments reflect authentic work in the discipline. As they move through the subject matter of the unit, they receive information about how they are doing, what goals they are meeting, and what they can do to improve. When the time comes at the end of the unit for them to show what they can do, they have had multiple opportunities to build their understanding and skill, and they are not surprised by the outcome.

In classrooms where students, parents, and teachers work together to continually assess students' progress toward learning goals, the classroom environment becomes more focused on learning. Students feel more control and take a more proactive approach to their learning while teachers' focus is "less on teaching and more on the learning in the classroom" (Black, et al., 2003, p. 80).

Types of Assessment

Assessment is a common practice in today's classrooms. It usually takes place in predictable ways in traditional formats. A wide variety of assessment options are available, however, to meet the instructional needs of teachers and the learning needs of students.

Formative Assessment

Although tests and exams are not going to disappear from schools, student learning can be greatly enhanced when information from a wide variety of kinds of assessment is used to inform instruction, provide feedback, and evaluate products and performances. The kind of assessment that occurs before and during a unit of study is called *formative assessment.*

Several strategies of formative assessment give students and teachers the kinds of information they need to improve learning:

1. Strategies for gauging student needs, such as examining student work, analyzing graphic organizers, and brainstorming
2. Strategies to encourage self-direction, such as self-assessment, peer feedback, and cooperative grouping
3. Strategies for monitoring progress, such as informal observations, anecdotal notes, and learning logs
4. Strategies to check for understanding, such as journals, interviews, and informal questioning

Summative Assessment

While formative assessments can give students and teachers information about how well they are doing while they are working on projects, at some point, most teachers are required to give a report on student learning at the end of a particular unit or on a particular project. Students also want and need to know how well they have done. This kind of assessment, done after the fact, is called summative assessment.

Summative assessments, like unit tests, can provide useful information if teachers and students take the time to look at them analytically. Teachers can find areas of weakness to address in more depth in future units and with future groups of students. Students can identify problem areas and set goals for future learning.

Traditional Assessment in the Classroom

In Joel's chemistry class, he takes only one kind of assessment, a test or final project at the end of a unit of study. When his class studies chemical bonds, for example, he reads the assigned chapter, listens to lectures, watches relevant videos, answers questions, and performs laboratory experiments, all in preparation for the exam. The test cannot ask him about everything, so it will ask questions that sample his knowledge while Joel must study or memorize everything that might be on the test. Unfortunately, although Joe's teacher wants to improve students' higher-order thinking, it is likely that less than 10 percent of the test "will measure student performance above the level of simple recall" (Beyer, 1987, p. 218).

The students in Joel's class come with a variety of experiences with the topic. Some already understood much of the material and were ready for more in-depth study. Some may have never heard of the topic before and have been desperately trying to catch up through most of the unit. Nevertheless, beyond some superficial interaction with the teacher, every student receives the same instruction.

The students in the class approach an upcoming test from a variety of perspectives. Some students are excellent test-takers or good memorizers and know they have to do little preparation. Others go through severe anxiety attacks before tests even when they know the material thoroughly. Joel usually studies quite a bit, but he is still anxious and hopes he will do well on his exams.

On the day of the exam, the test, which has been kept secret, is administered, and students fill in the answer in absolute quiet. The teacher watches carefully to make sure that no students refer to their notes or ask classmates for help.

A few days after the exam, when the class has moved on to the conservation of matter which depends on understanding of previous topics, Joel receives his test back, with his answers checked right or wrong, his essay evaluated, and a grade assigned. Joel sees that he got a B+, breathes a sigh of relief and puts the test in the back of his notebook without looking at it any further. A few students discuss disputed items with the teacher. None of Joel's classmates use the exam as an opportunity to reflect on their learning, to look for gaps in understanding, or to set goals for future learning, even when the teacher was careful enough to make constructive comments throughout the test. Furthermore, Joel's teacher does not examine the test results systematically to collect information for future instruction because she is now busily working on the current unit.

This all-too-common method of assessment is efficient and familiar to most students, teachers, parents, and administrators, but it fails to provide teachers or students with the information they need to promote deep understanding of the subject.

Consider, on the other hand, the experiences of a student in a classroom where assessment occurs frequently for a variety of purposes.

Formative Assessment in the Classroom

When Martha enters her chemistry class, her teacher conducts a large-class discussion on chemical bonding to determine what her students already know about the topic. She then assigns a lab investigation and observes students as they

conduct their experiments, taking notes on their questions and discussions. The teacher notices that many of the students are not using the higher-order thinking skills of analysis and generalization as they draw conclusions from the experiment, so she plans a lesson in which she teaches those skills directly. She observes their interactions after the instruction to determine if students understood the skills and are using them effectively.

When students write in their journals at the end of each day, the teacher reads through them, looking for areas of common understandings and misunderstandings, as well as concepts that are proving particularly difficult for individual and groups of students. She uses her findings to plan activities that will meet the needs of all her students.

As students progress through the unit, the teacher continually provides opportunities for them to think about their learning and to ask questions. She designs a performance task which requires students to show that they understand the concepts associated with the unit. Working with a small group, Martha will build a 3-dimensional computer model to illustrate chemical bonding. The teacher provides the group with a checklist to help them manage their time. She also makes a special point of taking observational notes about the students' collaboration skills. Martha and her group use a rubric describing the expected quality of the final project to monitor the quality of her work. When they receive a final assessment and grade for her project, they reflect on what they have learned and use that information to set goals for future learning.

In this classroom, assessment is integral to teaching and learning. The teacher assesses students while students assess each other and themselves. The focus in this classroom is not on getting grades, although grades are given; it is, rather, on learning and improving thinking.

Validity and Reliability of Formative Assessment

Collecting Good Assessment Data

Teachers have been conducting informal formative assessment forever. It is human nature, to form judgments about people and situations. Most of these kinds of judgments, however, are unconscious, and many result in false beliefs and understandings. For the data collected from formative assessments to be valid, it must assess what it claims to assess, and to be reliable, it must provide information that can be replicated.

Valid assessments accurately target specific skills, strategies, and knowledge. Answering multiple-choice questions about problem solving in mathematics, for example, does not really give a teacher information about how well students solve problems. Answering these questions correctly may show that students have memorized how to use a problem-solving strategy or show that they have highly-developed guessing skills, but it will not show how students perform under authentic problem-solving situations. Rarely are these easy-to-score assessments valid for 21st century skills.

Stiggins (2004) warns, "We have not invested in ensuring the accuracy of classroom assessments. Thus the chances of inaccurate assessment and therefore ineffective decision making at all over levels clearly increase" (p. 25). When teachers make decisions about students' knowledge and abilities too quickly with too little information, their conclusions can inhibit growth rather than encourage it.

Araison (2001) describes some threats to validity:

1. Stereotyping, drawing conclusions based on personal impressions or previous biases
2. Logical errors, evaluating students' abilities based on irrelevant characteristics, such as how they are dressed or the achievements of their siblings. (These judgments are usually unconscious and teachers are unaware of making them.)
3. Inadequate sampling, making judgments based on just one observation or piece of information
4. Generalizing, assuming that when students behave in a certain way in one situation, they will be behave the same way in other situations

Data collected about student performance must also be reliable. Reliable information is consistent and typical. Any assessments of students' thinking collected, for example, the day before a long holiday, are likely to be unreliable since student's behavior is bound to be atypical.

For assessment data to help teachers draw useful conclusions it must be both valid, showing something that is important, and reliable, showing something that is usual. Researchers use the term "triangulation" to describe the process that is used to draw conclusions from data. Like a journalist who seeks corroboration before printing evidence of a crime, a teacher needs more than one piece of information before drawing a conclusion about a student's ability. Even then, a conclusion must be tentative and open to contradictory data. This means, for example, that a teacher may see that a child has difficulty generalizing in a group project and in a learning log entry. Later, however, the child may show that she can generalize in a different subject area. The teacher can make a tentative conclusion that the child's inability to

generalize is connected to her insufficient subject-area knowledge, not necessarily her thinking expertise.

Most teachers are alert and maintain continuous awareness of their students. They cannot help but notice how students are behaving and what they are saying. Unfortunately, they rarely consider this kind of informal observation as formative assessment and do not record what they see in a systematic manner. These kinds of observations, when used without careful analysis, can result in skewed perspectives and faulty decisions because they do not consider enough data. Instruction based on data collected in haphazard or unsystematic ways can impede student progress. The careful collection and consideration of information about students derived from formative assessments takes time and planning, but the effect this kind of assessment has on student learning and motivation makes it well worth the effort.

Performance Assessment

There is value in providing students with an opportunity to show what they have learned and in assessing their progress through performances and products. Teachers and students can form more rich and useful judgments about student progress through performance assessments, tasks through which students demonstrate what they have learned in authentic, realistic ways.

Designing tasks for summative assessments can be challenging. They should "be complex enough to engage students in real thinking and performances, open-ended enough to encourage different approaches, but sufficiently constrained to permit reliable scoring; they will allow for easy collection of records, and they will exemplify 'authentic' work in the disciplines" (ERIC, 1993). For example, a set of multiple-choice questions can test a student's memory of the components of the scientific method, but this will show little about how a student designs and carries out a scientific inquiry. However, a performance assessment would resemble what scientists do in their work lives. It would require students to create a hypothesis, collect and record data, draw conclusions, and so forth.

Assessing higher-order thinking demands that students be engaged in complex activities that require them to select and effectively use appropriate thinking strategies. Costa and Kallick (2000) describe the challenge of assessing thinking.

> Although some cognitive operations such as reasoning and problem solving may be assessed using tests…cognitive operations generally require demonstration and performance in real-life problem-solving and decision-making tasks. To make a pattern of intellectual behaviors habitual requires time--time beyond that required for one problem-solving task, one lesson, one unit, one class, or even one school year. Therefore, assessment strategies must be designed to gather data about increasing and spontaneously applying habits of mind over time and in a rich variety of contexts (p. 117-118).

Performance assessments, such as reports, multimedia presentations, models, and dramatic performances, are engaging, authentic, and give students opportunities to show what they know in their particular learning styles. They also give teachers who are looking for it, a wide variety of information about students' content knowledge, thinking skills, and collaboration and research processes.

High-Stakes Testing

In classrooms all over the world today, the most common type of assessment is neither formative nor performance-based. Billions of dollars are spent on high-stakes, standardized testing that provide government agencies with information about what students are learning. The main purpose of these assessments is, at best, to provide teachers, local, regional, and national education agencies with information about their students' progress in comparison with other students, schools, and regions. At worst, these tests fuel competition among groups and create an unhealthy emphasis on skills and knowledge that can be efficiently and economically tested, often leaving little time for authentic learning activities. In any case, taking a high-stakes test resembles no discipline-based activity, such as conducting scientific experiments, using mathematics to design structures, writing persuasive arguments, or investigating local history. Furthermore, because of the scope and bureaucracy associated with these tests, the results often arrive long after students take the test.

Stiggins (2004) decries the impact of these high-stakes test on student learning and motivation. He recognizes, however, that they are not going away, so he suggests that rather than hoping that they will someday be eliminated, teachers should work to "build learning environments that help all students believe that they can succeed at hitting the target if they keep trying" (p. 24). Students who are confident in their ability to learn, who have acquired the thinking skills that enable them to handle all types of assessment situations, will succeed in all aspects of life and school, including high-stakes standardized tests.

The effective use of a variety of types and methods of assessment is critical in a student-centered classroom. This gives students a chance to show what they know and to find out what they need to work on, and it gives teachers the information they need to guide students to deep understanding of content and to help students become independent learners.

Becoming proficient at using different kinds of assessment to collect data about students' thinking and understanding about a topic is, arguably, the most important skill a teacher can develop. The information you collect about your students not only will help you differentiate instruction to meet the needs of all learners, it will help your students take control of their own learning enabling them to get the most out of any learning environment for the rest of their lives.

Research on Formative Assessment

Integrating formative assessment into instruction challenges both teachers and students. Is it worth it? Research provides a definitive answer: Yes, it is.

In 1998, Black and Wiliam reviewed 21 research studies and about 580 articles or chapters on the impact of formative assessment on student achievement. They found that "innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains" (p. 9). In their analysis, they found an effect size between 0.4 and 0.7, a number that exceeds the impact of most educational interventions.

Stiggins (2004) confirmed this conclusion by concluding that effective classroom assessment can have an impact of an increase of a full standard deviation on student test scores, a result that is comparable to the results of one-on-one tutoring. While formative assessment improves the learning of all students from kindergartners to college students (Black et al., 2003), studies show that low achievers who need the extra help benefit the most (Black & Wiliam, 1998).

Formative assessment does not, however, on its own improve student learning, any more than weighing a pig fattens it. Students grow as learners when the information collected from formative assessments is used constructively to meet their individual needs and to help them become independent learners.

Students enter today's classrooms from a variety of backgrounds with a wide range of abilities and interests. Formative assessment helps teachers meet the individual needs of their students through differentiated instruction.

Developing the skills necessary for lifelong learning is critical for success in the 21st century. By using formative assessments strategically, students develop the skills to become self-directed learners.

Meeting Students' Needs

Today's teachers are very aware of the many ways in which students differ from each other. Considerable evidence suggests that students learn more when the instruction they receive is appropriate for their readiness and learning style (Tomlinson, 2000). When formative assessment is linked to instruction, students receive what they need to be successful when they need it.

Tomlinson (2000) lists four ways in which teachers can differentiate instruction:

1. Content: adjust what students need to learn or how they get the information they need.
2. Process: recommend different ways of approaching the content.
3. Products: allow students to rehearse, apply, and extend what they have learned in a variety of ways.
4. Learning Environment: create a flexible classroom with quiet places, areas for interaction, and teach routines that create independence.

Many teachers begin a unit of study by discussing the new topic. The intent of the discussion is to help students access background knowledge and prepare their minds to integrate new information into what they already know. However, if this preliminary discussion is also used to assess prior knowledge in order to differentiate instruction, the information gathered can help teachers think about how to best approach the topic. Will they spend more time than they expected reviewing prerequisite knowledge? Can they skip or just briefly review concepts that students appear to have already acquired? Will some students need extra instruction in small groups? Will others need to have the topic explained with culturally appropriate metaphors and examples? All these decisions require information about the kind of knowledge students bring to the study of the topic.

Differentiating instruction in higher-order thinking requires considerable skill and effort. First, students must be taught about thinking skills and sub-skills and they must learn to recognize and articulate their own thinking processes through reflection activities. Through learning logs and discussions aimed at uncovering how students think, teachers can provide feedback that encourages students to try new thinking strategies and refine familiar ones. This kind of differentiation requires teachers to have an extensive knowledge of different thinking skills and strategies that students can use in a variety of projects. The thinking skills checklists in the *Assessing Projects* library offer a starting point for assessing and analyzing students' thinking skills, and rubrics provide descriptions which can be used to encourage students to work toward more proficient and effective thinking.

Developing Self-Directed Learners

The world of the 21st century demands continuous learning. As workplaces become more complex, demanding a wider range of higher-order skills, and as communities become more connected through technology and other media, individuals must be able to develop their own skills to keep pace with their environment. Helping students control and manage their own learning is the ultimate goal of education. The *Assessing Projects* library contains a wide variety of assessments that students can use to assess their own learning.

Self- and Peer-Feedback

Research supports the powerful role that self-assessment can play in learning (Kitsantas, Reisner and Doster, 2004). Providing students with opportunities to assess their thinking and that of their peers gives them practice in the skills they need to become independent and self-directed learners.

Self-assessment helps students internalize the standards by which their products and performances will be judged (Wiggins, 1990). Assessments, such as rubrics, which are often used for final products can be used by students as they work on a project to determine how their work measures up to expectations. When students participate in the development of rubrics, they also must think about what excellence looks like in the field in which the product is created. They then learn to identify the discrepancies between their thinking and the thinking of experts in the field. This practice helps them develop the skills necessary to assess their own progress.

When students assess their own thinking processes and the products they create, they are doing more than just looking for errors. They are "making explicit what is normally implicit" (Noonan and Duncan, 2005). This is especially important when assessing mental processes, such as higher-order thinking and other 21st century skills that cannot be observed directly without careful planning.

Making self-assessment part of a daily classroom routine is critical for producing confident, independent learners, but it requires careful planning and consistency in instruction. Black and his colleagues (2003) suggest the following guidelines for successful implementation of student self-assessment:

1. The criteria for evaluating any learning achievements must be made transparent to students to enable them to have a clear overview both of the aims of their work and of what it means to complete it successfully. Such criteria may well be abstract—concrete examples should be used in modeling exercises to develop understandings.
2. Students should be taught the habits and skills of collaboration in peer-feedback, both because these are of intrinsic value and because peer-assessment can help develop the objectivity required for effective self-assessment.
3. Students should be encouraged to bear in mind the aims of their work and to assess their own progress to meet these aims as they proceed (p. 52-53).

In student-centered classrooms, teachers assess students, students assess each other, but, ultimately students assess themselves. Considerable research shows that asking students to think metacognitively about their thinking and their learning results in greater achievement. Marzano (1998) found that interventions that asked students to reflect on their learning had a greater impact on student achievement than any other method. When students assess themselves honestly, they can no longer see themselves as passive recipients of knowledge and skills instruction. They are, in very important ways, responsible for their own learning, for their response to instruction, and for their engagement in meaningful learning tasks.

One factor that increases the effectiveness of self-assessment is a focus on process rather than on product goals (Schunk & Zimmerman, 1998). For example, students who can assess their ability to form hypotheses, to draw conclusions from data, or to incorporate new learning into old, are far more likely to benefit from self-assessment than a student who focuses merely on writing a good lab report. Langer points out that thinking of outcomes often inhibits students in problem solving. With a process

orientation, thinking about "How do I do it?" instead of "Can I do it?" helps them think actively of different ways in which a problem might be solved instead of focusing on the many possibilities for failure (Langer, 1989, p. 34). Evidence shows that students who assess their own learning in terms of outcomes suffer a negative effect from infrequent self-assessment while frequent self-assessment benefits all kinds of learners (Kitsantas, Reiser, & Doster, 2004).

For students who have become accustomed to being "taught" instead of "learning," the change in classroom culture to one where students are in control of their learning can be uncomfortable. The teachers in Black's (2003) project in southern England found that their older students sometimes did not respond positively to the role they were expected to play in classrooms where formative assessment was frequent and ongoing. While following their own progress in learning can be motivating for some, for others, it can require a level of commitment that is uncomfortable. Teachers need to be aware of this when they begin implementing formative self-assessment. As Black and his colleagues explain, "To overcome this pattern of passive reception requires hard and sustained work."

The value of self-assessment cannot be overstated. When this kind of thinking becomes an integral part of daily classroom activities, students learn more, are more intrinsically motivated, persist in challenging tasks, and attain higher levels of confidence in their ability to learn (Kitsantas, Reiser, & Doster, 2004).

Research on Assessing Thinking

In many classrooms, students' thinking is assessed solely on the basis of the products of that thinking. In the case of multiple-choice and true-false questions, we assumed that if students came up with the right answer, they were using good thinking strategies. We know now that this is not always the case. The challenge is, of course, how to get a window on a process that goes on primarily inside the brain. Fortunately, many thinking processes leave traces behind, traces that not only help a teacher understand how a student is thinking, but also help students grow as thinkers. By examining the artifacts of students' thinking, such as discussions, graphic organizers, and notes, teachers can learn a great deal about the thinking processes of their students, and they can use that information to make good decisions about individual and group instruction.

Andrade (1999) offers the following guidelines to help educators teach and assess the higher-order thinking skills of their students:

- Explain to students what kinds of thinking you expect from them.
- Frequently discuss and give examples of what good thinking looks like in different projects and subject areas.
- Ask students to contribute to the criteria and standards you will use to assess their thinking.
- Give students input into the kind of assessment that would be most appropriate for different projects and units of study.
- Give students instruction and practice with assessing themselves with the assessments you will use.
- Assess thinking processes as well as products of thinking.
- Give students a lot of feedback on their thinking and provide them with opportunities to give feedback to each other.

Assessing any higher-order thinking skill requires careful planning and instruction. First, students must be taught how to perform the skill through explicit instruction and extensive practice. Proficiency at a thinking skill can be assessed in a number of ways, through activities which target certain thinking skills and strategies, even through paper-and-pencil exercises, as well as through observation.

The true test, however, of whether students have learned the thinking skills they have been taught is if they use them spontaneously and independently in situations that require them. To assess thinking in this context, teachers must plan learning activities which require specific higher-order thinking skills in order to be successful. With those necessary skills in mind, then, teachers can analyze written assignments and learning logs and observe large- and small-group interaction for evidence of the targeted skills. As students make their thinking visible through writing and speaking, key words or questions indicate different thinking skills and provide teachers with evidence that students are using the skills independently and effectively.

If teachers notice that students are not able to think critically or creatively, solve problems, or reflect on their own learning, then further instruction is in order. If, on the other hand, students are capable of higher-order thinking but are not choosing to exercise it unless they are asked specifically to do so, they may need either to understand more about how and when to use the skills or to recognize their value and importance. Teachers can provide more scaffolding during complex tasks that

require complex thinking skills and engineer activities that help students see the value in that kind of thinking.

Teachers cannot expect their students to use higher-order thinking skills after just one, or even five lessons. These skills must be constantly reinforced and assessed throughout the year in a variety of contexts. In classrooms where higher-order thinking is valued, talk about thinking is part of every subject and every lesson. There is no, "Okay, now we'll do our thinking lesson." Instead there is, "Now we're going to think scientifically," and "Now we're going to think like authors."

Assessing Critical Thinking

One of the most profound characteristics of the 21st century is the access that ordinary people have to infinite amounts of information. In the past, we could depend on publishing companies and libraries to filter information, but the Internet, while convenient and rich with data, requires a more critical eye.

Critical thinking involves analyzing and evaluating information and is composed of six traits: interpretation, analysis, making inferences, evaluation, commitment, and generalizing. Critical thinking is an especially important skill in research projects, particularly those that require persuasion. In the *Designing Effective Projects* Web resource, several Unit Plans, such as *Healthy Oceans*, *Healthy Planet*, *Don't Trash the Earth, Virtual Ambassador, What Happened to Robin*, and *Famine* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/GradeIndex/) offer examples of the effective use of critical-thinking skills.

In one unit, fifth graders in Ms. Silvers' class research different waste management systems in *Don't Trash the Earth*. The teacher begins the research part of the unit by giving some explicit instruction on determining the credibility of sources, using the items in the Critical Thinking Evaluation Checklist from *Assessing Projects* as a guide. She then provides students with a guide to use with questions to think about as they use the Internet and other sources to gather information. At the end of the first day of research, she asks students to reflect on how they decide whether the information they find is credible or not. After reading through the reflections, she thinks about which students seem to understand and which do not and plans instruction to meet those needs.

In a later research project, Ms. Silvers observes students using a checklist to see if they are using the strategies for determining the credibility of sources without being directed to do so. When she discovers that many of her students seem to be accepting whatever they find as the truth, she sets up a demonstration where credible-looking information found on the Internet is false and emphasizes again the importance of asking the right questions about sources.

Ms. Silvers knows that an important skill such as this must be reinforced throughout the year and makes a point to assess it periodically through anecdotal observations. She also frequently asks students during different projects to write in their learning logs about how they know the information they are using in their research is credible.

Assessing Creativity

Helping students develop their creativity is a worthwhile goal if for no other reason than personal enhancement. A poem that is only read by the poet, an idea to make housekeeping more efficient, an insight into the world around us, may not be known to anyone, but still has the power to make life more meaningful and more pleasurable. Teresa Amabile (1983) argues that anyone with normal intelligence can aspire to be creative in some area, and everyone benefits from the "excitement and color" (Nickerson 1999, p. 400) these creative accomplishments add to our lives.

In the 21st century, however, creativity is more than an enhancement to life, it is an essential component. As technology becomes more powerful and accessible and as life becomes more complex, creative individuals will be needed to find solutions for problems related to health, the environment, education, and business.

Many teachers do not feel confident assessing the creative processes and work of their students. This is understandable since, by its very definition, creative work is unpredictable, unusual, and surprising. Creative processes can be encouraged, however, and some aspects of creativity can be assessed. Students can also be taught to assess the merit of their own work, a key component of creativity.

Any project can offer students opportunities to be creative and explicit instruction and assessment of creative processes can be included in almost any student-centered work. In *Monster Swap* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/MonsterSwap/), one of the exemplary Unit Plans in *Designing Effective Projects*, Ms. Welch's 2nd graders create monsters no one has ever seen before. She uses the Creativity Fluency Checklist from the *Assessing Projects* library to identify those skills that she will specifically address during this project. She models the following creative behaviors as she creates her own monster:

- Thinking of many different ideas
- Looking at things from different points of view

Then she puts students in groups to help each other create their monsters and tells them that she is going to be listening to see how many different ideas they can think of before they decide on the ones they want to use. While they are working, she takes anecdotal notes on their fluency at thinking of ideas. She notices that some students are still having difficulty thinking of more than one idea, so she puts them in a subgroup and works with them on that skill. At the end of the activity, she asks students to write in their learning logs responding to the following prompts:

1. Did I think of a lot of different ideas?
2. Did I think about my monster from different points of view?

Assessing Problem Solving

Many projects ask students to generate a solution to a problem. As life and work become more complex in the 21st century, problem-solving skills will be critical for success. Problem-solving skills are composed of identifying and describing problems, using heuristics (thinking tools and routines), coping with complexity, reasoning, argumentation (in upper grades), and decision making.

In many ways problem solving is the ultimate thinking skill because it encompasses all other kinds of thinking: critical thinking, creativity, and decision making. Students are asked to solve important problems in these Unit Plans in *Designing Effective Projects: Float that Boat, Go-Go Gadget*, *Creative Kids Go Pro*, *Plugging into the Sun*, *The Earth Moves Under My Feet, Biomes: Action for a Healthy Planet,* and *Designer Genes* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/GradeIndex/). The opportunities for teaching problem solving extend far beyond units designed for that purpose. Any student-centered activity can serve as a forum for teaching and assessing a specific problem-solving skill.

Students in Mr. Burton's physics class solve a problem involving motion in *Phabulous Physics* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/PhabulousPhysics/), one of the Unit Plans in *Designing Effective Projects*. They prepare brochures illustrating a real-world problem related to motion that answers the Unit Question, *How do the laws of motion describe everyday events?* They illustrate the problem, show how to solve the problem using physics principles, and use a spreadsheet to graphically show some aspect of the solution.

Mr. Burton knows from previous units that his students are often frustrated and confused when they are presented with projects that do not have clear solutions. Many of them feel that science is a topic with right answers that they just have to memorize, and the transition to more authentic work with physics has been a challenge for them. Therefore, in this unit he is going to focus on helping students cope with complexity in addition to the academic content. He presents them with a rubric from *Assessing Projects* that he modified to suit this project and provides them with some explicit instruction on strategies to help them deal with all the tasks they need to complete as part of the project.

As students are working on the project, he takes anecdotal notes specifically about how well students are doing with the complexity. Periodically, he asks them to write in their learning logs about how what they are doing compares with the rubric they received at the beginning of the unit. When he notices that particular students are having trouble, he meets with them individually or in small groups, giving them strategies they can use to minimize their frustration levels. During these conferences, he is careful not to provide students with answers to their questions, just with strategies they can use to form their own questions and find their own answers.

Assessing Metacognition

Metacognition, or "thinking about thinking" refers to the mental processes that control and regulate how people think. Metacognition is especially important in project work, because students must make decisions about what strategies to use and how to use them. Marzano's (1998) research of 4,000 different instructional interventions found that interventions that were most effective in improving student learning were those that focused on how students think about their thinking processes and on how students feel about themselves as learners.

Assessment plays an important role in the teaching of metacognition. In order for students to control their thinking processes, they must first be aware of them. In The *Earth Moves Under My Feet* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/EarthUnderMyFeet/), a

Unit Plan from *Designing Effective Projects*, 7th grade scientists monitor seismic data on the Web and plot geographic coordinates of real-time earthquake activity. Students use this scientific information to develop Earthquake Preparedness Plans for specific areas. Mr. Cole is going to focus on students' awareness of their data analysis skills in this unit. He begins by modeling how he thinks about data he has collected about seismic activity in Argentina. He explicitly describes how he is finding patterns and drawing conclusions from the information.

He then asks students to work in pairs to analyze their data while thinking aloud. Students are given checklists and asked to take note of those data analysis skills they notice their partners using. While the students are sharing their thinking processes, Mr. Cole takes anecdotal notes about their ability to articulate their thinking processes, noting those students that seem to have the most difficulty so he can work with them later.

At the end of the activity, he asks students to write in their learning logs, responding to the following prompts:

1. What thinking strategies did you use while you were thinking about your data?
2. What thinking strategies did your partner use?
3. How successful were your strategies?
4. What can you try next time?

Mr. Cole uses his anecdotal observations and the information from the learning logs to plan instructional activities that will help all his students improve their awareness of and ability to control and manipulate data analysis strategies successfully, strategies that will help them develop into self-directed learners.

Students learn what is assessed. For too long, many teachers have assumed that students will acquire higher-order thinking skills automatically if they are learning content or are given high-level questions to answer. Unfortunately, that is not always the case. Instruction and assessment in thinking do not happen by accident. Teachers must explicitly teach the kinds of thinking they expect from their students and assess that thinking in a variety of ways in order to ensure that students are developing as thinkers.

Successful Assessment

Effectively integrating a variety of kinds of assessment into everyday classroom activities "can in fact produce profound changes in the role of students as learners and in the role of teachers in developing students' capacity to learn" (Black et al., 2003, p. 102-3).

Paul Black and his colleagues worked with teachers in two English secondary schools for two years on including formative assessment in their teaching in a program called King's-Medway-Oxfordshire Formative Assessment Project or KMOFAP. At the end of the project, the researchers asked themselves "whether it is possible to introduce formative assessment without some radical change in classroom pedagogy because, of its nature, this type of assessment is an essential component of classroom learning" (p. 7).

These researchers found that a natural consequence of the continuous use of formative assessment is a move toward a classroom where students not only receive regular, useful information about how their learning is progressing, they are also actively involved in activities that help them transform knowledge and skills into personally meaningful learning. Formative assessment is just one component of a student-centered classroom.

Teachers who were educated as students and who learned to teach in an environment where assessment consisted of final exams and papers are not likely to have the skills and information they need to use formative assessment effectively. Professional development on key topics is crucial if they are to be successful.

Teachers do not teach in a vacuum. They are surrounded by building facilities, administrators, community cultures, supplies, and fellow teachers. The effective use of formative assessment and the building of student-centered classroom cultures require strong support and leadership at every level.

Examples of Student-Centered Classrooms

Consider the following scenarios of how assessment is integrated into instruction in a student-centered classroom

Mr. Levy's Ancient Greece Unit

Mr. Levy's sixth-grade class is about to begin a unit on Ancient Greece. Prior to beginning the unit he poses the Essential Question, *How can we learn from our past?* He asks students to journal in their handheld computers about what they already know about Greece and what they want to know. During the unit, students explore, research, read, collaborate, and journal about the various aspects of life in Ancient Greece. They use this information to create a virtual museum of Ancient Grecian artifacts. Students use a critical thinking checklist to assist them in developing their list of artifacts to include in the museum, and use the *Visual Ranking Tool* to designate which of these artifacts they believe are most influential in today's society.

Mr. Levy introduces a project rubric to help students (and parents) understand expectations and help them create quality work. While the students are developing their museum of artifacts, Mr. Levy monitors individual students' progress through conferences. The final virtual museum of artifacts is posted on the class Web site. At the end of the unit, students develop a list of reasons why the Greek empire fell and use *Visual Ranking* to prioritize the list. The final assessment, a unit test, includes a self-reflection of student learning during the unit.

Ms. Stewart's Probability Unit

Ms. Stewart's eighth-grade class is beginning a unit on probability in which they will learn about notions of equally likely by determining fairness of games. Ultimately, students will become designers for a toy company and create their own fair game. Curious about what her students' already know about the subject, she engages them in a game of Paper, Scissors, Rock and asks them, "Is this game fair?" She is surprised at how many students answered, "All games are fair, since you always have a chance at winning". She asks them to reflect on this activity and note how they can determine if a game is fair in their journals. This pre-assessment will launch the unit and create a place for students to look back and compare their own learning after completing the unit.

While students spend the next several class periods examining games for fairness, Ms. Stewart uses a variety of methods to assess whether her students are gaining some basic understanding of probability. She walks around the room with her clipboard, monitoring student progress and using checklists to evaluate their work. She also informally questions students to probe their understandings of the concepts. When she is convinced that her students have a basic understanding of probability, she groups them into game designer teams. She assigns the teams the task of creating a game and defending its fairness mathematically to the toy company's board of directors. Ms. Stewart wants to increase the likelihood that her students will be successful on this project, so she provides them with a project scoring guide, which clearly articulates her expectations for quality work. She is pleased at the high quality of her students' projects. She finishes the unit by asking students to look over their saved work for the unit, to choose a piece of work that shows how much they have learned, and explain in their journals how it does so. Ms. Stewart then has

her students replay the game, Paper, Scissors, Rock, re-examining it for fairness. She instructs her students to compare these findings with their prior responses and to draw conclusions about what they have learned through the unit on probability.

Student-Centered Classroom Culture

Teachers who are successful in traditional classrooms where they are at the center of instruction often find it difficult to relinquish control to more student-centered activities that are less predictable and organized. "Why should I change when everything is going well?" they wonder. Like students who resist activities without clear-cut right answers, teachers occasionally have difficulty coping with the complexity of a classroom where students take control of their own learning.

In order for students to learn 21st century skills, however, such as higher-order thinking, teamwork, and problem solving, they must be engaged in complex projects that resemble real-life work in different disciplines. They also must receive continual information about their learning progress. Research clearly shows the positive effect that this kind of assessment has on student learning (Black, et al., 1998).

Although there is good reason to believe that student-centered instruction and formative assessment have the power to motivate students to become engaged in their own learning, the path to self-direction is often not an easy one. "Students who have grown used to being tacit observers or "sleepy onlookers" may well resent having to work harder, especially when such passive learning roles are the norm in other subjects." One teacher in Black's project was accused of not doing her job correctly because she did not give notes which students could memorize for tests.

Teachers may also find giving up traditional practices difficult. Formative assessment de-emphasizes grades and emphasizes learning. Students are asked to set goals and monitor their own progress. They are encouraged to be creative, to take risks, and to ask questions. In short, they are expected to care about their own learning. For some students and teachers this is a huge leap.

Traditional classrooms that focus on extrinsic rewards provide few opportunities for students to think about themselves as learners, rather than just as students.

> When the classroom culture focuses on rewards, gold stars, grades, or class ranking, then pupils look for ways to obtain the best marks rather than to improve their learning. One reported consequence is that, when they have any choice, pupils avoid difficult tasks. They also spend time and energy looking for clues to the "right answer." Indeed, many become reluctant to ask questions out of a fear of failure (Guskey, 2005).

Grades are not going to disappear from most classrooms, but teachers can work to minimize their importance, focusing on the intrinsic value of learning from a task and self-assessment, rather than on accomplishing easily countable and verifiable tasks.

If students are to take control of their own learning, they need instruction and support in specific skills such as collaboration, problem solving, and critical thinking. Like the teachers in Black's study, teachers who use formative assessment effectively need to expand the way they think about student learning. Teaching must become less about delivering subject-area knowledge and more about engineering instruction around authentic tasks that allow students to practice working with new content in ways that challenge their thinking and help them develop 21st century skills of self-direction and collaboration.

Professional Development

Even though the teachers in the King's-Medway-Oxfordshire Formative Assessment Project had substantial help and advice from Black and Wiliam's team of researchers, they still faced numerous challenges. Without extensive support, efforts to integrate formative assessment into instruction are likely to be less successful than they could be. The changes in instructional practices that go along with the effective use of formative and summative assessments do not happen quickly or without some anxiety and frustration. Black and his colleagues (2003) found that

> ...although the classrooms of most of the teachers involved in the project were changed radically, this change was gradual and slow. Half-way through the project, (i.e. after a year), many of the teachers had changed only small details in their practice and although these changes were significant changes for them, the outward appearance was that little had changed.... However, during the second half of the project, the changes became much more radical and for many of the teachers, the various techniques that they had adopted cohered to form a unified approach to formative assessment (p. 112).

Learning, for teachers as well as students, is not easy. "Learning, real learning, is hard work. You read, you think, you talk. You get something wrong, you don't understand something, you try it again. Sometimes you hit a wall in your thinking, sometimes it is just too frustrating. Yes, learning can be fun and inspiring but along the way, it usually makes us miserable" (Wilson & Berne, 1999, p. 200). For teachers who have been successful in a teacher-centered classroom, and even for novices who have had extensive experiences as students in traditional environments, moving to a student-centered classroom that focuses on ongoing and authentic assessment can seem overwhelming.

In order for teachers to make the leap from teacher-centered classrooms to incorporating formative assessment into student-centered instruction, they must be motivated to do the work necessary to make the change; they must have the knowledge and skills necessary to be successful, and they must have institutional support.

A study conducted by the National Foundation for the Improvement of Education found that 73% of 800 teachers surveyed participated in professional development to improve the achievement of their students (Renyi, 1996). Certainly, the benefits of formative assessments, particularly in the areas of helping students become more independent learners, suggested by research (Black, et al, 1998) can motivate teachers to do the work necessary to make ongoing assessment part of everyday life in their classrooms. Coverage of content is also more efficient in classrooms where students can take responsibility for their own learning. "Teachers report getting more done in the curriculum, more hands-on activities occur, and more learning takes place during years with self-directed learners in a classroom" (Buchler, 2003).

Teachers also need to acquire the knowledge and skills necessary to organize their instruction around formative assessment. Teaching our students to think deeply about content requires a kind of knowledge beyond an advanced understanding of the subject matter. We need to thoroughly understand the basic concepts of the discipline (Askew, Brown, Rhodes, William, & Johnson, 1997) and to understand the different ways in which students think about the subjects they are studying, the misconceptions they may have, and have at our disposal a variety of metaphors,

analogies, and examples that will help our students understand abstract concepts (Black, et al., 2003).

Some teacher education programs do not address higher-order thinking skills in a concrete way, so that teachers can observe what they look like at different levels, and how to teach students the thinking skills they need to complete projects. In addition, teachers need instruction and practice on the skills important for assessment, such as recording anecdotal observations, giving written and oral feedback, and analyzing the information collected from various types of assessment.

Finally, teachers must have extensive support; for without it, even if they acquire the skills and knowledge necessary to integrate assessment into instruction, decades of failed educational initiatives suggest that even very good ideas, such as this one, will fail without it.

Leadership

The most creative and well-informed teacher may struggle and give up within an environment that does not support teaching that helps students develop into critically thinking, self-directed learners.

Students who are expected to take responsibility for their own learning in one class and are allowed to passively follow directions in another, are not likely to embrace self-direction. On the other hand, a school-wide program focusing on the use of formative assessment is likely to leave most teachers by the wayside. In Black's project in south England, his team began with a few math and science teachers and, over time, added English teachers. Even at that slow pace, however, teachers experienced challenges with new ways of looking at teaching and learning.

The designers and researchers of the KMOFAP project offer the following suggestions for improving student learning through consistent and continual use of formative assessments.

1. An individual or small group of teachers can take on the responsibility of trying out the methods and then, if they are successful, encourage others to follow their example.
2. An entire school can take on formative assessment as a school-wide initiative and support can be provided on a large scale to help all teachers adopt effective methods.
3. The best option, according to the researchers, would probably be to start out with a "limited experiments designed to inform and to lead to growth over several years" (2003, p. 100).

Providing teachers with a quick and easy type of formative assessment, such as asking students to respond with green, amber, or red traffic light icons to indicate good, partial, or little understanding of a concept, can give them a glimpse of what is possible with formative assessment. As teachers realize the value of the information they collect with simple, easy-to-use assessments, and see how their students' learning benefits from them, they become much more willing to try out other techniques.

Several professional development strategies, such as lesson study, action research, and teacher study groups, can provide teachers with the opportunities to take the first steps that will lead them into classrooms where student learning is at the center of teaching, and where on-going and embedded assessment gives students whatever they need to learn.

The switch from a teacher-centered classroom where students passively absorb information and show what they know on end-of-unit tests to one where students engage in meaningful activities that require critical thinking, creativity, and problem solving will not happen quickly or easily. Those who plan and implement professional development with the goal of creating student-centered classrooms need to keep in mind that "everyone learns best when there are ongoing opportunities to develop questions, investigate, reflect, apply and share knowledge in real-life contexts" (Bernard-Powers, et al., 2000, p. 4).

Assessment Strategies

These assessment strategies provide valuable information to both teachers and students. Each strategy offers unique methods and instruments. The key is to understand their different purposes, how they can be structured, and finally, what to do with the results. Assessment strategies can be broken into five main categories. It is not necessary to use all methods within a category, but all categories should be included in an assessment plan.

Strategies for Gauging Student Needs
Use these strategies prior to instruction to 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
Use these strategies to assess the ability of students to take ownership of their learning, demonstrate interpersonal skills, produce higher-quality work, understand feedback, and assess classmates' work.

Strategies for Monitoring Progress
Use these strategies to help students stay on-track during a project. Students become more self-managing when they are provided with these assessment methods and instruments as they complete open-ended tasks. These strategies also assist in determining when and where students need extra help or additional instruction. Many of these strategies provide documentation of learning growth over time.

Strategies for Checking for Understanding and Encouraging Metacognition
Use these strategies to check for student understanding as they progress through the project. Students also use these strategies to think about their own learning. The same method can be used for both purposes, but it is important to provide explicit questions and prompts to help students think about what and how they are learning.

Strategies for Demonstrating Understanding and Skill
Use these strategies to assess student understanding and skill at the end of the project. Two different types of strategies are in this category:

- Products and performances
- Portfolios and student-led conferences

Products are things that students create, sometimes known as artifacts. Performances are things that students do. Portfolios are the purposeful collection of products and performances over time that exhibit the student's efforts, progress, and achievements while student-led conferences are the means by which students share portfolios, samples of their work, and discuss their interests, learning, and goals.

Planning Assessment

Assessment for project-based units should be planned to:

- Use a variety of assessment methods to meet different purposes
- Embed assessment throughout the learning cycle
- Assess the important objectives of the unit
- Assess higher-order thinking
- Engage students in assessment processes

Assessment Plan

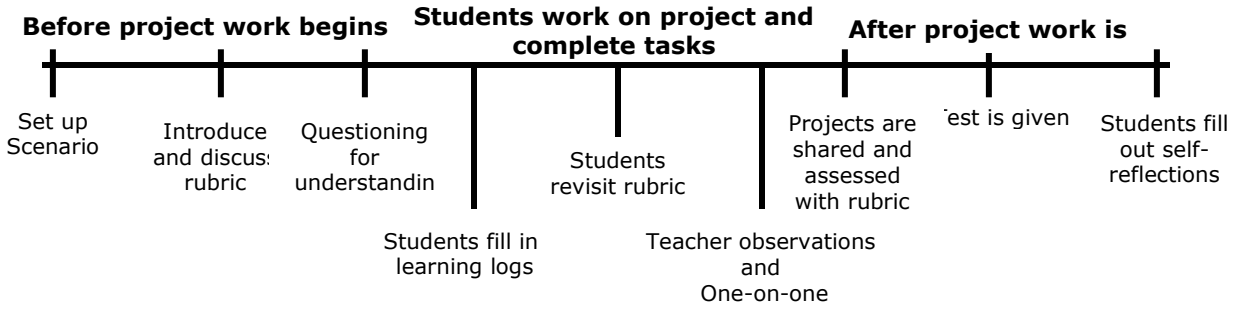
An assessment plan ensures a project stays focused on intended learning goals and should be developed before the project activities and tasks. Because project tasks allow for broader expression of individual learning, assessment strategies need to be open enough to accommodate a range of student work, 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 setting goals, reviewing and managing their learning progress during the project, and self-reflecting after the project. A plan will answer key questions:

- What methods will you use to gauge student readiness for the unit?
- What product or performance task will engage your students and best demonstrate your intended learning goals and targeted thinking skills?
- What will quality work look like? How will you involve students in understanding the project expectations and criteria?
- In what ways will you address and assess higher-order thinking in this unit?
- What reporting and monitoring methods will you use to encourage student self-management and progress during independent and group work? What monitoring and reporting tools will you need to create?
- How will you monitor student understanding and adjust if necessary?
- What methods of assessment will help students reflect on their learning (metacognition) and for you to check understanding? What assessment tools will you need to create?
- What methods will you use to assess final understanding and demonstration of learning? What will quality look like?
- How will you and your students know they have met the learning goals?

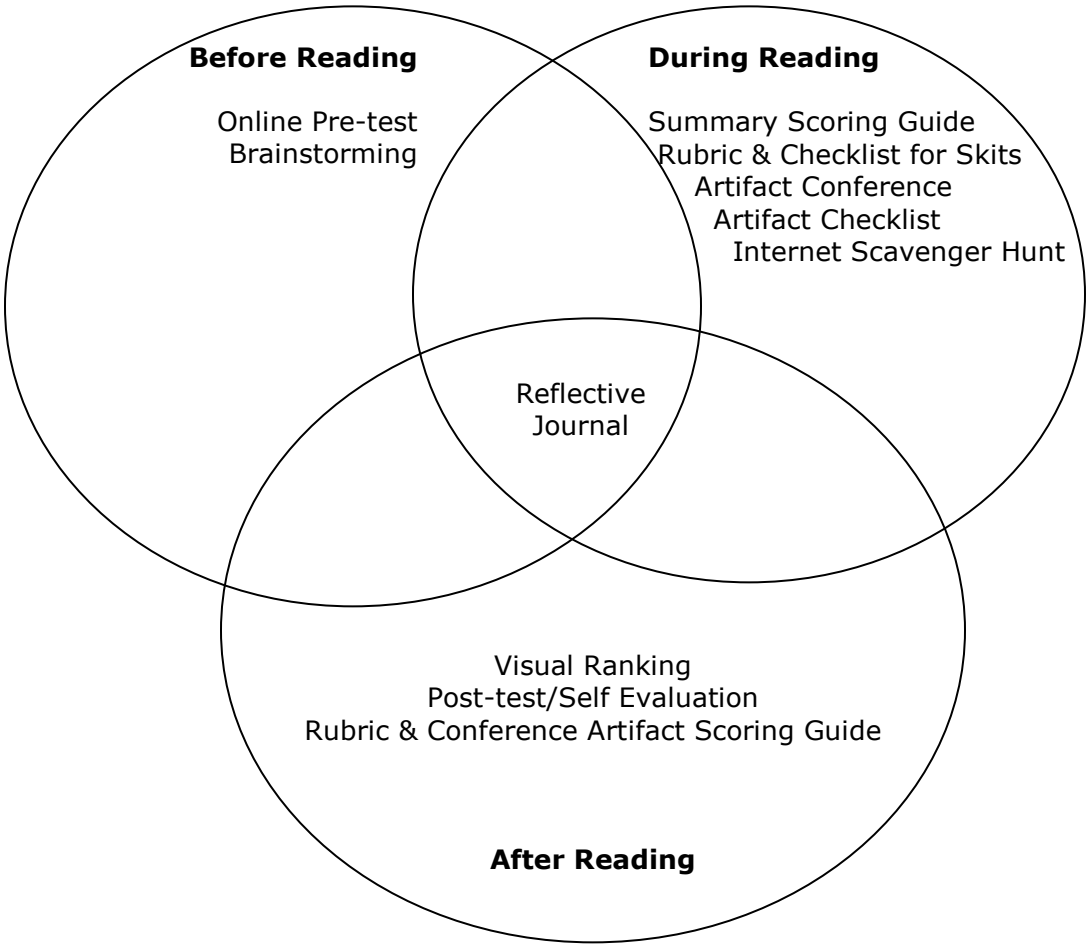
Timeline

A timeline is a simple way to show an assessment plan and check that a variety of assessment methods occur throughout the learning cycle.



Venn Diagram

A Venn Diagram is another way to visually represent how and when a variety of assessments can occur throughout the learning cycle. It also shows how the same method is used at various times over the course of a unit of study.



Table

A table provides a format for describing in detail the processes, purposes, and methods for assessment throughout the learning cycle. The following example is taken from the *National Energy Plan* Unit Plan (http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/NationalEnergyPlan/VR_UnitPlans3.htm) within the *Visual Ranking Tool.*

Assessment	Process and Purpose of Assessment
Questioning/ Brainstorming	Use questioning and brainstorming to determine how much students know about energy resources prior to the start of the unit and to draw connections to students' personal lives.
Project Overview and Checklist	Students use the project checklist to understand where they are in the unit and where they are going, as well as to self-assess their progress while working on the various components of the project. They revisit the checklist throughout the unit to help monitor their progress and check due dates.
Research Worksheets	Students use the State Energy Information, Energy Plan Comparison, and Energy Plan Choices worksheets to help guide and assess their research of energy policies, usage, and resources.
Project Journal	Students are prompted at the end of each project step to create journal entries in response to prompts. During conferences review the project journal entries and provide feedback and clarify misunderstandings. Students use the journals to record new learnings and reflect on their thinking. Review journal entries at the end of the unit to assess understanding.
Teacher Conference	Meet with each team at least once during the project to assess the students' quality of research and understanding of content. The conference is also used to provide feedback on current work, clarify misunderstandings, and assist in locating other research resources, if necessary.
Visual Ranking Comments	Read the students' comments within the *Visual Ranking* projects to assess comprehension and ability to provide sound reasoning for their selections.
Anecdotal Notes	Periodically take notes during individual and group work. These notes support, checking progress and adjusting instruction. Refer back to these notes when conducting the final assessment.
Presentation Outline	Review students' presentation outlines and provide feedback, suggestions, and corrections before they begin working on their multimedia presentations.
Presentation Scoring Guide	Students use the scoring guide to self-assess and provide constructive feedback to peers prior to presentation completion. Use the scoring guide to assess verbal communications skills, as well as quality of content, design and research, following the final project presentations.

Changing Assessment Practices

Every year, Ms. Perry engages her students in a project-based study of *Romeo and Juliet*. Last year (Scenario 1) she used traditional methods to assess student work. This year (Scenario 2), she revised the unit to include some new methods of assessment.

Read the two scenarios below and focus on the shift Ms. Perry made in assessment practices. Consider how these changes are likely to affect her students' overall learning and project performance.

Romeo and Juliet - Scenario 1

Ms. Perry, a high school English teacher guides her students through a unit on *Romeo and Juliet*. She focuses on state reading standards related to character analysis and literary devices, along with other oral and written communication standards.

Ms. Perry begins the four-week unit by explaining to her students that they will be learning about Shakespeare and his most famous play, *Romeo and Juliet.* She introduces the Essential Question for a student discussion, *Does literature help us better understand ourselves?* She explains that they will be completing a project at the end of the unit where they will apply the themes of the play to a current problem and develop solutions.

Students spend several weeks reading and acting out the scenes from *Romeo and Juliet.* Ms. Perry assigns students roles and they begin reading aloud and analyzing scenes. Students also read some parts of the play for homework. After each act, Ms. Perry gives her students a quiz to evaluate their learning.

They spend considerable time during class discussing the difficult scenes and the literary terms associated with the play. For instance, students identify and discuss the metaphors concerning Juliet in Romeo's soliloquy. Ms. Perry asks students questions such as:

- *How do the metaphors help to show the feelings and thoughts of the characters?*
- *How does the imagery affect the way we respond to the scene?*

Just before finishing the play during the fourth week, Ms. Perry asks the students to define fate and to take a stance as to whether or not they believe in it. The class discusses fate as understood in the time of Shakespeare. After finishing the play, they take a multiple choice and matching test on the play's action, characters, themes, and literary devices.

Ms. Perry assigns a final project to student teams in which they will apply the themes of the play to modern life to develop a solution to an age –old problem that will positively impact their community. They are required to present their findings and solutions to an audience and create appropriate products to supplement their message (multimedia presentation, brochure, newsletter, flyer, Web site, and so forth).

The class discusses example themes, such as parent-teenager communication, peer pressure, or violence in school, and they review an example student-created brochure on conflict resolution. Ms. Perry hands out the rubric that will be used to evaluate the final project and discusses expectations, including problem-solving and group work. Students also receive a checklist to help them stay on-track through the stages of brainstorming, planning, and implementation of their project.

Romeo and Juliet – Scenario 2

Ms. Perry attends a class, conducts online research, and reads a few publications about assessment since last teaching the *Romeo and Juliet* unit. She decides to try some strategies she hadn't considered before and develops a plan for embedding other methods of assessment in the unit.

To provide more opportunity for students to consider Shakespeare's relevance, Ms. Perry sets up an e-pal project so her students can exchange ideas with peers comparing Shakespeare's time to their own. To structure the students' email communication, Ms. Perry plans student reading logs with specific questions that prompt analysis of characters and literary elements as the students read each act of the play. Students will write answers to the reading log questions and exchange them with their e-pal. They will periodically hand in a log of their email exchanges during the unit.

As before, students will read the play and explore the themes in *Romeo and Juliet* and discuss how they apply to modern life and relationships. To start the unit, Ms. Perry introduces the same Essential Question, *Does literature help us better understand ourselves?* A short discussion of what students already know about Shakespeare and *Romeo and Juliet* follows. Ms. Perry is surprised to find that students know very little about Shakespeare. She decides to introduce an Internet scavenger hunt, a structured search for basic facts about the life and times of Shakespeare. After the activity, students complete a handout on what they now know and would still like to know about Shakespeare and the era in which he lived.

As in past years, students spend the next several weeks reading, acting out *Romeo and Juliet,* and discussing difficult scenes and literary terms such as metaphor. This year however, Ms. Perry uses observation sheets to keep track of notes for individual students, looking for such things as: participation in discussion and analysis of ideas. She refers to these notes when conducting brief one-on-one conferences with her students. The conferences are meant to ensure student are on track as they develop a short essay on one theme, character trait, or literary device from the play that seems relevant to their own life. Students send these essays to their e-pals for peer feedback before handing them in.

Ms. Perry introduces the final project to the class, and they discuss example themes and review a student sample. They also examine the rubric that will be used to evaluate the final project. To help create ownership for the criteria for which their work will be rated, Ms. Perry asks students to use the rubric to score the sample student project. Together, they discuss the assessment rubric and make some changes to the language of the criteria. Students also receive a checklist to guide them through all stages of the project.

As they work on the project, students use the information they have recorded in their reading logs to provide "evidence" to support a case for their solutions to the modern life issue they choose for their project topic. Using these arguments, students create a presentation discussing their topic, its relationship to *Romeo and Juliet*, and their solutions.

Students take a final test on the play's plot development, literary devices, and characters. Afterwards, they complete a self-assessment to include in their English class portfolio, and respond in the form of a reflection, to the Essential Question, with a focus on what the question means in relationship to their own learning.

Changing to Student-Centered Assessment

Much like Ms. Perry in Scenario 2, changing to a student-centered classroom does not mean abandoning traditional classroom assessment practices; but integrating a variety of student-centered strategies throughout the entire instructional cycle. These strategies are often embedded and contribute to learning and instruction at the same time.

In student-centered classrooms:

- Tests and quizzes are still used but are not the only method of assessing student learning.
- A variety of assessments, each for different purposes, are implemented at multiple points within a unit of study. For example:
  - Teachers determine student understanding and activate prior knowledge before launching the project
  - Teachers and students give and receive feedback in the form of peer and teacher conferencing
  - Checklists and rubrics help students understand expectations and manage learning progress
  - Self assessments and reflections encourage metacognition and ownership of learning
  - Rubrics define quality for products and provide criteria for self, peer, and teacher assessment
  - On-going observations provide opportunities to adjust instruction

Gauging Student Needs

Students bring a wide variety of experiences, abilities, and interests to any new topic. A thorough understanding of the students' background knowledge and understanding helps teachers design instruction to address misconceptions and to take advantage of relevant experiences.

The table below includes an overview of the methods, purposes, and instruments used for gauging student needs. Links provide more detailed information and specific examples.

Assessment Method	Purpose	When Used	Instrument
Examining Student Work	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? Are there any patterns or trends to focus on?	▪ Samples of work and assessments from different students ▪ Samples of one student over time ▪ Data from tests
Graphic Organizers	Graphic organizers provide a visual representation of student's 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
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	Use at the beginning of a project, during a class discussion, or individually in journals.	▪ Topic on chart paper or electronic white board ▪ Journal

Assessment Method	Purpose	When Used	Instrument
	they want to know, and finally record what has been learned and is yet to be learned. They allow students to make personal connections before the content is deeply explored.		
Think-Pair-Share	Think-Pair-Share asks students to first think about a question, then to pair with someone and verbally share their response, and finally to 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	Students generate terms and ideas related to a topic and form creative connections between prior knowledge and new possibilities.	Use at the beginning of project, during a class discussion, individually, or in small groups.	▪ Topic on chart paper or electronic white board

Graphic Organizers

Many teachers appreciate the learning benefits of graphic organizers throughout the learning process. Graphic organizers are visual representations that illustrate the components of a concept or process and their relationships to each other. These visual representations allow students to exercise both their right- and left-brains and to retain information both in linguistic and image form. When they are created by groups, they encourage students verbalize their knowledge and check their understanding with their peers.

There is considerable research to support the use of graphic organizers throughout instruction. Marzano, Pickering, and Pollock (2001) found impressive gains in achievement when students created various types of diagrams and charts that showed their understanding of concepts.

Jay McTighe in his book *Graphic Organizers: Collaborative Links to Better Thinking* (1992) outlined three strategies for using graphic organizers for teaching and assessing and a number of ways that students use them to aid in the learning process.

Before instruction, use a graphic organizer to provide structure for the presentation of new material while indicating relations between ideas. Create a graphic organizer and ask students to fill it in, thereby gaining an accurate idea of students' prior knowledge, areas of interest, questions, and misconceptions.

During instruction, graphic organizers help students clarify relationships, organize their thoughts, and formulate plans or process steps. They involve students in strategies like sequencing, comparing, classifying, analyzing, and problem solving. When asked to modify an organized structure of information, students can learn from their own mistakes. Graphic organizers allow for the exchange of ideas about why a linkage is valid or invalid, and help students identify links that are missing. The maps help identify misunderstandings about concepts and the connections among ideas. After reviewing, address students' misconceptions and identify areas for new learning.

After instruction, students construct their own organizers to isolate and organize key concepts. This summarization technique is a tool for students to depict complex relationships in concise, accurate terms. Post-instruction graphic organizers also encourage elaboration. A student connects prior knowledge with what was learned and identifies relationships between those ideas when creating a graphic organizer. Graphic organizers make abstract ideas more visible and concrete allowing for better assessment of thinking skills. Also, asking students to complete maps at the beginning and the end of a project provides documentation of their growth.

Concept Maps

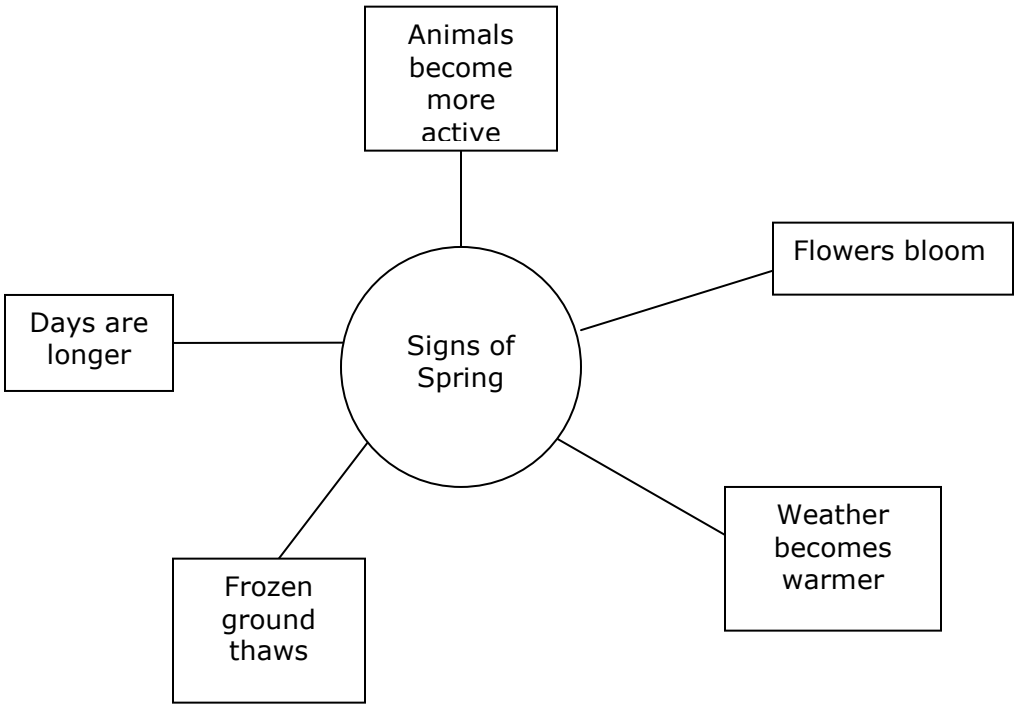
Concept maps are an effective way to organize, cluster, and brainstorm ideas. Causal maps are used to illustrate cause-and-effect relationships.

Cluster Maps

These maps are a useful way to help students cluster and brainstorm ideas and information or show relationships. They can be used as a starting point before beginning a larger project or as a pre-writing activity to be checked by a peer or teacher. This visual representation helps all students to see their ideas on paper and then use these ideas to write essays, reports, or create multimedia presentations. From simple clusters to more complex ones, students at all levels and in all subject areas can use clustering strategies to generate ideas.

Example Cluster Map:

This cluster map was inspired by the *Wave of Spring* Unit Plan (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/WaveOfSpring/) from *Designing Effective Projects.*



Causal Maps

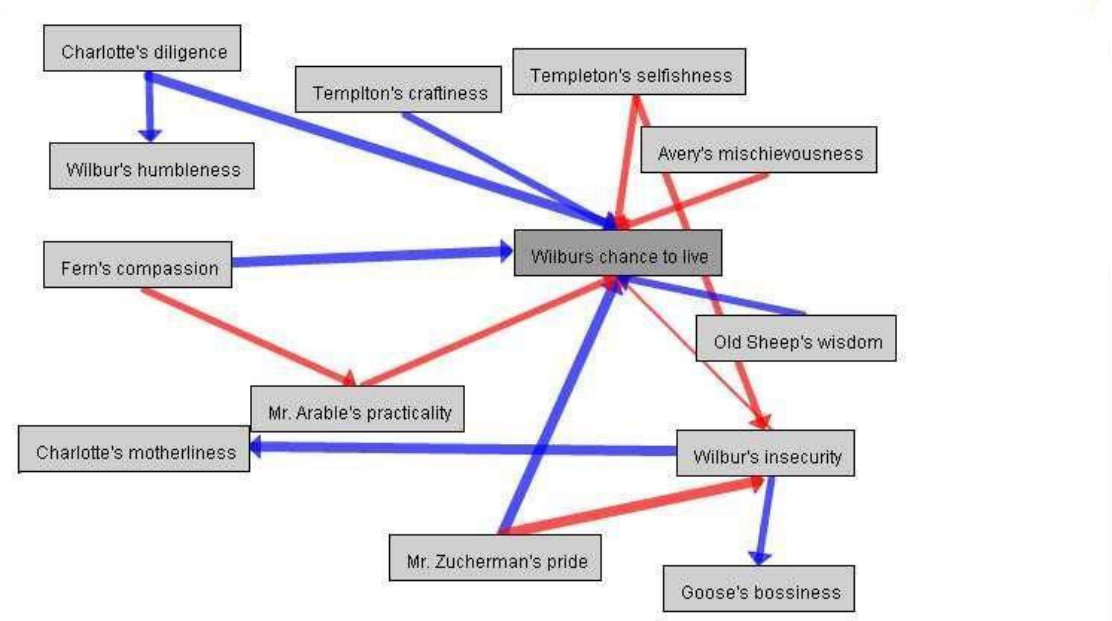
Causal maps are a special kind of concept map. These maps help students create visual representations of cause-and-effect relationships. Analyzing cause-and-effect relationships is important in understanding complex systems, such as historical events, novels, or destruction of animal habitat.

The *Seeing Reason Tool* (http://educate.intel.com/en/ThinkingTools/SeeingReason/) promotes cause-and-effect thinking through visual mapping. Students create visual representations of relationships in a cause-and-effect investigation. These maps make thinking visible and promote collaborative refinement of understanding. In *Seeing Reason* maps, connections of blue arrows show that the appearance of one factor increases the strength of another, and the width of the arrow indicates the strength of the impact. Red arrows reflect a negative impact. For example, in the map below, based on *Charlotte's Web* Wilbur's chance to live slightly decreases his insecurity, and Wilbur's insecurity greatly increases Charlotte's motherliness.

The *Seeing Reason Tool*:

- Maps cause-and-effect relationships
- Helps students analyze complex systems
- Communicates understanding visually and promotes collaborative work

Example Causal Map



This causal map is taken from the *Seeing Reason* Unit Plan, *Charlotte's Web* (http://educate.intel.com/en/ThinkingTools/SeeingReason/ProjectExamples/UnitPlans/CharlottesWeb/SR_UnitPlans2.htm).

By using clustering and causal maps, both students and teachers can visually represent their knowledge and organize their information in logical and meaningful ways. Each map serves its own purpose and can be adapted

Sequencing Activities

Sequencing activities help students to arrange information in a logical order, making it easier to track information over time.

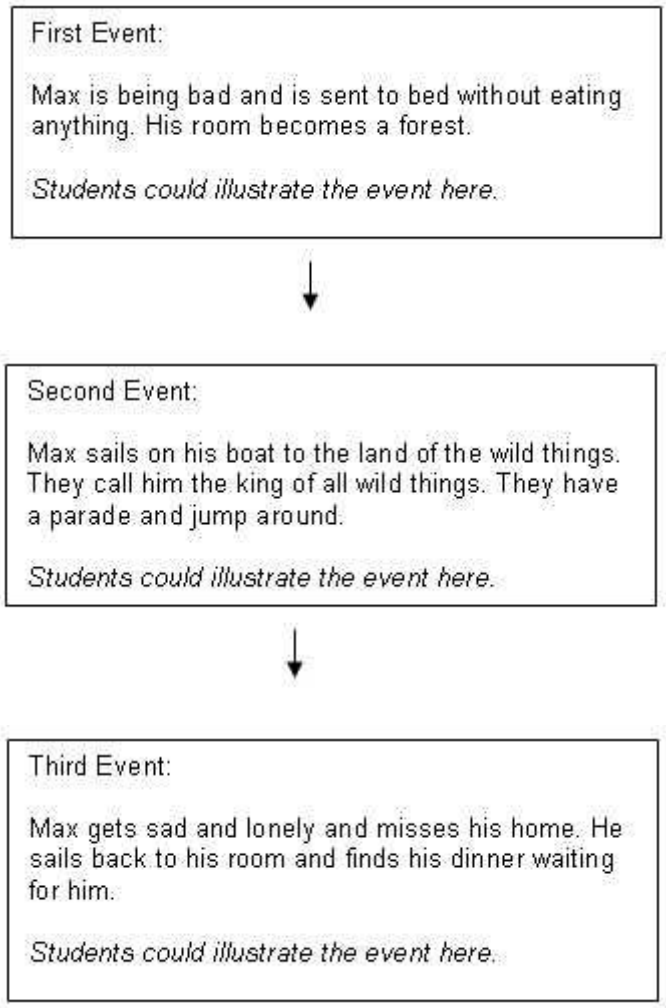
Chain-of-Events

The use of a chain-of-events graphic organizer is a valuable way to:

- Organize steps in a procedure
- Trace plot development in a story or novel
- Document actions of a character
- Record the important stages of an event

Chain-of-Events for Where the Wild Things Are by Maurice Sendak

This is a sample graphic organizer a student might create.

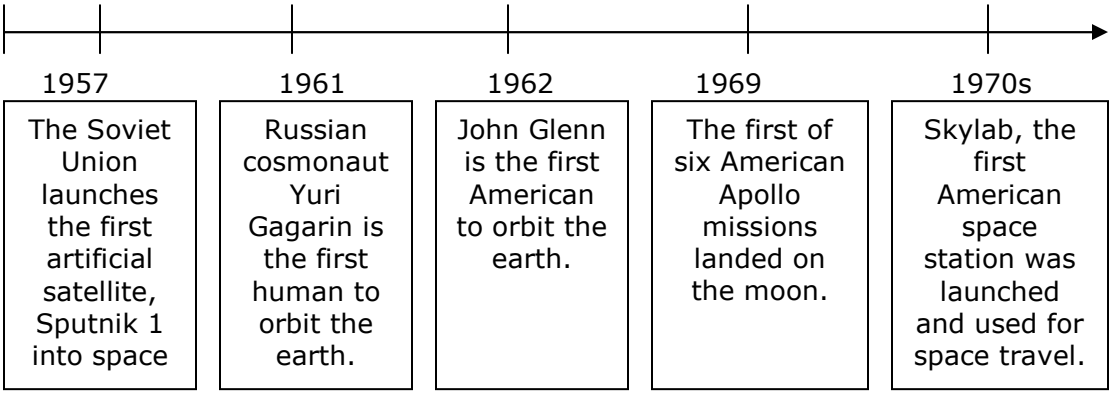


Timelines

Like a chain-of-events organizer, timelines help students place events and people in chronological order. Throughout a lesson or unit, students can add to the timeline, use it as a reference and a benchmark to make sense of dates and events and to see patterns in history. By sequencing important events, students can make connections to past and current content. Individual and class timelines can be effective ways to represent events and time periods.

Space Exploration Timeline

This is a sample timeline a student might create.



Storyboard Planners

Storyboard planners are helpful ways to construct ideas and organize information before creating a product. Students can create storyboards, using multimedia technology or paper and pencil. These storyboards can be used as a pre-writing or brainstorming activity before students create a final product. The storyboards can be checked by a peer or teacher to make sure the student is on-track and provide feedback before getting to work.

Web Site Storyboard

This is a sample storyboard a student might use.
This storyboard is from the Unit Plan, *African Adventure Safari* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/AfricanAdventureSafari/) from *Designing Effective Projects.*

Classification Charts

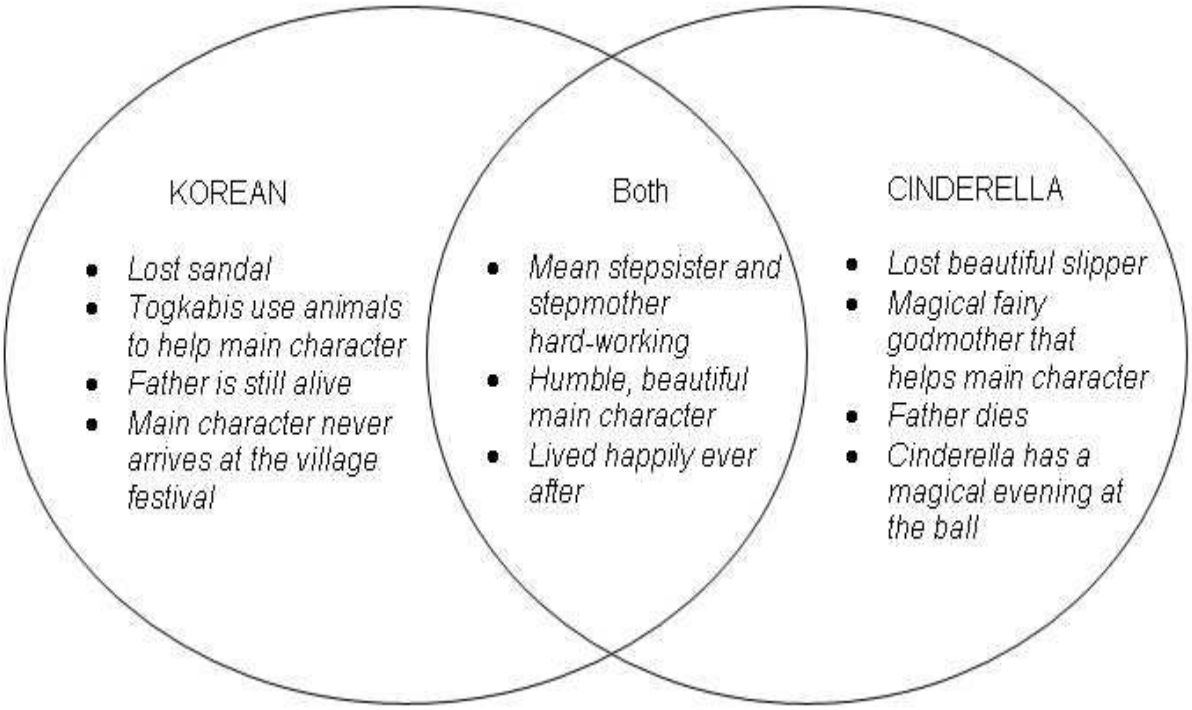
With classification charts, students organize information visually to compare related ideas.

Venn Diagrams

Venn Diagrams are used across the curriculum and with any grade level to compare information. A Venn Diagram is made up of two or more overlapping circles. The similarities between topics are listed in the intersection of the two circles. The differences are listed in the remaining sections. From simple two-circle Venn Diagrams to four-circle Venn Diagrams, students construct visual representations of their learning. Students use the diagrams to organize information as an aid for developing multimedia presentations, reports, essays, or oral presentations. Teachers can use Venn Diagrams as a way to assess student learning or as a quick, informal means to check for student understanding.

Venn Diagram Example

This sample Venn Diagram is from the Unit Plan, *Where in the World is Cinderella?* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/WhereIsCinderella/) in *Designing Effective Projects.*



T-Charts

Another type of classification chart is a T-chart. With T-charts, students can clarify

concepts or ideas by comparing and contrasting them visually by listing and examining two facets of a topic. They can, for example, list pros and cons, advantages and disadvantages, facts and opinions, strengths and weaknesses, or problems and solutions. Like the Venn Diagram, the T-chart can be used to organize learning for a report, presentation, or essay.

T-Chart Example: Destination America

This is an example T-chart inspired by the Unit Plan, *Destination America: Our Hope, Our Future* in *Designing Effective Projects.*

Destination America: Our Hope, Our Future

Compare Ellis Island immigrants to Angel Island immigrants using the T-Chart below.

	Ellis Island	Angel Island
Where are the immigrants from?	Mostly European countries (Italy, Poland, Ireland, England)	Mostly from Asian countries (China, Japan, Korea, India, Philippines)
Where is the island located?	East coast – across the Atlantic Ocean in New York Harbor	West coast –– across the Pacific Ocean in San Francisco Bay
Reasons immigrants came to America:	Religious and political persecution, crop famine, loss of jobs, overpopulation, free expression, personal opportunity and government incentives in America	Poverty, limited job opportunities in homeland, war, high taxes, the hope to have a better life in America
Nick name:	Gateway to America	Guardian of the Western Gate
When was island open for immigrants?	Opened for immigrants between 1892 to 1924	Immigrants and emigrants between 1910 and 1940
Why were the islands built?	To regulate immigration into America – a stopping point to America	Designed to control the flow of Chinese immigrants with the passage of the Chinese Exclusion Act of 1882. Process and detain Chinese and other Asian immigrants.
How many people passed through the gates?	Over 22 million immigrants passed through the doors to American through Ellis Island	Estimated 1 million people entered and left the country. 175,000 Chinese 150,000 Japanese

What did the immigrants have to do when they got there?	Medical examinations and full physicals for everyone by 1917. If a problem was curable, they were sent to the island hospital. If not, they were sent back home.	Humiliating and barbaric medical examinations performed. Interrogation sessions took place.
What were the conditions like?	The Statue of Liberty greeted the immigrants and welcomed them to America. The conditions were crowded.	Harsh prison-like conditions while awaiting the demanding hearing process to prove their status as legal immigrants
How long did they stay?	Process took 3-5 hour with the interviews. Some stayed for months waiting for family members or other reasons.	Some stayed over night, while others stayed for months. Chinese immigrants stayed an average of 2-3 weeks. While waiting for their immigration status, many of the immigrants etched poems of depression and fear on the walls of the barracks.
How were they granted permission to stay?	Prove they could be in America legally. Prove their country of origin, where they expected to live and work in America. Anyone with a criminal record or suspected of being an indentured servant was rejected. By 1921 a literacy test had to be passed and a passport or visa had to be shown. Had to have at least 20 dollars to be allowed to enter America. Their money was exchanged on the island.	Prove their identity by matching details of their lives with the answers of their relative in the United States. Often had to wait months while their case was being investigated.

Prioritized Lists

Making a list is a pretty simple task, but when a student is required to order and prioritize the list, higher-level skills of analysis and evaluation are put to use. With the use of ordered lists, students visually construct information on paper or with a computer. These lists promote collaboration and discussion among students while they compare their lists and reasoning in a visual diagram.

The *Visual Ranking Tool* helps students analyze and evaluate criteria for the decisions they make in forming a list. By ranking lists, students must identify and refine criteria as they assign rank to a list. While using this graphic organizer, students can manipulate and order information and visually represent content being learned. These lists can be used to spark debates, create proposals, or to understand the quality of a character in a story.

Prioritized List Example: Visual Ranking

This example list comes from the *Visual Ranking* Unit Plan, *Grow a Business* (http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/GrowABusiness/VR_UnitPlans1.htm). In this unit, fourth-grade students conduct market research, determine product potential, seek funding, and market and sell flowers for Mothers Day. They use *Visual Ranking* to compare the different flowers they could sell.

Know-Wonder-Learn Charts

A Know-Wonder-Learn (K-W-L) chart is one of the most commonly used graphic organizers to tap students' prior knowledge. The chart consists of three columns, one titled "Know," another titled, "Wonder," and a third titled, "Learn." This simple chart activates students' prior knowledge by asking them what they already know about a particular subject and helps them to make personal connections before the content is deeply explored. Students begin by brainstorming their ideas on the Know section of the chart. Then, independently or collaboratively brainstorm questions they have about the content in the Want to Learn section. Finally, as students begin to answer these questions during the project, they record the information on the Learn section of the chart.

K-W-L charts require students to construct meaning from what they've been learning, compare their new knowledge to what they already know, and to clarify their ideas. They also keep students focused and interested in the content and provide a way to keep track of what they are learning. Ultimately, the chart can be used as a document in an assessment portfolio to show what a student has learned.

K-W-L charts can be used across the curriculum at any grade level. They can be used to start a new unit of study and referred to throughout the unit. They usually are not a graded document but rather a place for students to write down their ideas and questions without the fear of being judged. These charts also may help with student organization and can be a starting point for peer-to-peer or whole-class discussion.

Brainstorming

Before students learn about a topic, it is essential to activate their background knowledge. Brainstorming is a useful way to get them started or to help them generate new ideas without fear of criticism or reproach. To begin, ask students to generate as many ideas about the topic as possible, and encourage them to include outrageous ideas, new and unusual techniques, or ideas that expand on previous comments and suggestions that have worked for them in the past. Record the ideas generated from brainstorming on a chart for all students to see.

After the initial list is generated, ask students to categorize the ideas into subtopics. These might include ideas they already know about or are unsure of, or ideas to work on now or to study in the future. The following questions can help guide the discussion:

- What do we already know about this topic? What does this list tell us?
- Can we learn about all of these ideas given the time we have to work on our project?
- Which ideas from this list should be our priority?
- Are there other ideas we've not thought of now that we've discussed the list in detail?

After the discussion, ask students to reflect on the activity in their journals. This can either be left open-ended or ask students to record the ideas they generated and explain which ones they are going to use in their project and which ones they still have questions about. Afterwards, review the journal responses to assess students thinking.

There are a few variations on traditional brainstorming, but they all serve the same purpose—to activate prior knowledge.

ABC Brainstorm

In this method, ask students to list the letters of the alphabet down a sheet of paper. Then prompt them to write a word or phrase that could be associated with the topic for each letter. Begin by having students work individually, then pair them up or have them work in small groups to try to fill in all of the letters. Finally have students share their lists and give justifications for the words or phrases they've chosen.

Carousel Brainstorm

In this method, divide the class into small groups and provide each group with a large sheet of paper with a different subtopic or idea listed at the top. Allocate a short period of time for groups to brainstorm as many ideas related to their topic as possible. Then have groups pass their sheets on to the next group, and so on, until each group has been given the opportunity to add their ideas to every sheet. At the end of the brainstorming session, post all of the sheets so that they can be viewed by the entire class. Lead a discussion to debrief the activity or return the original sheet to each group and ask them to reflect on all of the additional ideas that each group added to their original brainstormed list.

Encouraging Self-Direction and Collaboration

The ultimate goal of education is to produce students who can learn on their own. This is especially critical in the 21st century, a time of rapid technological change, when skills must be constantly learned and relearned. Self-directed learners are efficient at planning and following through without prompting. They know how to identify and use a wide variety of resources and tools. They take appropriate risks and learn from their mistakes.

The literature shows that classrooms promoting self-directed learning develop students who are curious and willing to try new things (Garrison, 1997), view problems as challenges, desire change, and enjoy learning (Taylor, 1995). Taylor also found students in these environments to be motivated and persistent, independent, self-disciplined, self-confident and goal-oriented. All of these characteristics support the 21st century skills that students must acquire to be successful in their future endeavors.

The table below includes an overview of the methods, purposes, and instruments used for self-direction and collaboration. Links provide more detailed information and specific examples.

Assessment Method	Purpose	When Used	Instrument
Project Plan	Project plans help students take ownership of learning. Students identify goals, design strategies to meet goals, create timelines, and define criteria for assessment.	Use at the beginning of a project in conferences with students. Help students develop their own plan and review for feasibility and specificity.	▪ Checklists ▪ Prompts ▪ Forms
Self-Assessment and Reflection	Self-assessment and reflection provide students opportunities to assess their own 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	Peer feedback helps students internalize the characteristics of quality work by assessing the work of their peers.	Use throughout the project during group discussions, after a rough draft, or a final product or performance.	▪ Checklists ▪ Scoring Guide or Rubric ▪ Prompts ▪ Forms

Observation of Groups	Observation of group work supports assessment of collaboration skills.	Use throughout the project by taking notes, using checklists, and providing prompts while groups work together to complete tasks. Students also assess their own group work skills using checklists and reflections.	▪ Checklists ▪ Questions ▪ Reflections

Project Plans

Project plans are usually contracts between students and teachers that describe the components of a project, such the goals, the process for reaching the goals, a timeline, and criteria for assessment of learning. Plans are either developed solely by the students themselves or more often with teacher assistance. When students have a plan to refer to throughout the project, it helps them monitor their progress, adjust as necessary, reflect on the process, and ask for guidance when needed. This method balances students' choice in their learning with responsibility for expectations.

There are two distinct areas of assessment when using project plans:

- The resulting product or performance that is assessed by the criteria established in the plan
- The student's process of setting up and carrying out the project is also a performance that can be assessed

Initially, students need help setting goals and deadlines for these plans. Goal setting is critical because students need clear targets to measure their performance. Students often set goals and timelines that are too difficult to reach. Facilitate this process by questioning, negotiating, and helping students create feasible plans of action. Also consider modeling learning strategies such as predicting, questioning, clarifying, and summarizing, so that students will develop the ability to use these strategies on their own while they work on projects. Critical questions to ask include:

- What do you intend to learn?
- What strategies and resources will you need?
- What evidence will you produce to demonstrate your learning?
- What will be the criteria for assessment? How will you know you have been successful?
- What is your timeline for completing your learning?

During project implementation, control gradually shifts from the teacher to students. Students develop ownership in setting goals and deciding what is worthwhile learning and then continue to exercise a great deal of independence as they approach the learning tasks.

Some of the benefits of using project plans include:

- Encourages responsible self-directed learning
  - Helps students learn to plan and make decisions about their learning
  - Helps students learn to manage their time
- Allows for individual pacing
- Involves students in curriculum planning
- Targets meaningful tasks
- Provides students with clear goals and expectations
- Fosters self-reflection and self-assessment

Prompts to Encourage Self-Management of Projects

The questions in this checklist help students to direct their own learning.

Instructions: Use these questions to guide your work on the project:

- ☐ What do I know now?
  - I ask myself questions to help me think about what I know
  - I organize my current knowledge
  - I make predictions about what I think I'm going to learn
- ☐ What are my options?
  - I identify possibilities
  - I explore options
  - I make choices
  - I create opportunities
- ☐ What do I need to find out?
  - I plan my research strategy
  - I collect the necessary information to make an informed decision
- ☐ What choice will I make and how will I implement it? What goal setting strategies can I use now and in the future?
  - I synthesize the information into my own thoughts
  - I communicate the information thinking about my audience and purpose
  - I formulate a plan of action to pursue my chosen option
  - I modify my plan if new information arises that warrants a change
- ☐ Now what?
  - I evaluate the results of my actions
  - I use my learning to establish new actions or goals

Helping Students Plan Projects

Use these prompts to help guide students as they set goals and develop plans and timelines for completing their projects. The questions can be used during conferences.

Questions	Notes
Setting Goals ▪ What are your goals for the project? ▪ What is the purpose? ▪ Are there conflicting goals you need to consider?	
Designing a Plan ▪ Does your plan have a logical sequence of steps? ▪ Does it include the resources you need to complete the steps? ▪ Is your timeline evident? ▪ What are your priorities?	
Monitoring Progress ▪ What are any challenges? ▪ How will overcome them? ▪ If your first methods don't work, what will you do instead? ▪ Who or what can you use as a resource on this project? ▪ Do you have a plan for checking your progress? ▪ What will you do if you get behind? ▪ How will you know your work meets the criteria? ▪ How will you determine what more needs to be done?	

Reflecting ▪ Have you incorporated feedback into improving your project? ▪ What have you learned about yourself? ▪ What areas do you want to improve upon?	

Two Different Project Plans

The following project plans demonstrate different levels of control between teacher and student. Sample 1 is more teacher-directed than Sample 2.

Sample 1. Project Plan for our Water Unit

1. I will write a research paper answering the five questions I want to learn about my water topic.
    a. My water topic is _____
    b. The five questions I will answer are:
        i.
        ii.
        iii.
        iv.
        v.
    c. Things I need to do in order to complete this project:
    d. Materials or resources I will need:
    e. I will complete this by: _____

    This will be assessed using the Research Rubric.

2. I will create a display or model that demonstrates my understanding of my water topic. I choose to create a:
    a. Things I need to do in order to complete this project:
    b. Material I will need:
    c. I will complete this by: _____

    This will be assessed using the Construction Rubric.

3. I will write an editorial to our newspaper defending my opinion on a controversial water topic. I choose (please circle):

Industrial or farm pollution	Sewer run-off
Fish depletion	Recreational use
Water power	Selling water

Conservation/consumption
Floods/control
Irrigation rights
overuse
Water treatment
Dams
Groundwater

Other: _____

a. Things I need to do in order to complete this project:

b. Material I will need:

c. I will complete this by: _____

This will be assessed by our class-created Editorial Rubric.

4. In my group, we will decide on a question we would like to answer related to the science of water. We will design an experiment to answer our question. We will then either give a demonstration of our experiment to the class or ask them to participate in an activity.
   a. Our question is:

   b. Our members are:

   c. Things we need to do in order to complete this project:

   d. Material we will need:

   e. We will be ready to present by: _____

   This will be assessed using the Collaboration Checklist, the Design an Experiment Rubric and the Group Presentation Rubric.

Student Signature: _____ Date: _____

Parent Signature: _____ Date: _____

Teacher Signature: _____ Date: _____

Sample 2. Student Self-Directed Project Plan

This sample project plan is more student-directed.

1. **Generating Topics and Goal Setting**

   What would I like to know more about? Date: _____
   - Brainstorm ideas:

   What would I like to accomplish? Date: _____
   - Write goals for your project:

2. **Developing an Action Plan**

   Where can I find out more about my topic? Date: _____
   - Record possible sources of information:

   What is the best way to show my learning? Date: _____
   - Select a way to demonstrate your learning and write about your ideas:

   What do I need to work on my project? Date: _____
   - Make a list of materials and resources needed for your project:

   When will I do each part of my project? Date: _____
   - Make a timeline of steps leading to completion of your project. First brainstorm all the things you think you will need to do:

   - Now put them in sequence: Projected Dates:

3. **Implementation and Monitoring**

   How am I doing? Date: _____
   - Make a list of people who can give feedback on your progress and your work and who can help you find resources:

What changes do I need to make on my plan? Date: _____

- Reflect on your project timeline, the feedback you've received and write about changes and adjustments needed:

How will I judge my project? Date: _____

- Develop assessment criteria for the project. Decide what makes a quality project. Brainstorm parts to be assessed and establish levels of quality. Use example rubrics to help you decide. List the parts you will assess here and attach your full criteria when finished.

What do I need to do before I present? Date: _____

- Review your plan and vision for the project presentation, describe it and list the final things needing to be done.

Have I done everything I need to do? Date: _____

- Put materials together needed for presentation and practice in front of others for flow and timing. List names of those who listened and helped:

4. Assessment and Reflection

How did I do on my project? Date: _____

- Assess yourself and self-reflect using the rubric you created:

- Set possible future goals from what you've learned by working on this project:

Student signature _____ Date _____

Parent signature _____ Date _____

Teacher signature _____ Date _____

Self-Assessment and Reflection

Through self-assessment and reflection students learn to assess their own learning for the purpose of improving it. To become capable assessors of their learning, students must have clear goals, the opportunity to help create a definition of quality work, ongoing feedback, and the opportunity to correct or self-adjust their work before they turn it in. After finishing the project, students need to reflect on the strengths and weaknesses of their work, make plans for improvement, and integrate the assignment with previous learning (Paris & Ayres, 1994; Stiggins, 1997; Wiggins, 1998). Through self assessment, students become more responsible for their own educational growth; more reflective, autonomous, motivated, and effective.

Students' self-assessments are an essential part of guiding instruction because they provide further evidence of student efforts and achievements. Self-assessments improve communication because students become aware of areas in which they are having difficulties and are better able to articulate their needs (Kulm, 1994).

Self-assessment takes many forms, including:

- Writing conferences
- Discussion (whole-class or small-group)
- Reflection journals
- Self-assessment checklists
- Teacher-student interviews
- Rubrics

These types of self-assessment share a common theme: they ask students to review their work to determine what they have learned, how they have learned, and what areas of confusion still exist. Through these forms students assess their progress in knowledge, skills, strategies, processes, and attitudes. The *Assessing Projects* library has several sample self-reflection assessments to help students assess their individual efforts, their participation in a group, their thinking processes, their written assignments and presentations, and their performance of skills and processes.

Students do not learn to assess their learning on their own; they need to be taught strategies for self-monitoring and self-assessment. An effective strategy might be to:

1. Model using a checklist or rubric to assess a piece of writing using think-aloud strategies as you look at each criteria
2. Students try the technique themselves using one of their writing samples
3. Students review each others' writing and self assessment and make comments
4. Students discuss whether and how well the technique worked and what to do differently next time

An effective way to foster student self-assessment is to ask the students to develop the criteria for the assessments themselves. To do this, students must analyze the each aspect of their learning processes and products, thereby leading to a much deeper understanding.

Students' observations and reflections also provide valuable feedback for refining instructional plans. As students discuss their learning and the strategies they use, review the responses to see if students are learning what was expected, and then modify instruction as necessary. When students are given opportunities to suggest

how they can be helped in their learning and indicate what activities or instructional strategies have been most effective, they become more empowered and actively engaged in the learning process.

Methods to Foster Reflection

Closing Circle

At the end of the day or class, ask each student to share one thing they now know about a topic or a connection that they made. Make notes of responses requiring a follow-up discussion.

Exit Slips

Pose questions at the end of class and ask students to write a response in order to exit the class. Read the responses and plan necessary instruction.

Write a Letter

Students write a letter to themselves, another class, or to the subject they are studying. This helps students to think of connections in a very personal way. Use the reflections to assess understanding.

Reflective Journals

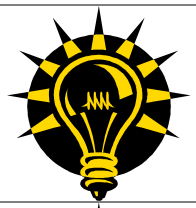
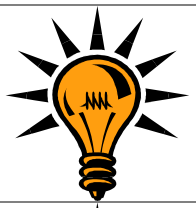
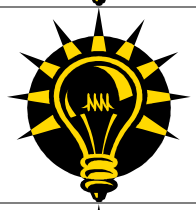
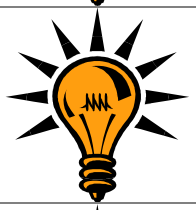
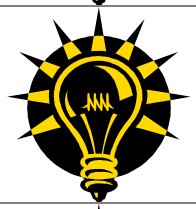
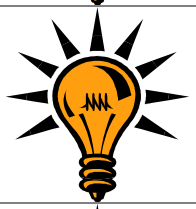
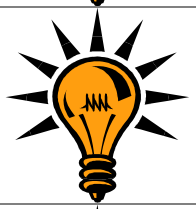
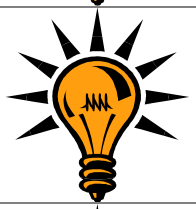
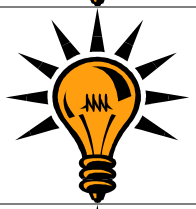
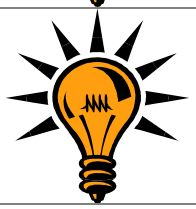
Students reflect on their own learning. Either provide guiding, reflective questions for the students to respond to or they can be left open-ended. Below are reflective question examples:

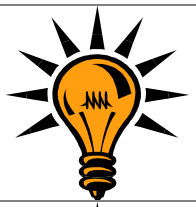
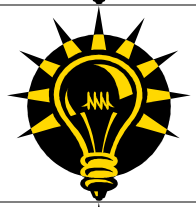
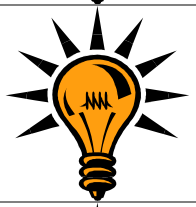
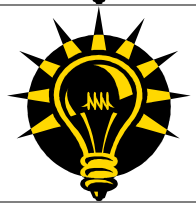
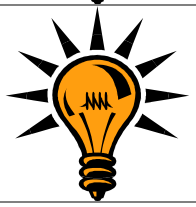
- I work best when….
- I do my best on activities that…
- I like to work with others when…
- The thing I like best about this is…..
- The most interesting part of this project is…
- I would like to learn more about…
- I wish I could improve on…
- I need to work on…
- The hardest thing for me to do is…
- I need help with…
- When I don't understand something, I…
- Before I start to work on a project, I…
- When I need to study, I…
- When I want to remember something, I…
- I learned that I could…
- I am good at…
- I have learned how to…
- I can help others with…
- I want to work on…
- I want to learn how to…
- I plan to get help with…
- I am going to take responsibility for…

Sample Primary Reflection Checklist

Use this checklist with primary students to help them reflect on their work.

During my project, I....

Tried new things			
Took turns			
Cooperated			
Asked/helped			
Solved problems			
Made good choices			
Checked my work			

Stayed on task			
Encouraged others			
Kept trying, even when stuck			
Did my best work			

Encouraging Peer Feedback

When providing feedback to peers, students are learning about learning by reflecting on the activities of other students. Students are forced to think analytically about their peers' performance and, in turn, they are able to extend that thinking to their own performance. Peer feedback encourages a greater sense of involvement and responsibility and helps students define what excellence looks like.

It is very important to set clear criteria for students when they provide feedback to their peers. They need to know what to look for in their peer's work. One way to ensure students understand this type of assessment is to give them a practice session with it. In this way, students can experience the process and become familiar with the procedure and what is expected of them before they conduct their first review.

One way to start is to provide two completed student samples, one at a very high level and one at a low level, so students can compare the strengths and weaknesses of each. Discuss the criteria with the class, passing out the checklist, rubric, or question prompts. In small groups students then apply the criteria to the student samples. This method allows for a rich discussion while students try to come to consensus about the criteria as it relates to each sample. When the small groups have finished, each group shares their thinking and feedback on the samples with the whole class so that all can benefit from the insights of others.

When students are learning how to give constructive feedback to their peers, teacher-made checklists and rubrics can give them the guidance they need. Once students have more experience, however, they can develop the checklists and rubrics for peer feedback themselves.

Group Presentation Peer Assessment

Distribute this form to students while they watch group presentations. Instruct them to look for the characteristics below and provide feedback to the group. Have them mark each characteristic with a:

+ for distinguished work (it can hardly be improved upon)
= for proficient work (it is good, but you can see some ways to improve)
- for apprentice work (there is much need for improvement)

Name: _____ Date: _____

Group I am observing : _____

- ☐ The group members are experts on their topic
- ☐ The group presentation is interesting (expressive voices, movement, interaction, eye contact with audience)
- ☐ The presentation has clear visuals that help me understand the topic in more depth
- ☐ All members participate very well in the presentation
- ☐ All members take the project seriously
- ☐ The group answers questions with detail
- ☐ The presentation makes sense (catchy beginning, middle with details, good conclusion)
- ☐ I learned something new from the presentation
- ☐ The presentation is well rehearsed (no mistakes, everyone knows there part)
- ☐ The group members speak in clear, loud voices so everyone can hear

Peer Presentation Assessment Guide
Composting Investigation and Presentation
***Score each group on a scale of 1-5 with 5 being the best.**

Student Team _____ Date _____

Project _____ Assessor _____

CONTENT	SCORE	COMMENTS
Research thesis or proposal is identifiable. Write the thesis or proposal in the Comments section as you understand it.	/5	
Information in the presentation is interesting, informative, and useful. Write four facts you learned or found interesting in the Comments section.	/5	1) 2) 3) 4)
Rate the compost design and experiment process on a scale of 1-5, with 5 being the best. Provide reasons for your rating.	/5	
Does the presentation address the unit questions, How can our community manage waste better? and How can composting today benefit the future? Answer the questions as you understand them from this team's presentation.	/5	
Does the presentation address the scientific concepts of conservation of mass and chemical reactions with understanding? How or how not?	/5	
PRESENTATION AND ORGANIZATION		
Technology tools are used to make the project more interesting.	/5	
Information is presented in a clear order.	/5	

Presentation shows clear evidence of proofreading and no noticeable mechanics, usage, and presentation errors. Sources are cited.	/5	
Presentation shows proof of collaborative effort among group members.	/5	
Presentation is varied and kept the audience's attention.	/5	
TOTAL POINTS **Project Grade:**	**/50**	

Peer Feedback of Critical Thinking

The following questions are provided to high school students as they review a peer's paper. These prompts help elicit constructive feedback, require critical thinking, and help focus the review on important aspects of the paper.

- What is the writer's purpose?
- What is the question-at-issue or problem being discussed?
- What is the thesis of what is being written? Paraphrase it below.
- List the main points of the paper.
- What are the writer's justifications for taking the positions he or she does?
- What is the strongest evidence for the writer's position? Why?
- What is the weakest evidence for the writer's position? Why?
- What are the implications of the advocated position?
- What are the assumptions underlying the writer's position?
- Give examples of the evidence, argument, and inferences in the paper.
- Has the writer taken into account alternative positions and opposing points of view, recognizing and evaluating evidence and key assumptions on both sides? Where?
- What is the point of view of the writer?
- Can you recognize where conclusions have gone beyond the evidence? Provide examples.
- Can you distinguish evidence from conclusions based on that evidence? Where?
- What do you find most compelling about this paper?
- What are parts don't you understand? Why?

When using these prompts during review, the reviewers must analyze content, the writer's reasoning, organization, and evidence during which time they are actively applying what they are learning about the subject matter, using critical thinking skills, and communication skills.

If you ask several peers to review each paper, many insights for the writer can emerge. For example, if different peer reviewers identify different theses, then the writer knows that the writing was not fully understood, and the thesis statement will need to be made clearer. Similarly, if most of the reviewers miss a main point, a key justification, or an important piece of evidence, the writer knows that part of the message was overlooked and needs more emphasis. What reviewers find to be the strongest and weakest evidence informs the writer about which content to highlight and which to downplay or edit out. When reviewers examine the writer's inferences, assumptions, conclusions, and implications, their own critical-thinking skills are put to the test.

The teacher can assess the peer reviewer's analysis and evaluation skills by using a rubric when reviewing their comments to the writer. The teacher can also assess the writer's ability to understand and successfully incorporate the feedback into the revision. This can be accomplished in many ways:

- The writer summarizes the feedback they received and notes the changes they made in their revised document.
- The writer completes a self-assessment of their own paper before the peer review and then compares this with the peer review and comments.
- The writer turns the peer review into a checklist and uses it before turning in the next draft.

- The writer discusses the feedback during a conference or in a journal to help develop strategies for improvement.

Peer Feedback Form

Your name: _____

Peer reviewer's name: _____

Title of project: _____

Two compliments about the work are:

_____

_____

_____

_____

Two suggestions about the work are:

_____

_____

_____

_____

Note: Have the peer reviewer use "I" statements for this step:

- I would like to know more about…
- I am not sure what this means....
- I would like to know more details about....

Any other ideas or comments:

_____

_____

_____

_____

Note: Keep this form to refer to as you revise your work**.**

Assessing Collaboration Skills

Assigning students to work in groups not only enables them to practice a variety of process and thinking strategies but provides for the perfect opportunity to assess these skills.

All of the following strategies can be observed and assessed while students are working together to complete tasks:

- Content and communication skills are observed while students grapple with the content and help each other understand.
- Leadership strategies are used when students participate in any of the various roles, and help move a group to achieve its goals.
- Negotiating strategies are observed when students present different ideas for the group to consider.
- Problem-solving strategies are observed when students work to resolve differences or seek alternative solutions.
- Analyzing strategies are used when students summarize points of discussion, simplify complicated ideas, or put points in perspective.
- Negotiating skills are used when the group is asked to reach consensus, a process skill that honors the opinions of all involved to come to an agreed-upon outcome.
- Synthesizing strategies are used when students are asked to present work or to facilitate on-going work.
- Feedback strategies are used to inform peers or the teacher about the group's process, the task, and other aspects of the group work.

A variety of methods and instruments can be used to assess these strategies while students work in groups, including: questionnaires, checklists, rubrics, and prompts. To help students become self-directed learners, provide them with these same instruments and ask them to conduct self-assessments and provide peer feedback. Examples of these types of assessments are available in the Assessment Library.

Collaboration Self-Assessment

The following checklist can be used by students to assess their collaboration skills. The *Assessing Projects* application has many more examples.

I help my team by:

☐ Organizing my learning: ☐ identify goals ☐ define tasks ☐ outline approaches
☐ Being a self-starter: ☐ suggest new ideas and directions ☐ volunteer to tackle a difficult task
☐ Seeking information: ☐ ask questions ☐ seek facts ☐ request clarification
☐ Providing information: ☐ find and share resources ☐ offer facts and opinions
☐ Encouraging members: ☐ respond enthusiastically to others ☐ invite everyone's participation ☐ make people feel good about themselves
☐ Analyzing: ☐ summarize points of discussion ☐ simplify complicated ideas ☐ put points in perspective
☐ Facilitating: ☐ keep discussion on track ☐ help direct creation of timeline and setting of priorities ☐ help direct division of tasks ☐ help identify necessary changes and encourage group action for change
☐ Questioning: ☐ stimulate discussion by presenting different points of view ☐ challenge weak ideas
☐ Problem solving: ☐ work to resolve differences ☐ seek alternative solutions ☐ help team reach fair, well reasoned decisions

Prompts for Observing Group Work

Use the prompts below while observing group work. As students become accustomed to teacher modeling of these questions, they will start using them with their peers.

Clarifying
Do you think that J means ....?
Can you explain that in a different way?
I don't quite understand what you mean?

Summarizing
What have you found out so far?
Where do you need to go still?

Listening
Did I understand you to say ...?
Am I right that you said .....?

Participating
What do you think about this?
What do others think?
Who agrees?

Facilitating
I'm not sure?
I don't know. What do you think?
How should we move forward?

Problem Solving
How else could you think about that?
What if someone said...?
There are some people who think that ...., what do you think?
How does this help you?
How would you decide about…?

Analyzing
How does that fit with what D said?
Is that the same as what N was getting at?
How is that different from M's idea?
Can anyone think of how that might happen?

Feedback
How have you listened and given feedback to others?
How effective are...?
What changes to ... would you recommend?
How would you have handled...?

Collaboration Self-Assessment

Examples of what I offered to the planning of the project:
1.
2.
3.
4.

Examples of what I contributed to the completion of project:
1.
2.
3.
4.

Examples of my ideas that helped make the project successful:
1.
2.
3.
4.

Examples of what I did to help our group stay on task:
1.
2.
3.
4.

Examples of strategies I used to resolve conflicts or problems:
1.
2.
3.
4.

What I enjoyed most about this project:

- Reasons:

What I learned from this project:

- Reasons:

Examples of changes I would try to do the next time I am working on a project:
1.
2.
3.
4.

Monitoring Progress

Teachers monitor the progress of their students by collecting information about learning processes and concepts while students are working on projects. By providing feedback based on this information, teachers can address misconceptions and other learning problems appropriately.

When data collected from assessments that monitor student progress is tied to timely, specific feedback, students can take more control over their learning by addressing specific areas of weakness and affirming areas of understanding and strength. Research shows that when feedback is specific, focusing on features of the task and on ways that students can improve, all students benefit, but struggling learners benefit the most (Black & Wiliam, 1998).

The table below includes an overview of the methods, purposes, and instruments used for monitoring progress. These methods help students and teachers stay on-track during a project. They 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 provide documentation of learning growth over time. Links provide more detailed information and specific examples.

Assessment Method	Purpose	When Used	Instrument
Informal Observations and Anecdotal Notes	Notes from observations support teaching adjustments and provide evidence for final assessments.	Use throughout the unit during group and individual work time.	▪ Notes collected in individual or group folders ▪ Checklists to help focus expected behaviors
Learning Logs	Logs are short regular updates in a project notebook, journal, or on a short form that are used with structured prompts	Review during progress checks, in project meetings, or conferences.	▪ Forms ▪ Prompts
Progress Checklists	Progress checklists are necessary where projects require students to meet specific requirements in sequence and on a schedule.	Use during team meetings or in conferences. Students use to monitor progress and help design or customize to meet their needs.	▪ Checklist with milestones, due dates, and approval stages
Progress Reports	Progress reports help students to document	Use during key stages of a project,	▪ Forms ▪ Prompts

Assessment Method	Purpose	When Used	Instrument
	progress or explain something new in their understanding. A report might be a rough draft, a storyboard, or data summary.	such as at outline or midpoint of the first draft.	
Project Meetings and Conferences	Project meetings allow for approval or signing off on student's 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.	Brief regular team and individual meetings throughout the project.	▪ Agenda, ▪ Goals ▪ Process Form

Informal Observations and Anecdotal Notes

Anecdotal notes are frequent written descriptions of observations while students are working. They provide a way to record aspects of students' learning that might not be identified by other techniques, such as physical behaviors and attitudes. Anecdotal notes should be taken on all students, although some students may warrant more entries than others.

Observe students while they are working in groups, at locations in the classroom specifically designated for assessment tasks, or while completing parts of a project. Objectively record what students say and do. The notes should serve as a reference to observed behaviors, attitudes, skills, concepts, processes, misconceptions, or insights students exhibit while working. The notes can also be used as a cross-check for student's logs or journals.

It is helpful to have specific ideas about what to look for in the observations: levels of understanding, strategies and abilities, or types of thinking. Observe and make notes on group work during a problem-solving activity or investigation. Circulate from group-to-group as the students work and listen to their conversations, make notes on what they understand, what they are having difficulty with, and how they are processing the information. Review the notes and look for patterns. The anecdotal notes may start to show that a student is consistently losing focus during group work. The notes may also show that the same question or misunderstanding keeps arising. Once again, use the recorded information to determine what may need clarifying or how to modify instruction to best meet the learning needs of the students.

Taking frequent observational notes can be a challenge for secondary teachers with large classes and limited time with their students. Careful planning can make it possible to collect anecdotal information even under these difficult circumstances. To make the best use of this strategy, teachers can

- Precisely identify and describe anticipated behaviors before taking notes so they can be recorded in as few words as possible. Develop a shorthand system that fits your needs and subject area.
- Use customized checklists of frequently observable behaviors whenever possible.
- Create a schedule for observing students, allowing more time for students who will need more feedback and support.
- Use technology to record, save, and organize your notes.

After a project has been completed, the sequence of dated anecdotes can serve as a record of students' development. Because anecdotal notes concentrate on describing student performance over a period of time, use them to assess long-term goals such as self-concept, collaborative group work, strategies development, work habits, knowledge attainment, and interests or attitudes.

Anecdotal Notes Example 1

Assessment Center: _____ Date: _____

Name	Name	Name
Name	Name	Name
Name	Name	Name
Name	Name	Name
Name	Name	Name
Name	Name	Name

Anecdotal Notes Example 2

Group Activity: _____ Date: _____

Name of Student: _____
Observations:

Group Activity: _____ Date: _____

Name of Student: _____
Observations:

Group Activity: _____ Date: _____

Name of Student: _____
Observations:

Observation Checklist

Observation checklists are lists of specific concepts, skills, strategies, processes, or attitudes that are important to observe in students at a particular time. They can help to assess communication skills, cooperative learning strategies, thinking skills, and the extent of participation during oral presentations, classroom performances, individual or group work time, or completion of an assessment center. Checklists are designed to quickly record the presence or absence of specific qualities or understandings, usually in a yes/no format. One example is provided below:

Observation Checklist for Thinking Skills

Thinking Skills Note when students are demonstrating each thinking skill in group or whole-class discussions (modify with alternate skills not included). Review for skills to emphasize more or for students needing encouragement or more instruction.									
Student Name									
Evaluate									
Generalize									
Infer									
Interpret									
Analyze									
Elaborate									
Abstract									
Analyze Perspectives									
Make Decisions									
Problem Solve									
Notes									

Learning Logs

Learning logs are for students to document specific accomplishments during classroom activity. Entries in consist of short, objective entries; they are brief, factual, concise, and impersonal. They might contain an explanation of a math

Plant Data Log											
Name: _____				**Group Member Names:**							
Date Seeds Planted: _____				**Date First Growth Appeared:_____**				**Final Measurement Date: _____**			
Week 1				**Week 2**				**Week 3**			
Date	Temp	Growth		Date	Temp	Growth		Date	Temp	Growth	
		inches	cm			inches	cm			inches	cm

problem-solving strategy, observations of science experiments, data collection, questions about readings, lists of outside readings, homework assignments, reminders, or anything else that lends itself to keeping records.

Learning logs are used by students for:

- Recording key ideas and questions for follow up
- Keeping track of daily accomplishments
- Making predictions about what will happen next
- Monitoring change in an experiment or event over time
- Recording steps taken throughout the project to refer back to in later projects
- Recording problem-solving techniques
- Keeping track of problems solved, books read, or homework assignments completed

Learning logs are used by teachers for:

- Monitoring progress throughout the project
- Checking for understanding and providing feedback as necessary
- Helping students redirect efforts

Sample Learning Log

Plant Growth Graph

2 ½ inches															
2 ¼ inches															
2 inches															
1 ¾ inches															
1 ½ inches															
1 ¼ inches															
1 inch															
¾ inch															
½ inch															
¼ inch															
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date

Notes:

Sample Checklists

Two sample project checklists follow: one for elementary and one for high school. The high school example comes from the *National Energy Plan* Unit Plan (http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/NationalEnergyPlan/VR_UnitPlans3.htm) within the *Visual Ranking Tool*.

Project Checklist for Elementary Research Project

(Mark the date when completed)

Name : _____ Date : _____

Topic : _____

Bring this checklist to the project meetings and be ready to discuss issues or concerns. Scheduled meetings:

_____ _____ _____

1) _____ Make a web of your topic with main ideas and sub-categories.
2) _____ Decide on 5 major research questions you would like to answer. Write them down and attach to your web.
3) _____ Collect the information/take notes using:
   - experiments, interviews, magazines, films, books, brochures, Internet, experts
4) _____ Organize the information:
   Main topics
   What order?
   Paragraphs
   Does it make sense?
   Conclusion
5) _____ Develop criteria for evaluating the project as a class. Check your work and adjust as needed.
6) _____ Present the information:
   - written or oral report:
     include visuals (maps, drawings, charts, illustrations, models, diorama)
   - skit, song, poem, interview, puppet show
7) _____ Assess the project:
   - Read two other reports and assess using rubric
   - Write a letter describing what you liked and what could be made more clear. Ask at least one question.
   - Evaluate own and self-reflect
   - Choose at least one goal to improve on

Project Checklist for High School Energy Project

Step 1: Research a State's Energy Consumption Patterns and Potential Energy Resources

Explore and take notes on the energy data at the Energy Information Agency State Energy Web page (www.eia.doe.gov/emeu/states/_states.html*) on your assigned state. Specifically, use the ***State Energy Information*** worksheet to note your state's strengths and weaknesses in regards to energy availability and energy consumed. Use this document to:

- ☐ Analyze your state's energy consumption and resources
- ☐ Compare the data with other states
- ☐ Use the information you learn to make decisions specific to your assigned state in the following steps.
- ☐ **Due Date:** Turn in the **State Energy Information** worksheet by
- ☐ **Due Date:** Complete project journal entry by _____

Step 2: Rank Priorities

- ☐ Within your group, elect a Chairperson to lead the discussion and a Spokesperson to record the choices and report the group's decisions.

  Chairperson:_____

  Spokesperson:_____

- ☐ Meet to discuss the priorities that matter most to your individual states in choosing energy options based on your understanding of your state's natural resources, energy consumption, and values of the citizenry.
- ☐ As a group, choose at least five priorities for choosing energy options:

  _____

  _____

  _____

  _____

  _____

- ☐ After the full class decides on the complete list of priorities, log in to the *Visual Ranking* workspace and rank the list based on the needs and interests of your subcommittee's states.
- ☐ Use the comment feature of the tool to describe the value and importance of that item to your states and why it is ranked at that particular spot.
- ☐ Compare your choices with other teams' rankings. Do you want to change any of your rankings?
- ☐ **Due Date:** Complete your ranking by _____
- ☐ **Due Date:** Complete project journal entry by

Step 3: Prioritize Energy Options and Create an Energy Plan

- ☐ Use the ***Energy Plan Choices*** document for information on 15 energy options for increasing or saving energy. Research any option if you need more information. Consider your own state's energy consumption and production history as you discuss possible energy plans.
- ☐ Rank the energy options using the *Visual Ranking Tool* according to your priorities and other criteria.
- ☐ Keep a running tally of the number of quads that each option saves or creates.
- ☐ Use the comment feature of the tool to describe the value and importance of the energy choice to your states and why it is ranked at that particular spot.
- ☐ Compare your choices with other teams' rankings. Do you want to change any of your rankings?
- ☐ **Due Date:** Complete your ranking by _____
- ☐ **Due Date:** Complete project journal entry by _____

Step 4: Compare Your Energy Plan Options with Previous Energy Policies

- ☐ Review energy policies held in the past. Use the following resources:

  American Energy Policy
  www.esru.strath.ac.uk/EandE/Web_sites/01-02/RE_info/usa.htm*

  Energy Timeline (View other time periods also from links at top)
  www.energyquest.ca.gov/time_machine/index.html*

  Jimmy Carter State of the Union Address 1980 (Last third of the speech)
  www.jimmycarterlibrary.org/documents/speeches/su80jec.phtml*

- ☐ How do your teams' decisions compare against those past policies? How are your plans different? How would your choice of plans improve the U.S. energy situation for the future over previous policies? Include at least five points for comparison.
- ☐ Use the **Energy Plan Comparison** worksheet to keep track of your findings.
- ☐ **Due Date:** Complete project journal entry by

Step 5: Compare Your Policy Options with the Energy Policy Act of 2005

- ☐ Compare your teams' decisions to the policies that are planned in the Energy Policy Act of 2005 (http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005*; the actual 550-page Act is also available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf* and a short overview is available at www.whitehouse.gov/news/releases/2005/08/20050808-4.html*)
- ☐ Review the Strategic Plan for Fiscal Years 2005-2008 for the Federal Energy Regulatory Commission (www.ferc.gov/about/strat-docs/strat-plan.asp*) energy policies for your assigned state, and the estimated costs (www.cbo.gov/showdoc.cfm?index=6581&sequence=0*) for the enactment of the Energy Policy Act. Update the **Energy Plan Comparison** worksheet with any new information.
- ☐ Use the **Energy Plan Comparison** worksheet to keep track of your findings.

☐ **Due Date:** Turn in the **Energy Plan Comparison** worksheet by _____

☐ **Due Date:** Complete project journal **entry** by _____

Step 6: Present Decisions and Findings

☐ Create an outline of your presentation. Use the Energy Plan Comparison document and Energy Plan Choices handout to provide support for your plan. Go over your team's plans in a conference with the teacher.

☐ Develop a 5-10 minute presentation to be made to the class explaining your top choices.

Presentations should include:

- ☐ Evidence that your plan will guarantee a reliable supply of energy sufficient to meet the demands of the American economy over the next 10 years (at least 13 quads of energy over 10 years)
- ☐ Evidence that your plan will promote continued economic growth
- ☐ Evidence that your plan will provide for the environmental welfare of future generations
- ☐ Impact (positive and negative) of different choices
- ☐ Justification for choices, including how much energy each produces or saves and any data estimates on how much it would cost to implement
- ☐ Comparison of your choices with previous policies and the Energy Policy Act of 2005
- ☐ Final conclusions/arguments

☐ Use the Energy Presentation Scoring Guide to self-assess and provide feedback to peers on their presentations.

☐ **Due Date:** Turn in presentation outline by

☐ **Due Date:** Presentation scheduled for

☐ **Due Date:** Complete last project journal entry and turn in project journal by _____

Notes:

Sample Elementary Progress Reports

Students bring the following forms to project meetings for progress checks and feedback. The storyboard helps ensure students are on track before they continue working. These forms come from the *Playground Design* Unit Plan within the *Visual Ranking Tool* (http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/PlaygroundDesign/).

Playground Map Progress Checklist

Use this checklist to plan, monitor, and assess your playground map to make sure it includes all project requirements. Bring this checklist to the project meetings.

Requirements	To Do	In Progress	Completed
We created a playground map to scale. All items on the map are in proportion.			
We planned a space that is safe. We left enough room between elements and did not overcrowd the playground.			
The map is 2-dimensional and was created from a bird's eye view. All objects are displayed as if you were looking down on them.			
We chose appropriate geometric shapes to represent each of the playground elements. If the picnic table is rectangular, we selected a rectangle to represent it.			
We labeled each playground item on the map. It is easy to read and see what each geometric shape represents.			
We included a map key. The scale is clearly indicated on the map.			

Playground Design Slideshow Progress Checklist

Use this checklist to plan, monitor, and assess your slideshow presentation to make sure it includes all project requirements. Bring this checklist to the project meetings.

Requirements	To Do	In Progress	Completed
We created a title slide that includes the project title and names of all team members.			
We created an introductory slide to explain our project.			
We explained the process we used to determine what items should be included in the new playground design.			
We used math to communicate and persuade. We used and displayed the data we collected to prove our points.			
We included the final *Visual Ranking* list.			
We included a chart that displays playground elements we are going to keep, add, or change. Our chart gives reasons for including or changing these items. The reasons include an evaluation of the data.			
We included a scanned picture of our playground map. The map is to scale and depicted from a bird's eye view. A map key is included.			
We addressed the Essential Question: *How can our voice be heard?* in the summary slide.			
We considered our audience.			
We put our best effort into creating high-quality work.			

Playground Presentation Storyboard

Use this storyboard to plan your presentation. Bring your draft to the project meeting for approval.

Date: _____

Title Slide	**Introductory Slide**
Process	**Data**
Visual Ranking List	**Chart of Playground Elements**
Playground Map	**Summary Slide**

Checking Understanding and Encouraging Metacognition

Metacognition, or "thinking about thinking" refers to the mental processes that control and regulate how people think. Metacognition is especially important in project work, because students must make decisions about what strategies to use and how to use them. Marzano's (1998) research of 4000 different instructional interventions found that those that were most effective in improving student learning were those that focused on how students think about their thinking processes and on how students feel about themselves as learners.

The table below includes an overview of the methods, purposes, and instruments used for checking for understanding and encouraging metacognition. These methods help teachers check for understanding while they help students think about their own learning. The same method can be used for both purposes but teachers must be explicit in helping students think about what and how they are learning through questions and prompts. Links provide more detailed information and specific examples.

Assessment Method	Purpose	When Used	Instrument
Written Journals	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 the project	Use throughout the project, at key points and at the end of the project.	▪ Prompts for entries ▪ Journal review plan
Video and Photo Journals	These journals capture visual documentation of progress, reactions and reflections or to demonstrate skill development.	Use throughout the project, but may be integrated into final products or performances.	▪ Outline of photo sequence and topic (shot list) ▪ Schedule for video scenes
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 structured interviews and observations throughout the project.	▪ Conference questions ▪ Observation by students ▪ Observation by teacher

Assessment Method	Purpose	When Used	Instrument
Informal Questioning	Questioning allows students to openly express their ideas and thoughts, enables them to reflect on other students' explanations, as well as make connections. Use to provide challenges, to assess student understanding, and revise lessons as necessary.	Use throughout the 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 within the project and at the end of the project.	▪ Test and quiz questions

Written Journals

Considerable research supports the role that writing can play in learning. Writing forces students to make their vague ideas explicit in language, allowing both teachers and students to examine and analyze their thoughts.

Journals consist of brief, informal entries written over time, prompt reflection and analysis of concepts or processes. They may be written in response to prompts designed to elicit specific understandings or misconceptions or they may be more open, allowing students to make decisions about what kind of reflection would be most beneficial for them.

Journals are designed to help students:

- Organize their reflections on the project and the process
- Document their work, feelings, thinking, needs, and attitudes for self-assessment during and at the end of the project
- Provide a place for them to write questions and comments for the teacher to respond

Journals are designed to help teachers:

- Gain insights into individual student learning, thinking, and group processes not evident in the product and not available through observations
- Compare early and late entries to determine student progress
- Provide early and on-going feedback to students and to get feedback on students' understanding of the project, process, or of a particular activity
- Reflect on their teaching and plan future instruction

Different types of journals can be used for different kinds of learning activities. Varying the method and format for journal-writing can help keep students engaged in reflecting on their writing.

Managing journals can be a challenge for secondary teachers where responding to individual journals in a timely manner can be overwhelming. One way to address this problem is to teach students effective strategies for assessing and responding to their peers' reflections. This ensures that students get constructive, frequent feedback even when a teacher is unable to respond. To collect the information necessary to plan instruction, teachers can read randomly chosen journals and target particular students' journals to read based on classroom observations. Finally, when students write to themselves as an audience, they can use their journal entries to reflect on their learning over time and describe how they used the writing to explore their own understanding. If the writing in the journals is an integral part of their learning, students can be motivated to take them seriously and to recognize the benefit of this self-assessment activity even without constant teacher feedback.

Journal Prompts

Using the prompts below, ask students to reflect in their journal about new learnings and their thinking processes. Review the entries to provide feedback, clarify misunderstandings and provide additional lessons if necessary. Also review journal entries at the end of the unit to assess understanding. Use the Journal Rubric to inform students of expectations and assess their ability to reflect.

Prompts: (for elementary and middle school students)

- This week I learned..... (ask students to create a concept map here as a variation)
- How well did you work with others in your group? What role did you take and how did it go?
- What helped or hindered you in learning today?
- Reflect on your progress and your efforts, areas of strength and weakness and provide specific examples…….
- What areas have you really improved on over the past week?
- What is challenging you right now? Why? What are your ideas for overcoming it?
- What is puzzling you?
- Write three questions you still have, two "ahas", and one suggestion for improvement.
- What is your opinion about….Why do you feel that way?
- Connect what you learned today to ……..
- What thinking skills did you use today?
- What are you learning about yourself from working on this project?
- What do you still want to know more about? How will you find out?

Prompts: (for primary students)

- What did I do? I worked on…….
- What did I already know? I knew that …….
- What did I learn? I learned that….., I learned how to….. Give examples
- What do I still need help with? I can't figure out….., It was really hard to….
- What do I want to know more about? I still have questions about…..

Structured Interviews

Structured interviews are regularly scheduled, formal times for students to interact with teachers. They may be brief or comprehensive, depending on the circumstances. Students are expected to prepare for a formal interview and may even know the questions they will answer in advance.

Structured interviews between the student and teacher help identify what students have learned, what they are having difficulty understanding, and what they still need or want to learn. They provide for a connection with students at a deeper level. The interviews also provide a time for students to present their work and gain firsthand knowledge about how their work is assessed. Students learn strategies that will improve their performance and help them to generate goals and next steps.

Several researchers have found that interviews are better than traditional assessment methods for determining students' reasoning and level of understanding; for diagnosing their misconceptions and missed connections; for identifying areas of strength; for discovering students' attitudes toward the subject; and for assessing their ability to communicate verbally about the subject areas they are studying. Interviews allow for the direct response to students' misconceptions and errors (Moon and Schulman, 1995; Stiggins, 1997).

Set up a formal time for the interview, calling a student aside as the class is involved in other activities. During the interview, ask students directly about their comfort level, needs, and interests. Students can set the tone when initial questions are asked such as:
How's it going?
What are you working on today?
What do you need help with today?

From there, the questions should draw the students into thinking out loud, explaining how they've worked on aspects of the project, what they've had difficulty with, or what conclusions they've made. Ask probing questions to encourage students to elaborate or think more deeply about the issues or problems. If students don't provide a complete answer, they may know a partial answer. Asking the right questions and allowing for plenty of "wait time" will provide teachers with a more accurate picture of students understanding. Some probing questions follow:

- Could you say more about that?
- Could you explain what you mean by…?
- Why do you think that?
- What were you thinking about when you said …?
- What do we know about this?
- Why do you think that happens?
- What reasons do you have for that?
- What would be an example of this?
- What evidence do you have about that?
- What does this remind you of?
- Do you see a connection between this and…?
- How else could you approach that?
- How could you do that?
- What does that tell us?
- Can you think of a situation where that wouldn't work?

- When wouldn't that happen?
- Is that the same as what you said earlier, or have you changed your mind?

Talk very little during the interview, resist the urge to teach, to give students answers or suggestions, or to pose leading questions. Write down a few key ideas and observations as the student speaks and then expand on the notes immediately after the session is over. For more accuracy, a tape recorder or video camera can be used.

Conference Questions

Schedule individual conferences to assess students' ability to reflect and "think about their thinking". The following questions are used during the conference to monitor thinking and provide feedback during the project. They can also prompt students to start monitoring their own learning.

Questions	Notes
Before Project ▪ Why are you learning this? ▪ What do you know from previous work that can help you with this project? ▪ What problems do you usually have with projects and how are you going to deal with them? ▪ How are you going to use your strengths in this project? ▪ How interested are you in learning this? ▪ How difficult will it be for you to learn? ▪ What are the critical questions? ▪ What should you do first? ▪ Do you know what you need to know? What questions do you need to ask? ▪ Where can you find answers to these questions? ▪ How much time will you need to do this? ▪ What can you do during this project that will challenge you?	
During Project ▪ What do you do when you are working on a project and you find yourself unable to do something? ▪ What are some strategies you can use to keep on track? ▪ What do you notice about your thinking? ▪ How did you remember that information? ▪ Are you checking your understanding as you work? How? ▪ Are there other ways you could work that may be better? ▪ How can you see an error if you make one?	

▪ How could you expand on this? What is the logical next step? What is missing? What needs to be filled in? ▪ When might it be a good idea to revise something? Why do you think that is so?	
After Project ▪ What can you tell me about your project? ▪ What is the most important thing you learned from this? Why? ▪ What did you think was easy to do and hard to do? Why? ▪ What changes would you want to make? ▪ Did you meet all of your goals? ▪ How did your planning contribute to the success of the project? ▪ What did you learn about yourself by doing this project? ▪ How has your thinking affected your learning? ▪ What goals can you set for the future? ▪ How can you apply your learning to new situations?	

Students Observing Thinking

How do we assess a process that goes on primarily inside the brain? Teachers often use checklists to observe student behaviors. The following activity is used to observe thinking, but in this case it is used to help students see and understand their own thinking and the thinking of others.

1. Present the class with a problem to solve in small groups.
2. Hand out the Problem-Solving Checklist and ask each group to review.

Problem-Solving Skills	Comments
Responds positively to complex problems	
Maintains concentration in active environment	
Persists with challenging problems	
Takes a systematic approach to support decisions and conclusions	
Identifies all of the key elements of the problem	
Represents problem in symbols	
Uses equations	
Works backward	
Chooses effective notation	
Makes tables and diagrams	
Builds models	
Simplifies the problem	
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	
Makes generalizations to other cases	

3. Ask students in each group to choose a person to be the observer who will:
    - Observe the rest of the group solving the problem and record in the checklist observations about the strategies and processes the group uses as they work.
    - Make check marks or brief comments when observing any of the behaviors listed in the chart.
    - Coach the group in problem-solving strategies.
4. After giving students time to work on the problem, ask the students being observed to check the thinking strategies they think they used and compare them to the observers. Have them discuss their thinking strategies and support their statements with evidence.
5. Ask students to reflect in their journals about any new understandings they take away from the activity.

This checklist can be adapted to include other thinking skills and processes. For example, students could analyze a short story and use a checklist of literature analysis skills

Questions for Assessing Thinking

Use this Assessment Checklist to monitor and guide student thinking as students work in teams to classify items into categories.

Create Categories

Questioning Strategies	Assessment Checklist
1. What kind of an item is this? 2. What is the relationship between _____ and _____? 3. How is _____ like _____? 4. How are _____ and _____ different? 5. Can you distinguish between _____ and _____? 6. Can you separate the _____ from the _____? 7. Which one doesn't belong in this group? 8. Why are you grouping the items that way? 9. Can you separate these items into more distinct categories? 10. Why are you putting _____ and _____ together? 11. Can you think of descriptive names for the categories you've created?	Circle the letter of the skill or strategy that is apparent in each group's discussion. 1. Students can identify common features and compare and contrast items. 2. Students can differentiate between general categories and specific items. 3. Students can generate reasonable categories and explain their reasoning. 4. Students can create appropriate names for categories. **Comments** **Team 1** **1 2 3 4** **Team 2** **1 2 3 4** **Team 3** **1 2 3 4** **Team 4** **1 2 3 4** **Team 5** **1 2 3 4** **Team 6** **1 2 3 4**

Refine Categories

1. Are you sure you want to categorize the items that way? 2. Are there ways that items in the same category are different? Are these important differences? Would this make a difference in your categories? 3. Take two items that could create a new category and put them together and ask them in what new category they might belong. 4. Try re-categorizing the items	1. Students can see flaws in their reasoning. 2. Students can see multiple ways of categorizing. 3. Students can evaluate the best categories and explain their reasoning. **Comments** **Team 1** **1 2 3** **Team 2** **1 2 3** **Team 3** **1 2 3**

into different groups. Do these groups more accurately reflect the characteristics?	**Team 4** **1** **2** **3** **Team 5** **1** **2** **3** **Team 6** **1** **2** **3**

Finalize Categories

1. What is the overall theme of this category? 2. What generalization can you make from this information? 3. Think of good names for your categories. • Are they short with just a few words? • Do they accurately describe the items in them? 4. Do all of the items fit in the category or do you need to move some to other categories or create new ones? 5. Can think of any additional items that would fit in the category? 6. Are some of your items more important to the category than others? 7. Are your categories as refined as they can be?	1. Students can generalize categories that include multiple items. 2. Students can prioritize items based on the degree to which their features relate to the category description. 3. Students can finalize their category descriptions to include all appropriate items and exclude all irrelevant ones. 4. Students can elaborate the categories by generating additional appropriate items and describing those items in more detail. **Comments** **Team 1** **1** **2** **3** **4** **Team 2** **1** **2** **3** **4** **Team 3** **1** **2** **3** **4** **Team 4** **1** **2** **3** **4** **Team 5** **1** **2** **3** **4** **Team 6** **1** **2** **3** **4**

Informal Questioning

Questioning is a valuable part of the assessment process because it helps establish what students already know, asks them to use and extend this knowledge, and then to develop new ideas. Questions that have students to use higher-order thinking skills help them use their knowledge to problem solve, to analyze, and to evaluate. These types of questions reveal the most about whether or not a student has truly grasped a concept. This is because a student needs to have a deep understanding of the topic in order to answer this type of question.

Probe students' initial responses to help them clarify ideas, support a point of view, or extend their thinking. It also helps to allow plenty of “wait time” so that students have an opportunity to formulate a thoughtful response. Questioning helps students think and express their ideas and also provides insight into areas needing further study. Good questions will challenge common misconceptions, set up a conflict, or address areas of ambiguity.

Informal Question Examples

While circulating around the classroom and observing group discussions, pose the following questions to assess students' critical-thinking abilities. Keep notes on individual students and use during conferences to provide feedback and to assess at the end of the project.

Examples of Questions	Notes
Questions of clarification: ▪ Could you give me an example? ▪ Is your basic point ___or___ ? ▪ How does_____ relate to _____? ▪ Could you explain that further? ▪ Why do you say that?	
Questions that probe assumptions: ▪ What is being assumed? Why would somebody say that? ▪ How would you justify taking this view? ▪ Is this always the case?	
Questions that probe reasons and evidence: ▪ How could we go about finding out whether that is true? ▪ Is there reason to doubt that evidence? ▪ What would be an example? ▪ What led you to that belief? ▪ What criteria do you base that argument on? ▪ Why do you think that is right? ▪ How does that apply in this case? ▪ By what reasoning did you come to that conclusion? ▪ Who is in a position to know if that is the case?	
Questions about viewpoints perspectives: ▪ How would other groups or types of people respond? Why? What would influence them? ▪ How would people who disagree with this viewpoint argue their case?	

▪ Did anyone see this another way? ▪ What is an alternative? ▪ What would be another way of saying that?	
Questions that probe implications and consequences: ▪ What effect would that have? ▪ If this and this are the case, then what else must also be true? ▪ What are you implying by that? ▪ How do you know you've considered the consequences?	
Questions about the question: ▪ To answer this question, what questions would we have to answer first? ▪ Is this the same issue as…? ▪ How is that question going to help you? Can you think of any other questions that might be useful? ▪ Is this question easy or hard to answer? Why?	

Demonstrating Understanding and Skill

The tables below include an overview of the methods, purposes, and instruments used for demonstrating understanding and skill. Links provide more detailed information and specific examples.

Assessment Method	Purpose	When Used	Instrument
Products	Products are things that students create and build that show learning. (Examples in table below.)	Often completed at end of project, but depends on product and length of project.	Rubrics or Scoring Guides
Performances	Performances are demonstrations, productions, and events that students design and conduct to show learning. (Examples in table below.)	Often presented at end of project, but depends on product and length of project.	Rubrics or Scoring Guides
Portfolios	Portfolios allow for the assessment of students' progress, processes, and performance over time.	Accumulate work and reflections over the course of a project, semester, class, or year.	• Checklists • Rubrics or Scoring Guides • Reflection Questions
Student-Led Conferences	Student-led conferences require students to organize and communicate their learning by sharing their 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

Products and Performance Tasks		
Products	Reports	Historical research, scientific research, journal article for publication, policy recommendations
	Designs	Product design, home design, building or school design blueprints, transportation alternatives
	Constructions	Models, machines, exhibits, dioramas
	Essays	Letters-to-the editor, guest column for local newspaper or community publication, book and movie reviews, story writing
	Artistic expressions	Pottery, sculpture, poetry, fine art, posters, cartoon, mural, collage, painting, song writing, movie script
	Print media: books, pamphlets, brochures	Nature trail guide, self-guided walk through community history, public service announcement, history scrapbook, photo timeline, investigative documentary, commercial, training manual, animation/cartoon
	Multimedia: informational kiosk, video, photo journal, slideshow, digital book	
Performances	Presentations	Persuasive proposal, inspiring speech, debate, informative lecture, research analysis and conclusions, newscast
	Skill demonstrations	Science laboratory processes, constructions, specific sports skills, teaching or mentoring younger students, on-demand tasks
	Artistic/creative performances	Interpretive dance, play, skit, character study, docu-drama, readers' theater, radio plays
	Simulations	Mock trial, reenactment of historical event, role-play

Product and Performance Assessment

Products and performance assessments emphasize what students can do or create, not just what they know. This type of assessment provides information about how students understand and apply knowledge, as well as their thinking and reasoning. Use performance-based assessments to make observations on a student's performance within a specific time frame and setting. Checklists, scoring guides and rubrics are created before the observation takes place and are then shared with students so that they know the requirements or necessary skills in advance and can prepare for them. This allows students the freedom to work on those skills or areas where they feel they might be weak.

When students create products, such as models, presentations, and publications, their work is authentic, resembling the kind of work that people do in real life. A carefully designed product assessment will require critical thinking and problem solving, the deep understanding of relevant concepts and the proficient use of appropriate skills. Product-based assessments also allow students to make some choices about format and topic so they can use their strengths and interests to support their learning.

Effective product and performance-based assessments must address several factors. Determining the purpose of the assessment is paramount to a successful assessment. To help focus on important aspects, ask the following questions:

- What concept, skill, strategy, or knowledge am I trying to assess?
- What should my students know?
- At what level should my students be performing?
- What type of knowledge is being assessed: reasoning, memory, or process? (Stiggins, 1994)

After establishing the purpose, define the criteria to use to determine the success of the student's product or performance. You may find existing assessments that prove to be very useful, but it is important to note that some of the criteria may include too many skills or concepts, or they may not fit the needs exactly. We recommend a review of the traits and descriptors and an adaptation for the purposes before applying any of them to performance-based assessments.

Airasian (1991, p. 244) suggests completing the following steps when determining or adapting the criteria for a specific purpose:

- Identify the overall performance or task to be assessed, and perform it.
- List the important aspects of the performance or product.
- Try to limit the number of performance criteria, so they can all be observed during a student's performance.
- If possible, have groups of teachers think through the important behaviors included in a task.
- Express the performance criteria in terms of observable student behaviors or product characteristics.
- Don't use ambiguous words that cloud the meaning of the performance criteria.
- Arrange the performance criteria in the order in which they are likely to be observed.

Valuable information is gained about how to help students improve when utilizing these performance-based assessment strategies. Using the criteria determined in advance and observing the process as well as the product, provides for a careful analysis of student performance as well as opportunities to look for patterns related to teaching and learning goals. This allows for the modification or development of instructional practices to facilitate growth among all students. When analyzing collected data, questions to consider include:

- Did successful students use a different approach than less successful students?
- Were the less successful performers hindered by misconceptions and how might they have developed these misconceptions?
- Where in the process did students run into difficulty?
- What kinds of errors did they make?
- Are there certain traits that students have difficulty with?
- Are there consistent misconceptions across the class that need addressing?

Rubrics and Scoring Guides

Rubrics come in a variety of forms and levels of complexity, however, they all contain common features which:

- Focus on measuring stated objectives which are often defined by **traits** or dimensions (of performance, behavior, or quality)
- Describe performance for each **trait** at several levels with **descriptors**

In the *Assessing Projects* exemplary library, all rubrics have **4 levels** of quality or competency arranged from highest to lowest level. *Assessing Projects* rubrics are defined as general or trait-specific. General rubrics provide a big picture overview of the objective and are not defined by specific traits. This Collaboration rubric is an example of trait-specific:

Collaboration Rubric

Traits	4	3	2	1
Contribution to Group	I contribute consistently and actively to the group discussions I accept and perform all of the tasks I take on I help the group set goals I help direct the group in meeting our goals	I contribute to the group discussions I complete my assigned tasks I contribute to setting our goals I contribute to meeting our goals	I contribute inconsistently to the group I complete my assigned tasks with encouragement I contribute sporadically in setting our goals I have trouble in meeting goals	I choose not to participate I do not complete my assigned tasks I get in the way of the goal setting process I delay the group from meeting goals
Cooperation with Group	I share many ideas and contribute relevant information I encourage other members to share their ideas I balance my listening and speaking	I share ideas when encouraged I allow all members to share I can listen to others I show sensitivity to other people's feelings and	I share ideas occasionally when encouraged I allow sharing by most group members I listen to others sometimes I consider other people's	I don't like to share my ideas I do not contribute to group discussions I interrupt when others are sharing I do not listen to others

	I'm concerned about others' feelings and ideas	ideas	feelings and ideas sometimes	I'm not considerate of others' feelings and ideas

This rubric is a general rubric that does not define specific traits for critical thinking:

General Critical Thinking Rubric

4	3	2	1
I can tell what the most important parts of the information I'm studying are. I use my own knowledge to make inferences and draw conclusions about information and check to see if I'm right. I do whatever I need to do to learn more about ideas and concepts that are new to me. I can thoroughly and clearly explain in speaking or writing my opinion on a topic and give reasons for it.	I can usually tell what is most important about information. I use what I know to draw conclusions and make inferences about information, and I usually check to see if I'm right. I make an effort to learn more about ideas and concepts that are new to me. I can explain my opinion and give good reasons for it.	Sometimes I get important ideas mixed up with unimportant details. With help, I make inferences about information, but sometimes I do not have good reasons for them. If someone reminds me, I learn more about ideas and concepts that are new to me. I can usually explain my opinion, but I do not always have good reasons for it.	I usually can't tell the difference between what's important and what isn't. I have difficulty making inferences. I am usually happy with what I already know about information and do not bother to find out more. I cannot explain my opinion.

Scoring Guides

Assessing Projects distinguishes scoring guides from rubrics in that they include points or ratings at each level to help in determining scores.

Scoring Guide Example 1

This example looks very similar to a rubric, except for the addition of a multiplier to add weighting for each trait.

4	3	2	1
Key equations and mathematical solution _____x 8 = _____			
Equations show mastery of understanding and organization.	Equations show good understanding and organization.	Equations show developing understanding and organization.	Equations are limited or nonexistent.
Excel graph showing a mathematical representation _____ x 5 = _____			
Graph is logical and has sufficient detail. The visual solution is clearly evident.	Graph is reasonable. All parts are shown, and the solution is evident.	Graph is limited, and the visual solution is incomplete.	Graph is incomplete or absent.
Comments and problem insights _____ x 2 = _____			
Comments are highly effective, and the message enhances the solution.	Comments are relevant, and the message supports the solution.	Comments need additional work, but the message relates to the solution.	Comments are incomplete, and the message does not support the solution.

Scoring Guide Example 2

This example of a scoring guide looks similar to a checklist, but includes **indicators** for rating the expectations.

5	4	3	2	1
Exceeded expectations. Expectations were met and expanded on, well beyond the scope of the project.	Met all expectations and included some extra elements or details to enhance the project.	Met the expectations.	Came close to meeting the expectations but was missing one or two minor elements or details.	Did not meet the expectations and was missing crucial elements.

Expectations	Weight	Score
Research paper and presentation provided an overview of genetic engineering in agriculture.	X 2	
Research paper and presentation provided a supported investigation of the social, ethical, and monetary issues around the benefits and risks of GE agriculture, especially related to the concerns of Ixtapa.	X 5	

This example of a scoring guide below asks primary students to rate how well they worked on a project. The key provides some information for rating, but is not as detailed as rubric descriptors or the indicators for the scoring guide example above.

Scoring Guide Key

= Always

= Sometimes

= Never

I worked hard.			
I helped my group complete the slide with the correct information.			

Grading with Rubrics

Using rubrics to assign grades to performance tasks requires educating students and parents, who are accustomed to tests and quizzes. Grades derived from rubrics reflect a wider variety of knowledge, skills, strategies, and processes than traditional exams do, and, consequently, they require a more sophisticated understanding of quality. The following sections show how three different kinds of rubrics can be used to assign grades to products and performances.

Trait-Specific Rubrics with Single Descriptors

Trait-specific rubrics can be converted into scoring guides for grading by assigning point values to levels of performance. The possible point value of a trait should take into account the relative value of different traits. In the example below, organization of data is assessed, but is not given more points than complete data.

Learning Log Scoring Guide

	10	9	8	7
Data	My data is detailed, thorough and complete.	My data is complete.	My data is somewhat complete, but some pieces might be missing.	My data is incomplete and several important pieces are missing.
	5	4.5	4	3.5
Organization	My data is organized so that I can quickly and easily find the information I need. Other people can also find information if they need it.	My data is organized so that I can find the information I need.	My data has an organizational plan, but it is sometimes difficult to find what I need.	My data is not organized carefully. It is very difficult for me to find the information I'm looking for.
	5	4.5	4	3.5
Appearance	My log is neat and attractive, and my writing is easy to read.	My log is neat, and my writing is easy to read.	Parts of my log are messy, and sometimes my writing is hard to read	My log is messy, and often my writing is hard to read.
				Total Points: 19/20

Trait-Specific Rubrics with Multiple Descriptors

Assigning grades using rubrics with multiple descriptors at each level requires a more comprehensive look at the trait. Descriptors within a level of a trait may not all be equally important. A particular product might meet some descriptors at one level of a trait and others at a different level. Sometimes, the number of descriptors is not consistent in different levels. Some components, creative interpretations, for example, while significant in the higher levels of the rubric, would simply not appear in the lower levels.

When using detailed rubrics to assign grades to complex performance tasks, circle or highlight the descriptors that apply to a particular piece of student work. Then use professional judgment to assign a grade by giving points for each trait or by looking at the overall quality of the work

The following example shows how a rubric that has multiple descriptors at each level of a trait can be used to give a grade. This kind of grade is somewhat subjective in that the teacher must generate a score that seems appropriate without actually adding up specific points. If the scores are consistent and fair, students adjust to this kind of grade and appreciate the more detailed feedback from this style of scoring.

Poster

	4	3	2	1
Content (60 points possible) Your Points 57/60	My poster demonstrates in-depth understanding of relevant concepts. My poster has a purpose and conveys a theme that says something important and interesting about the topic. The theme and purpose of my poster are surprising, original, and meaningful.	My poster demonstrates understanding of major concepts. My poster has a purpose and conveys a theme that says something about the topic. The theme and purpose of my poster are meaningful.	My poster demonstrates that there are gaps in conceptual understanding. My poster attempts to reflect a purpose and theme that say something important about the topic, but the theme is shallow or poorly conveyed, and the purpose is vague and confusing. The theme and purpose of my poster are predictable.	My poster shows significant gaps in conceptual understanding. My poster does not reflect a theme or purpose related to the topic.

Design (15 points possible) Your Points <u>13/15</u>	I effectively and creatively use lines, shapes, mass, texture, and color to make my poster interesting, attractive, and meaningful. My images are relevant to the content and add meaning to the overall meaning of poster. My poster is balanced, and all the elements work together to create a focused message.	I effectively use lines, shapes, mass, texture, and color to make my poster interesting, neat, and attractive. My images are relevant to the theme of the poster. My poster is fairly balanced and most of the elements work well together.	I use lines, shapes, mass, texture, and color in predictable ways, and my poster does not attract a viewer's attention. Some of the images relate to the content of the poster. My poster is slightly unbalanced and some elements detract from the overall message.	My use of lines, shapes, mass, texture, and color is careless and sloppy, and my poster is unattractive and unappealing. My poster is unbalanced and the elements do not work together to present a unified message. Few of my images relate to the overall poster. OR My poster has no images.
Creativity (15 points possible) Your Points <u>12/15</u>	I use text, graphics, and layout in unusual, surprising, and appropriate ways to communicate meaning in my poster.	I use text, graphics, and layout in unusual and appropriate ways to make my poster interesting and attractive.	I try to use text, graphics and design in unusual ways, but they are not always effective. OR My poster is generally predictable in appearance and theme.	The unusual elements I include in my poster are inappropriate or ineffective. OR I make no attempts to include unusual elements in my poster.
Conventions (10 points possible) Your points <u>10/10</u>	My poster contains no errors in written conventions My poster manipulates conventions effectively, when	My poster has a few errors in written conventions that do not distract the reader from the meaning.	I have some errors in written conventions that detract from the meaning of my poster.	Multiple errors in writing conventions distract from the meaning of my poster.

	appropriate, to make my poster more interesting and meaningful			
Grade: 92/100				

General Rubrics

General rubrics that do not specify individual traits can also be used to assign grades, but they provide students with little concrete information about their performances..

This rubric about a persuasive speech describes what speeches that receive different grades look like in general. It does not give specific feedback, such as which public speaking skills could be improved but does give students a general idea of how their speech compares to standards.

Persuasive Speech

A	B	C	D
The student used effective public speaking skills, such as eye contact, posture, and volume. The student showed an awareness of the audience. The student used many credible facts and sources to persuade the listeners. The speech began with an introduction that engaged the audience and ended with a good conclusion.	The student used effective public speaking skills, such as eye contact, posture, and volume, most of the time. The student showed some awareness of the audience. The student used some credible facts and sources. The speech began with an introduction and ended with a conclusion.	The student sometimes failed to use effective public speaking skills. The student showed limited awareness of the audience. Some of the student's facts were not credible. The speech did not have either an introduction or a conclusion.	The student rarely used effective pubic speaking skills. The student showed little awareness of the audience. The student included no facts or facts that were not credible. The speech was missing an introduction and a conclusion.

Helping Students and Parents Understand Grading with Rubrics

Students and parents who are accustomed to grades from tests and quizzes, need to learn how grades derived from rubrics reflect a wider variety of knowledge, skills, and processes than traditional exams. Grading with rubrics can never be as precise as counting correct answers to a multiple-choice test. This is to be expected because work that requires deep understanding and higher-order thinking is not as easy to describe and assess as facts or basic skills. It is important to communicate how to use rubrics to assign grades, particularly if students have not been graded with this method in the past. Teachers can avoid misunderstanding by showing examples of

rubrics and how grades were calculated so that students and their parents, will learn the reasoning behind grading with rubrics.

Some of the anxiety over grades can also be avoided when students' learning has been assessed in a variety of ways throughout a unit. Multiple assessments can prepare students for final grades on projects by letting them know frequently where their weaknesses and strengths are. If students are having trouble with a particular skill, strategy or topic, a final product assessment will not be the first time they hear about it.

The primary reason to use rubrics and scoring guides is to increase the quality of work. They define clear expectations and force students to be responsible for the work they create. With the use of rubrics, students are able to articulate what they've learned and know exactly what they need to do to be successful. Rubrics and scoring guides are assessments that provide for clear communication with students, teachers, and parents. This communication allows everyone involved to understand the expectations and ensures student learning and success.

Portfolios

Student portfolios are purposeful and organized collections of student work assembled over a period of time that tell the story of a student's efforts, progress, and achievement. Use them to assess student growth, overall learning, and the process by which work is done, as well as the final product. Portfolios support assessment of difficult attributes, such as creativity and critical thinking, responsibility for learning, research strategies, perseverance, and communication skills.

Students participate in the selection of the items in the portfolio as well as the development of the guidelines for selection. Most items in the portfolio are accompanied by reflections which explain why each item is evidence of some significant learning. When undertaking the process of producing a portfolio, students take ownership and responsibility for their learning by establishing ongoing learning goals and assessing their progress towards those goals.

Consider including the following items in the portfolio:

- An effective solution to a difficult problem
- An creative use of technology to demonstrate understanding
- An application to an out-of-school situation
- A piece showcasing higher-order thinking
- Something a student is proud of
- Something that demonstrates the attainment of a goal
- Something a student enjoyed learning or doing
- Something that shows great improvement over previous efforts (include the first piece for comparison)

When establishing the criteria for assessing the portfolio, discuss the following questions with students:

- Does your portfolio show growth or change over time? Does it show how you've improved?
- Does it include the process of how you worked as well as the final product?
- Does it include thoughtful reflections on your achievements and learning?
- Does it include goals for future work?
- Does your portfolio contain an adequate amount of information?
- Does your portfolio show how well you do various tasks?
- Does your portfolio contain adequate variety in the types of items included?

Portfolio Checklist

Provide this checklist for students to help in gathering their work for the portfolio. Ask them to indicate the date when they complete each component.

Section One: Introduction		**Section Six: Self-Directed Learner**	
	Table of Contents		Research Sample
	Reflective Introduction		Reflection
	Goal Sheet		Project Plan
			Reflection
Section Two: Scientific Inquirer			
	Work Sample # 1	**Section Seven: Collaborator**	
	Reflection #1		Project Sample
	Work Sample # 2		Reflection
	Reflection # 2		Peer Feedback
Section Three: Mathematical Problem Solver		**Section Eight: Communicator**	
	Work Sample # 1		Project Sample
	Reflection #1		Project Summary
	Work Sample # 2		Presentation Sample
	Reflection # 2		Presentation Summary
Section Four: Creative Risk Taker		**Notes**	
	Work Sample		
	Reflection		
Section Five: Decision Maker			
	Community Service Overview		
	Reflection		
	Journal		

Portfolio Rubric

4	3	2	1
I have included a wide variety of items in my portfolio that show my learning completely	I have included a variety of items in my portfolio that shows my learning	I have some items in my portfolio that shows my learning, but they are incomplete	I have included items that are routine and show little learning
My organization of the contents is clear, detailed, and aesthetically pleasing	My organization of the contents is clear	I have given some attention to detail, organization and aesthetics, but it is not always clear	I have not organized my portfolio or thought about aesthetics
My self-assessments are multidimensional including reflections about a wide variety of traits: ▪ process (self-direction, goals, collaboration, communication) ▪ thinking (creative, critical, problem solving) ▪ products and performances (strengths, needed improvements)	My self-assessments are multidimensional and include reflections about most of the traits	My self-assessments may be multidimensional but lack specific details and breadth	My self-assessments are one-dimensional: either global statements or statements focusing on only one aspect of the work
My work shows a strong commitment to improvement such as peer input, sharing, revisions, evidence of process	My work shows a commitment to improvement	My work shows some commitment to improvement	My work does not show commitment to improvement
My problem solving involves using various resources in expansive and meaningful ways	My problem solving involves using various resources efficiently	My problem solving depends on repetitive use of strategies and resources	My problem solving process shows limited use of resources, lack of confidence and lack of motivation

My work shows that I've gone beyond the established criteria in setting goals and meeting them	I have set goals and met them	I have set goals but they are restrictive or have not grown or shifted over time	I have not set goals

Reflection Questions for Portfolios

Analysis Questions

- How have you organized your portfolio and why is it in this order?
- Why have you chosen these particular pieces to demonstrate your learning?
- Which piece in your portfolio are you most proud of? Why?
- What piece would you like to remove from this collection? Why?
- What makes this your best piece?
- How did you go about creating it?
- What problems did you encounter? How did you solve them?
- Of all the items included, which one was the hardest for you?
- What makes your strongest piece different from your weakest piece?
- What goals did you set for yourself? How well did you accomplish them?
- Why did you select this piece of work?
- What was particularly important to you during the process of creating this work?
- How does this relate to what you have learned before?
- Which piece would you most like to improve? Why?
- What is the one thing you would like someone to notice about your portfolio? Why?
- Do you feel that this collection of work really reflects your abilities and what you have achieved this year? Why or why not?

Change Questions

- How is your work at the end of the class different from your work at the beginning?
- Has the way you plan work changed over time? If so, how?
- How did you learn to do …….?
- Has your persistence changed since the beginning of the class? How?
- What have you been working on this year to improve? Has it improved? Why or why not?
- What is getting easier for you?
- What do you still not understand?
- What do you feel most confident about?
- What was the most significant thing you learned?

Student-Led Conferences

When students take responsibility for sharing their learning during conferences, the increased accountability moves the student from passive recipient of information shared between teacher and parent, to active participant in a three-way interaction. In student-led conferences, the teacher takes on a much less active role during the conference and acts solely as the facilitator of the discussion if needed.

Prior to the conference, students must be adequately prepared and provided with guidelines for the conference. It cannot be assumed that students will possess the self-confidence, organizational skills, and communication skills necessary to lead a successful conference. To help students gain confidence, set up role-play situations, provide students with forms, prompts, and the necessary time to collect, prepare, interpret and reflect on the information they will share with parents. Both teachers and peers should provide feedback to assist students in improving their presentations and collected information.

Student-led conferences provide an excellent opportunity for students to share the contents of portfolios and to explain why each piece was selected for inclusion. Students can point to specific work that reflects the grades they've received such as scoring guides from project work, test scores, homework assignments, pieces of writing showing the writing process, class participation and collaboration checklists, as well as the number and types of missing assignments. Students can also share learning goals, accomplishments, strengths, and areas needing improvement.

After the conference is complete, provide forms for parents to assess the effectiveness of the conference and ask students to reflect on the process. This feedback can prove to be invaluable in assessing how well students are progressing in taking ownership of their learning and how well the conference structure is working for parents.

Schools employing the student-led conference model note that parent attendance at conferences has increased (Hackmann, 1996) and assert that over 90% of parents and students prefer the student-led conference. Students report increased self-confidence and personal satisfaction with being directly involved in the conferences. Parents begin to recognize their children's ability to assume increasing levels of responsibility and appreciate the opportunity to strengthen the lines of communication with their children. Citing a more positive and relaxed conferencing atmosphere, teachers report a reduced conference preparation workload and diminished levels of teacher stress during conferences (Hackmann, 1996).

Conference Self-Assessment

The following form is an example for students to use when preparing for student-led conferences.

Name _____ Date _____

ACCOMPLISHMENTS:
1.
2.
3.

STRENGTHS:
1.
2.
3.
4.

AREAS THAT I CAN IMPROVE:
1.
2.
3.
4.

GOALS:
1.

2.

3.

4.

Student-Led Conference Prompts

This piece of work is an example of:

I want you to notice…..

I am especially proud of……

This piece of work shows how I used to……..

But now I……

The most difficult part was……

This piece of work was my favorite because……..

This piece of work was my least favorite because……..

This piece shows how well I work with others because……..

This piece shows how I take charge of my own learning by…….

This piece shows how I've learned to use thinking skills by……

You can see how much I've improved in…….because…..

This piece shows how I still need to improve in……because…..

These pieces show how I met my goals because……..

These pieces show how I can assess my own learning because…….

These pieces show I can reflect because……..

Sample Product Rubrics

Science Investigation Rubric

	4	3	2	1
Research Problem	I describe my research question clearly, completely and in great detail. I make pertinent predictions that can be researched and tested. My hypothesis is based on conjectures with conditions.	I describe my research question clearly. I make reasonable predictions that can be researched and tested. My hypothesis is based on conjectures with some conditions.	I describe my research question but some elements are missing. My predictions may be difficult to research or test. My hypothesis lacks some conjectures or conditions.	My research question is missing, flawed or incompletely described. My predictions are not testable. My hypothesis is missing or not based on conjectures.
Information Gathering	My collection of relevant scientific background information focuses on the research question. My search of the literature includes many diverse, relevant sources: books, magazines, Internet, interviews. My gathered information has been described completely, with no content errors,	My collection of scientific background information is related to the research question. My search of the literature includes an adequate amount of relevant, diverse sources. My gathered information has been described completely, with only minor content errors, misstatements of fact, or	My collection of scientific background information includes some information that is not relevant to the research question. My search of the literature includes some diversity of sources and/or the quantity is minimal. My gathered information has not been described completely or	My collection of scientific background information is not relevant to the research question. My search of literature is limited by lack of diversity and quantity of sources. I provide a limited description of the background information.

	misstatements of fact, or misconceptions.	misconceptions.	there are major content errors, misstatements of fact, or misconceptions.	
Experimental Investigation	My investigation is a well-constructed test of the hypothesis and includes a detailed experiment that answers the research question completely. I include a clear step-by-step description of the experimental procedures: identify, address, and control all relevant independent and dependent variables. include materials with labeled diagrams and drawings of any equipment used to carry out the experiment describe safety measures in detail My investigation can be replicated exactly as described	My investigation is a reasonably-constructed test of the hypothesis and includes an experiment that answers the research question. I include a step-by-step description of the experimental procedures: identify and address most of the independent and dependent variables; control of variables is included include materials and diagrams and drawings, but not clearly labeled mention safety measures employed I've organized the information so that the investigation can be replicated.	My investigation is an incompletely-constructed test of the hypothesis which has small errors or answers the research question to some extent. I include a step-by-step description of the experimental procedure that misses some key details: identify and address some of the independent and dependent variables; attention given to the control of variables include materials; equipment might be mentioned, but not shown describe some safety measures I've organized the information, but some parts are missing, making it	My investigation is not relevant to the hypothesis or has serious errors. My description of the experimental procedure lacks key details: fails to address key independent and dependent variables; does not provide adequate attention to control of variables no mention of equipment used to carry out experiment no mention of safety measures My information is not sufficient to replicate the investigation.

			difficult to replicate.	
Data Collection and Display	I have a detailed description of my methods for collecting data and it has been collected in the most efficient and appropriate ways. My statistical analysis procedures are clearly organized and I explain my reasons for choosing them. All of my original data is included. My data is accurately recorded and displayed and all variables are labeled.	I have a description of my methods of collecting data and a reasonable amount of data has been collected in a sufficient manner. My statistical analysis procedures are valid and organized and contain few errors. Most of my original data is included. My data is recorded and displayed but my variables are unlabeled.	My description of the methods of data collection is incomplete and a minimum amount of data has been collected. I include some statistical analysis procedures and some original data. My data is recorded and displayed but may not include labels or legend.	My description of the methods of data collection is absent and insufficient data has been collected. I do not include statistical analysis of the data. My data has not been recorded or displayed or it has been done so incorrectly.
Analysis and Conclusion	My conclusion includes a restatement of the hypothesis, supports or refutes it and explains the role of the experiment in making the decision. My analysis includes identification of patterns, concepts, meanings or structures in the data and is used as evidence to support my statements.	My conclusion includes a restatement of the hypothesis and supports or refutes it. My analysis uses data in support of statements. My analysis includes identification of sources of error. My conclusion includes comparisons and interpretations and makes some inferences or deductions.	My conclusion provides some relationship to the hypothesis. My analysis refers to data in the body of the report as support. My analysis suggests the possibility of error but identifies no sources. My conclusion compares or interprets some of the information, but does not	My conclusion shows no relationship to the hypothesis. My analysis does not use data to support my arguments My analysis does not address the possibility of error. My conclusion does not interpret information

	My analysis includes identification of sources of error and explains the effect on results. My conclusion includes comparisons, interpretations, inferences or deductions from the research information and prior knowledge. I recognize and discuss the scientific or societal implications of my research, propose solutions, and recommend new avenues of experimentation.	I discuss how the research is useful and propose solutions or recommend new avenues of experimentation.	make inferences or deductions. I state that the research is useful, but provide no reasoning and I suggest some solutions or further investigations, but they may not completely relate to the conclusion.	or make inferences or deductions. I do not discuss the usefulness of the research and do not recognize solutions which follow from the knowledge gained.

Designs: Playground Design Project Rubric

The following rubric is taken from *Playground Design,* a unit plan in *Visual Ranking (*http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/PlaygroundDesign/).

PLAYGROUND DESIGN PROJECT RUBRIC				
CATEGORY	**4**	**3**	**2**	**1**
Content	We carefully and accurately collected, graphed, and analyzed data. We consistently used data to make decisions, solve problems, and effectively persuade others. We used appropriate geometric models to plan, problem-solve, and design a playground correctly to scale that makes the best possible use of the space.	We collected, graphed, and analyzed data. We often used data to make decisions, solve problems, or persuade others. We used appropriate geometric models to plan and design a playground correctly to scale that makes good use of the space.	We collected, graphed and analyzed data, but with some errors. We sometimes used data to make decisions, solve problems, or persuade others. We used geometric models to plan and design a playground that was mostly to scale, but we could have made better use of the space.	We attempted to collect, graph and analyze data, but our work has many errors. We rarely or never used data to make decisions, solve problems, or persuade others. We used geometric models to design a playground, but the scale was incorrect and/or we did not use the space well.
Visual Representation	We used a detailed and organized chart and accurately scaled map to communicate playground design elements. We displayed our data using bar graphs that are accurate, easy to read, and that support and prove key points of the message. We included the final *Visual Ranking* list and explained in detail how we arrived at	We used a chart and scaled map to communicate playground design elements. Items may contain minor errors but they do not interfere with the message. We displayed our data using bar graphs. The graphs are accurate and support key points. We included the final *Visual Ranking* list and explained how we arrived at the list.	We used a chart and map to communicate playground design elements, but the chart is somewhat disorganized and/or the scaled map contains several errors which interferes with the message. We displayed our data using bar graphs. The graphs contain a few errors and/or don't always appear to support key points. We included the	We attempted to use a chart and map to communicate playground design elements, but the chart is incomplete and or disorganized and the map is not to scale or contains many errors. We attempted to display our data using bar graphs, but the graphs contain many errors or are difficult to read. Graphs fail to support key points.

	the list and how it helped us to make decisions.		final *Visual Ranking* list.	We failed to include the final *Visual Ranking* list.
Decision-Making Processes	We used several different decision-making processes to create a safe and enjoyable playground design.	We used some decision-making processes.	We needed assistance in choosing decision-making processes.	We did not use decision-making processes.
Communication	We clearly explained the processes we used to decide which items to include in the new playground design. We effectively used math to communicate and persuade. Our data proved our points. We clearly and effectively addressed the Essential Question: *How can our voice be heard?*	We explained the processes fairly well. We used math to communicate and persuade. Our data supported our points. We addressed the Essential Question.	We tried to explain the processes, but our explanation was often confusing. We attempted to use math to communicate and persuade, but our data only partially supported our points. We attempted to address the Essential Question but our message was unclear.	We did not explain the processes or our explanation was very confusing. We did not use math to communicate and persuade. Our data did not support our points. We did not address the Essential Question.
Presentation and Organization	Our information is presented in an organized way. We planned our presentation with our audience in mind. The presentation was directed to our targeted listeners.	Most of our information is presented in order. We considered our audience.	Some of our information is out of order. At times we appeared to consider our audience, but we were not consistent throughout the presentation.	Our information is disorganized. We failed to consider our audience.
Completion	We successfully completed all parts of the task.	We completed most parts of the task.	We completed some parts of the task.	Our work is incomplete.

Constructions Rubric

	4	3	2	1
Innovative Design	My ideas for the design are complex, detailed and show imagination and creativity. My ideas include numerous alternate concepts and solutions.	My ideas are simple and show some imagination and creativity. My ideas include a few concepts and solutions.	My ideas are limited and show repetition of single ideas. My ideas include few concepts and solutions.	I can't come up with ideas without help. I can't think of alternate concepts or solutions without help.
Content	I explain the simple machines used in my design and provide detailed background information about how they work. I thoroughly explain the energies used in my design with accurate and detailed illustrations, diagrams, and words.	I explain how the simple machines work in my design. I explain the energies used in my design.	I try to explain how the simple machines work in my design, but there are some inaccuracies. I try to explain the energies used in my design, but there are some inaccuracies.	I do not explain how the simple machines work in my design, or my explanations are inaccurate. I do not explain the energies used in my design, or my explanations are inaccurate.
Design Process	I identify, control, and evaluate all of the variables that influence the stability, strength, and power of my catapult. I clearly identify the problems that occur and seek innovative and creative solutions. I keep detailed, accurate logs of my research and testing. I make predictions before each test. I include an accurate critique of the data and make new predictions based on the evidence. The reader can see how I made informed modifications after each test.	I identify, control, and evaluate most of the variables that influence the stability, strength, and power of my catapult. I clearly identify the problems that occur and seek appropriate solutions. I keep accurate logs of my research and testing. I make predictions before each test and use my data to help inform my modifications.	I identify, control, and evaluate some of the variables that influence the stability, strength, and power of my catapult. I identify problems that occur and seek solutions that often don't work. I keep inconsistent logs of my research and testing. Sometimes I predict and use my data to make informed modifications to my design.	I don't identify, control, or evaluate the variables that influence the stability, strength, and power of my catapult. I totally redesign rather than find solutions to specific problems. I keep poor logs of my research and testing. There is no evidence of making any modifications based on my data.
Structural Design	My construction is well thought-out, creative, and goes beyond expectations. My catapult works with ease.	My construction is sturdy and well-built. My catapult works.	My construction is sloppy and my catapult falls apart on many trials or it does not catapult the object.	My construction of a catapult does not work at all.
Write-up	My write-up includes explanations of the whole design process, initial sketches and notes, list of materials	I have all the pieces present, but not all of the details.	I have some omissions of required items. I have little	I have left out most of the required items or they are of very poor quality.

	needed, graphs of trials and data log, and final scale design drawing with dimensions. The rationale for my design choice is clear. My scale design drawing is accurate and labeled. My graphed data is complete and accurately reflects the data. The reader can understand and rebuild my catapult exactly as I designed it when looking at my drawings and reading my explanation.	I have included the rationale for my design choice, but it may be unclear. My scale design drawing may be somewhat unclear or under-labeled. My graphed data shows most of the data I collected and it accurately reflects the data. Some features of my design are not clearly explained or illustrated, though the reader can usually infer what has been left out.	explanation of the rationale for my design. My scale design drawing is of poor quality: it may not be to scale or I might not have included dimensions or major pieces are missing. My graphed data inaccurately displays the data I collected. My explanation and drawings do not allow the reader to understand or reproduce my design without asking questions.	I have not provided a logical rationale for my design. My design drawing is just a simple illustration without regard to helping the reader rebuild my catapult. I don't include graphed data or it inaccurately displays data I collected or it is made up data. The reader has no clue at all what my catapult looks like or how it's supposed to work.

Essays: Persuasive Writing Rubric for Middle School

	4	3	2	1
Ideas	I clearly state a position on a controversial topic.	I state a point of view on a topic.	I try to state a point of view on a topic, but it is unclear.	I do not state a point of view on a topic.
	My topic is narrow enough to be covered thoroughly.	My topic is narrow enough to be covered adequately	My topic is a bit too broad to be covered adequately.	My topic is too broad to be covered adequately.
	I explain what I want readers to do as a result of reading what I have written and why it will have a positive effect.	I suggest some kind of action for readers to take after reading what I have written.	I try to suggest an action for readers to take.	I do not suggest an action for readers to take.
	I effectively and honestly use appeals to reason, character, and emotion to make my case.	I use appeals to reason, character, or emotion to make my case.	I try to use appeals to reason, character, or emotion to make my case, but they are not very effective.	I do not use appeals to reason, character, or emotion to make my case.
	I correctly cite sources.	I correctly cite sources, with only superficial errors.	I try to cite sources but I may do it inaccurately	I do not cite sources.
	I use multiple, credible sources to support my point of view.	I use more than one credible source to support my point of view.	Some of my sources are not credible.	Many of my sources are not credible.
	I think about what my readers would need to know in order to agree with me and include that information.	I address readers' questions and concerns.	I try to address readers' questions and concerns, but I leave out some important points.	I do not address readers' questions and concerns.
	I discuss opposing viewpoints and I explain why my view is better by citing sources and using sound	I explain why my view is better than opposing viewpoints. I explain why	I explain why some opposing viewpoints are invalid, but my reasoning is faulty.	I do not explain why opposing viewpoints are invalid.

	reasoning.	opposing viewpoints are invalid using sound reasoning.		
Organization	My introduction states my point of view and engages the readers.	My introduction states my point of view.	My introduction is unclear about my point of view.	I do not have a clear introduction.
	I present my evidence in a logical order that builds toward a powerful conclusion.	I present my evidence in an order that builds toward a logical conclusion.	I try to present my evidence in a logical order, but some parts don't really fit.	There is no order in the way I present my evidence.
	I use a variety of words, phrases, and structures to connect ideas so they flow in a logical order and build on each other naturally.	I use words and phrases to connect ideas.	I try to connect my ideas, but sometimes they sound choppy.	My ideas do not connect to each other.
	My writing flows at a pace appropriate for the audience and the topic, elaborating when appropriate.	My writing flows at an appropriate pace, not spending too much or too little time on each topic.	Sometimes I spend too much or too little time on the topics in my writing.	The pace of my writing is inappropriate for the topic.
	My paragraphs break the writing up to help the reader understand the topic.	I use paragraphs appropriately.	I have some paragraphs but there may be too many or too few.	I do not have paragraphs.
	My conclusion emphasizes my point of view and what I want my readers to do in a memorable way.	My conclusion summarizes what the writing was about.	My conclusion is unclear in summarizing what the writing was about.	I do not have a conclusion.
Voice	I express a sincere belief in what I am writing.	My writing shows that I care about what I am saying.	I try to convey a belief in what I am writing about.	I write as if the writing is just an assignment to complete.
	I am respectful to my readers and to opposing opinions.	I do not put down other people's opinions.	I try to respect all opinions, but sometimes I act disrespectfully to other points	I treat opposing viewpoints disrespectfully.

			of view. I rarely include meaningful, personal details, even when it would be appropriate.	I do not reveal anything about myself in the writing.
Sentence Fluency	My sentences are varied in length and structure to enhance meaning. My sentence beginnings are varied and interesting. My writing has rhythm and sounds effortless when read aloud. I use sentence fragments appropriately to enhance interest and meaning.	My sentences are generally varied in length and structure. My sentence beginnings are often varied. My writing has rhythm.	The length and structure of my sentences vary a little. I attempt to vary sentence beginning structures, but some are repeated. Some parts of my writing have rhythm, but other parts are choppy and awkward.	The length and structure of my sentences are repetitive. Many of my sentences begin in similar ways. My writing does not have rhythm.
Word Choice	My language is precise, specific, and accurate. I use powerful and interesting words and phrases to create memorable pictures in the readers' minds. I use technical terms sparingly and, if they are necessary, I define them in easy-to-understand language.	My language is generally accurate. I use interesting words to engage the reader. I define important technical terms.	My language is sometimes vague, general, and not descriptive. I use predictable, uninteresting language. I do not define all the important technical terms.	My language is general and predictable. I do not define technical terms.
Conventions	I make no errors in spelling, punctuation, or capitalization.	I make no spelling, punctuation, or capitalization errors that detract from	I make some errors in spelling, punctuation, and capitalization that detract	Errors in conventions make my writing difficult to read and understand.

	I use Standard English throughout the writing. I successfully manipulate conventions of spelling, punctuation, and Standard English, when appropriate, to enhance meaning and style.	meaning. Standard English is used throughout the writing.	from what I am trying to say. I sometimes use nonstandard English.	I frequently use nonstandard English.

Artistic Expressions: Poster Rubric

	4	3	2	1
Content	My poster demonstrates in-depth understanding of relevant concepts. My poster has a purpose and conveys a theme that says something important and interesting about the topic. The theme and purpose of my poster are surprising, original, and meaningful.	My poster demonstrates understanding of major concepts. My poster has a purpose and conveys a theme that says something about the topic. The theme and purpose of my poster are meaningful.	My poster demonstrates that there are gaps in conceptual understanding. My poster attempts to reflect a purpose and theme that say something important about the topic, but the theme is shallow or poorly conveyed, and the purpose is vague and confusing. The theme and purpose of my poster are predictable.	My poster shows significant gaps in conceptual understanding. My poster does not reflect a theme or purpose related to the topic. The theme and purpose of my poster are confusing.
Images	My images are relevant to the content and add meaning to the overall meaning of poster.	My images are relevant to the theme of the poster.	Some of the images relate to the content of the poster.	Few of my images relate to the overall poster OR my poster has no images.
Design	I effectively and creatively use lines, shapes, mass, texture, and color to make my poster interesting, attractive, and meaningful. My images are relevant to the content and add meaning to the overall meaning of poster.	I effectively use lines, shapes, mass, texture, and color to make my poster interesting, neat, and attractive. My images are relevant to the theme of the poster.	I use lines, shapes, mass, texture, and color in predictable ways, and my poster does not attract a viewer's attention. Some of the images relate to the content of the poster.	My use of lines shapes, mass, texture, and color is careless and sloppy, and my poster is unattractive and unappealing. Few of my images relate to the overall poster. OR My poster has no images.

	My poster is balanced, and all the elements work together to create a focused message.	My poster is fairly balanced and most of the elements work well together.	My poster is slightly unbalanced and some elements detract from the overall message.	My poster is unbalanced and the elements do not work together to present a unified message.
Creativity	I include unusual, surprising, and appropriate uses of text, graphics, and design to communicate meaning in my poster.	I include unusual and appropriate uses of text, graphics, and design in my poster.	I try to include text, graphics and design in unusual ways, but they are not always effective OR My poster is generally predictable in appearance and theme.	The unusual elements I include in my poster are inappropriate or ineffective OR I make no attempts to include unusual elements in my poster.
Mechanics	My poster contains no spelling, grammatical or typing errors. My poster manipulates conventions effectively to make my poster more interesting and meaningful.	My poster has a few spelling or grammatical or typing errors that do not distract the reader from the meaning.	I have some spelling and grammatical errors that detract from the meaning of my poster.	Multiple errors in writing conventions distract from the meaning of my poster.

Print Media: Food for Thought Menu Scoring Guide

This scoring guide comes from the *Food For Thought* Unit Plan within *Designing* (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/FoodForThought/).

Scoring Guide

3 - Exceeds requirements	1 – Falls short of requirements
2 - Meets requirements	0 – Does not address requirements

Requirements	Score	Weight	Teacher Comments
The menu includes a catchy tagline or slogan for the restaurant.		X 1	
The menu includes a description of the restaurant.		X 2	
The menu has a wide variety of items from all the food groups.		X 4	
The nutritional benefits of the items are reflected in the descriptions.		X 5	
The prices are reasonable for each item.		X 3	
The menu allows people to know about the restaurant (and others you may have) by listing the address, phone number, and operating hours.		X 1	
The menu has digital pictures, graphics, or scanned artwork.		X1	
The layout of your menu is professional looking, with items in columns and the appropriate number of pictures.		X 2	
Total Score			

Multimedia Project: Why Recycle? Slideshow Presentation

This scoring guide comes from the *Don't Trash the Earth* Unit Plan (http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/DontTrashEarth/ in *Designing Effective Projects.*

CATEGORY	4	3	2	1	Points	Total
Mechanics and Usage (10%)	One or less misspellings or grammatical errors. New vocabulary is used effectively.	Two or three misspellings and/or mechanical errors. Some new vocabulary is used.	Four misspellings and/or grammatical errors. Some new vocabulary is used but not effectively.	More than four spelling and/or grammar errors. Project has not been edited. Very few new vocabulary is used.		
Organization and Layout Design/ Graphics (20%)	Content is well organized using headings or bulleted lists to group related material. Graphics are informative and support the plan. Slides are visually appealing and readable.	Content uses headings or bulleted lists to organize information, but the overall organization of the topics appears flawed. Graphics are informative but do not support the plan. Slides are readable but lack appeal.	Content is logically organized for the most part. Slides are hard to read. Graphics are used but not all of them are informative or support the plan.	There is no clear or logical organizational structure, just lots of facts. Graphics are not used or do not support the plan or provide information.		
Workload (10%)	The workload is divided and shared equally among all team members. The final product is cohesive (seamless integration of work).	The workload is divided and shared fairly among all team members. There is evidence of some cohesiveness.	One person in the group is viewed as not doing a fair share of the work. Cohesiveness of the project is lacking.	Several people in the group are viewed as not doing their fair share of the work. The project has no evidence of cohesiveness.		
Content/Plan (50%) (see attached component description)	All seven components are included in the plan. Presentation is persuasive and original.	At least five components are included in the plan. Presentation shows some originality and some persuasion techniques are	At least four components are included in the plan. Presentation lacks originality and few persuasion techniques are used.	Three or less components are included in the plan. Plan is not persuasive or original.		

		used.				
Sources (10%)	Source information is collected for all graphics and information sources. Documentation is in the desired format. A variety of sources (at least seven) are from valid Web sites.	Source information is collected for all graphics and information sources. Documentation is mostly in the desired format. At least five valid sources are used.	Source information is collected for some graphics and information sources, but not documented in the desired format. Only a few sources are used.	No source information is collected. Information in the proposal shows limited research.		

Presentation Scoring Guide

National Energy Policy:
Developing a Coherent Plan

This scoring guide comes from the *National Energy Plan* Unit Plan (http://educate.intel.com/en/ThinkingTools/VisualRanking/ProjectExamples/UnitPlans/NationalEnergyPlan/VR_UnitPlans3.htm) within the *Visual Ranking Tool*

4	3	2	1
Research _____ x 2 = _____ **Comments:**			
▪ Research sources include a wide variety of handouts, Internet, and printed texts, and present varying perspectives. ▪ All research resources are reliable, relevant, accurate, well-documented (sources are cited), and known for their expertise.	▪ Several types of resources (handouts, Internet, texts) from varying perspectives are used. ▪ All of the research resources appear to be reliable, relevant, and accurate, but they do not all cite their sources.	▪ Several types of resources (handouts, Internet, texts) may be used, but they only reflect one perspective. ▪ The reliability of some of the sources is suspect because they are not from known expert sites. Some of the sources are out of date.	▪ Only one type of source is used (such as sources only from the Internet), and they only reflect one perspective. ▪ Some of the sources are from obviously biased and unreliable sources or are so out of date that they are misleading. ▪ Sources are not referenced.
Content _____ x 10 = _____ **Comments:**			
▪ Evidence provided shows the choices in	▪ Evidence provided is fairly clear on how choices in	▪ Evidence provided is missing some	▪ Evidence does not show how choices in your

your energy plan are reliable, sufficient to meet demands, supportive of economic growth, and environmentally sensitive. ▪ Presentation provides clear and compelling information on your plan's impact, justification, energy data, and comparisons to past and current plans. ▪ Final conclusions are very clear, well organized, and convincing. ▪ Evaluation of the energy problem is insightful and thorough.	your energy plan are reliable, sufficient to meet demands, supportive of economic growth, and environmentally sensitive, but some areas are not fully supported. ▪ Presentation provides information on your plan's impact, justification, energy data, and comparisons to past and current plans. ▪ Final conclusions are clear, fairly organized, and make a reasonable argument. ▪ Evaluation of the energy problem covers the main issues.	elements on how choices in your energy plan are reliable, sufficient to meet demands, supportive of economic growth, and environmentally sensitive. ▪ Presentation provides incomplete information on your plan's impact, justification, energy data, and comparisons to past and current plans. ▪ Final conclusions are presented, but are not organized in a logical manner. ▪ Evaluation of the energy problem misses some of the main issues.	energy plan are reliable, sufficient to meet demands, supportive of economic growth, or are environmentally sensitive. ▪ Presentation provides very little or no information on your plan's impact, justification, energy data, and comparisons to past and current energy plans. ▪ Final conclusions are incoherent or not presented. ▪ Completely misses the main energy issues.

4	3	2	1
Delivery _____ x 2 = _____ **Comments:**			
▪ Presentation is well rehearsed with smooth delivery. ▪ Team members have clear roles in the presentation and all are "experts" on the entire subject. ▪ Delivery is supported by effective visual media, including slides, props, or handouts.	▪ Presentation is fairly well rehearsed with good delivery. ▪ Team members have clear roles in the presentation and all are "experts" in their assigned area of the topic. ▪ Delivery is supported by slides, props, or handouts.	▪ Presentation is not well rehearsed and is disjointed. ▪ Team members are unclear about their roles in the presentation and only appear to know the content that is written on the slides. ▪ Some of presentation is delivered by reading the slides, rather than using the slides as "notes."	▪ It is obvious that the presentation has not been rehearsed. ▪ Team members are unclear about their roles in the presentation and do not know the content that is written on the slides. ▪ All of the presentation is delivered by reading the slides, rather than using the slides as "notes."
Mechanics _____ x 2 = _____ **Comments:**			
▪ Presentation is free of any grammatical or spelling errors.	▪ Presentation is free of most grammatical or spelling errors, but they do not affect the understanding	▪ Presentation has some grammatical or spelling errors, some of which affect the understanding of the presentation.	▪ Presentation has many grammatical or spelling errors, which seriously affect the understanding of the

	of the presentation.		presentation.
Layout/Design _____ x 1 = _____ **Comments:**			
▪ Design of the presentation is creative, clean, and attractive, supporting the overall purpose/message of the presentation. ▪ Graphics, charts, sounds, and/or animations reinforce the key points of the presentation.	▪ Design of the presentation is attractive, basically supporting the overall purpose/message of the presentation. ▪ Graphics, charts, sounds, and/or animations do not conflict with the key points of the presentation.	▪ Design of the presentation is somewhat distracting, and is confusing as to how it supports the overall purpose/message of the presentation. ▪ Graphics, charts, sounds, and/or animations sometimes conflict or distract from the key points of the presentation.	▪ Design of the presentation is distracting and difficult to view, and does not support the overall purpose/message of the presentation. ▪ Graphics, charts, sounds, and/or animations have nothing to do with the content of the presentation.
Individual Contribution _____ x 8 = _____ **Comments:**			
▪ Evidence of teamwork is obvious and your contributions greatly enhance the project. ▪ You are an expert in the subject matter. ▪ You are able to see the issues from multiple perspectives. ▪ You discuss possible solutions rationally and clearly in order to weigh their benefits and drawbacks to make an informed decision.	▪ Evidence of teamwork exists and your contributions enhance the project. ▪ You are an expert in your subject matter, but you could be more informed on other team members' content. ▪ You are able to see the issues from more than one perspective. ▪ You discuss a narrow range of solutions rationally in order to weigh their benefits and drawbacks, but some options are not considered.	▪ Evidence of teamwork is spotty and it is unclear how your contributions enhance the project. ▪ You do not know your subject matter well and have limited knowledge of other team members' content. ▪ You are able to see the issues from only one perspective. ▪ You discuss solutions with some bias, so you cannot clearly weigh those options' benefits and drawbacks. Some important options are not considered.	▪ There is no evidence of teamwork and you do not provide any meaningful contribution to the project. ▪ You do not know your subject matter well and have no knowledge of other team members' content. ▪ You do not understand the issues and/or have serious misconceptions. ▪ You discuss solutions with significant bias, so you cannot weigh those options' benefits and drawbacks. Important options are not considered.
Total Points: _____ out of 100	**Comments:**		

Skills Demonstration Rubric

	4	3	2	1
Determines the Problem	**Analyzes and Readily Understands Task** I show my understanding of the ideas and processes. I identify all of the important elements. I exclude unnecessary information.	**Understands Task** I show my understanding of some of the ideas and/or processes. I identify most of the important elements. I choose and use the necessary information but am confused by the unnecessary information.	**Partially Understands Task** I show some understanding of the ideas and processes but may not express them clearly. I identify some important elements. I assume information that is not correct or use unnecessary information.	**Misunderstands Task** I have trouble showing that I understand the ideas and processes. I need help identifying the elements of the task.
Chooses Strategy	**Develops Efficient and Workable Strategy** I change the problem into useful processes using correct terms and reasoning. I choose the most efficient skills, strategies, and processes I review my work using a different strategy and explain which strategy is easier to evaluate.	**Develops Workable Strategy** I change the problem into useful processes. I choose skills, strategies, processes that fit the problem. I review my work to see if it makes sense.	**Uses Appropriate Strategy Some of the Time** I use only part of the information given in the problem. I choose skills, strategies, processes that partially fit the problem. I review my work using the same strategy.	**Uses Inappropriate or Unworkable Strategy** I change the problem into incorrect processes. I can not choose skills, strategies, processes without help or I choose ones that don't work I don't review my work.
Applies Strategy	**Shows Explicit Evidence** I communicate effectively with complete responses. I have a clear,	**Infers Some Evidence But Not Always Clear** I have a clear response, but not as complete.	**Possible Evidence of a Plan** My response is incomplete and my explanation is muddled.	**No Evidence of Carrying Out the Plan** I leave out portions of the problem.

	coherent and logical explanation. I have strong supporting evidence I include examples and counterexamples. I include clear and elegant diagrams and models.	Some people may not understand my thinking. I include some supporting arguments. My diagrams and models fit the problem.	My arguments are incomplete and unconvincing. My diagrams and models are unclear.	I have errors in my response. My diagrams and models conflict with the problem.
Makes Connections	**Synthesizes and Generalizes** I go beyond the requirements of the problem. I find a relationship, connection, or extension to a new situation or concept. I ask, "What if……?, I wonder….."	**Connects and Applies Answer** I complete the requirements of the problem, but do not go beyond. If asked, I can connect and apply answer to a new problem, but I may not see relationships or connections to other concepts or situations.	**Partial Connection of Answer** I don't complete the requirements of the problem. I partially connect and apply my answer to a new problem. My connection may be incorrect.	**No Connections** I can not complete the requirements of the problem without assistance. My connections do not apply. I don't provide evidence that the solution makes sense.

Artistic/Creative Performances: Play Rubric

	4	3	2	1
Content	My play reflects an in-depth understanding of the main topic/purpose. What my play says about the topic is enhanced with unique and appropriate interpretations or extensions. My play has a theme and a purpose that say something important or interesting about the topic.	My play demonstrates understanding of the major concepts that relate to topic or purpose. My topic offers expected interpretations or extensions. My play has a theme that says something about the topic.	My play reflects some gaps in understanding of the topic or purpose of the performance. My topic offers few interpretations or extensions. My play attempts to say something important about the topic, but it does so ineffectively or inappropriately.	My play topic has gaps in conceptual purpose of the performance. My topic has no interpretations or extensions. My play says nothing important about the topic but is simply a series of events.
Plot	My play has a well-developed plot that includes a series of major and minor events in a logical order that lead to a turning point.	My play has a plot that includes a series of events that logically lead to a turning point.	My play has an underdeveloped plot with some inconsistencies and illogical events. There is no clear turning point.	My play's plot is undeveloped. There are too few events to lead to a turning point.
Character Development	My play has a mixture of well-developed, believable major characters and minor characters that move the plot along and support the theme. The relationships among my characters are realistic and well developed and support the theme.	All my major characters are well-developed and believable. The relationships among characters are realistic and support the theme.	Some of my major characters are underdeveloped. The relationships among my characters are not adequately developed.	Most of my characters are undeveloped. The relationships among my characters are undeveloped.
Costumes	My costumes are appropriate to the characters and period depicted.	My costumes are complete and creative but some may not match the character or	My costumes are complete but do not match the character or period. No creativity in	My costumes are incomplete or inappropriate for the period and

		period.	design.	characters.
Props and Scenery	My props and scenery are well-constructed, reflect a clear time and place, and contribute to the theme of the play. They are used in a manner that add to the overall effect of the performance	My props are well constructed. Props add to the performance and are appropriate.	I use appropriate props to aide the performance.	My props are not constructed well and they do not match the content of the play.
Performance	In my performance every spoken word can be heard and understood clearly with no difficulty by each person in the audience The acting in the play is appropriate for the characters and situations. Different parts of the play are connected with smooth transitions. My play is well practiced/rehearsed.	In my performance only a very brief portion of the spoken words may be unclear or inaudible to some members of the audience, OR the audience has to make an effort to hear and understand. The acting in the play is usually appropriate for the characters and situations. There are transitions between parts of the play. My play is practiced.	In my performance several parts of the spoken words are unclear or inaudible to some members of the audience OR one portion is unclear or inaudible to most of the audience. The acting in the play is sometimes appropriate for the characters and situations. The transitions in my play are not smooth. My play does not appear to have been practiced and many lines are forgotten.	In my performance several portions of the spoken words are unclear or inaudible to most of the audiences. The acting in the play is not appropriate for the characters or situations. My play does not seem to be organized. I am unprepared with no attempt to deliver a quality performance.

Simulations: Romeo and Juliet Role-Playing Scoring Guide

This scoring guide comes from the *Romeo and Juliet* Unit Plan within the *Showing Evidence* Tool

	4	3	2	1	Score/ Comments
Preparation and Research (x 15)	**Attorney:** If an attorney, my arguments and examination of witnesses are concise, clear, and compelling. My statements and questions display a clear understanding of the plot and characters of *Romeo and Juliet* and are based on specific evidence and reasoning. **Judge:** If a judge, my rulings are based on a thorough and correct understanding of the play and on claims, specific evidence and reasoning and an appropriate court atmosphere is maintained.	**Attorney:** If an attorney, my arguments and examination of witnesses are clear and convincing. My statements and questions display a basic understanding of the plot and characters of *Romeo and Juliet* and are based on evidence and reasoning. **Judge:** If a judge, my rulings are based on a basic understanding of the play and on claims, evidence and reasoning and an appropriate court atmosphere is maintained most of the time. **Witness:** If a witness, my answers are appropriately based on a basic understanding of the play and claims, specific evidence and reasoning. I am able to apply an appropriate interpretation of the text to fit	**Attorney:** If an attorney, my arguments and examination of witnesses are fairly clear, understandable, and for the most part, convincing. My statements and questions display a limited understanding of the play and are based on some evidence and reasoning. **Judge:** If a judge, my rulings are based on a limited understanding of the play and claims, evidence and reasoning. The seriousness of an appropriate court atmosphere is not always maintained. **Witness:** If a witness, my answers are based on a limited understanding of the play and claims, evidence and reasoning. I am able to apply an appropriate interpretation of the text to fit some of the	**Attorney:** If an attorney, my arguments and examination of witnesses are unclear, illogical, and for the most part, confusing. My statements and questions are not based on the play or on claims, evidence or reasoning. **Judge:** If a judge, my rulings are not based on an understanding of the play, claims, evidence or reasoning. The seriousness of an appropriate court atmosphere is not maintained. **Witness:** If a witness, my answers do not reflect an understanding of the play, claims, evidence or reasoning. I am not able to apply appropriate interpretation of the text to fit the attorneys' questions. **Juror:** If a juror, I do not pay attention to	

	Witness: If a witness, my answers are appropriately based on an excellent understanding of the play and thorough and accurate understanding of the claims, specific evidence and reasoning. I demonstrate an ability to improvise and apply appropriate interpretation of the text to fit the attorneys' questions. **Juror:** If a juror, I pay attention to the current discussions and take notes. My notes reflect attention to the important aspects of the case along with questions and personal responses to the evidence presented.	most of the attorneys' questions. **Juror:** If a juror, I pay attention to the current discussions and take notes. My notes reflect attention to most of the important aspects of the case along with questions about the evidence presented.	attorneys' questions. **Juror:** If a juror, I sometimes pay attention to the current discussions and take notes sporadically. My notes reflect attention to some of the important aspects of the case and have limited questions about the evidence presented.	the current discussions or take notes. I may be distracting to other class members.	
Presentation (x 10)	**Court Presence:** My characteriza	**Court Presence:** My characterization	**Court Presence:** My characterization	**Court Presence:** Neither my characterization	

	tion is creative and well rehearsed with a smooth delivery. I have appropriate eye contact and maintain my voice volume.	is evident at a basic level, along with some rehearsal. I have appropriate eye contact and my voice volume is maintained most of the time.	is evident at a limited level, along with little rehearsal. I have some eye contact and my voice volume is maintained some of the time.	nor rehearsal is evident. I have no eye contact and it is difficult to hear the responses and questions.	
Props (x 5)	**Props/Characterization:** I use appropriate costume, props, visual aids, timelines, charts, etc. during the trial to enhance the understanding and evaluation of the evidence.	**Props/Characterization:** I use mostly appropriate costume, props, visual aids, timelines, charts, etc. during the trial to enhance the understanding and evaluation of the evidence.	**Props/Characterization:** I use some level of costume, props, visual aids, timelines, charts, etc. during the trial, but what is used sometimes detracts from the understanding and evaluation of the evidence.	**Props/Characterization:** I do not use costume, props, visual aids, timelines, charts, etc. during the trial.	
Teamwork (extra or neg. pts)	Evidence of teamwork is obvious, and my contributions greatly enhance the court presentation.	Evidence of teamwork is obvious, and my contributions enhance the court presentation.	Some evidence of my contribution to the court presentation exists, but my efforts are not equal to the other team member(s).	I contribute minimally to the effort.	Adjusted score:
Total	**Comments:**				

21st Century Learning Assessments

Communication Skills

Communication Checklist

	Check	Examples
Listening: I can use different listening strategies to interpret information.		
I can use different listening strategies depending on the situation.		
I can adapt my listening behavior to keep my attention focused.		
I process information and ideas by drawing pictures, using graphic organizers, and taking notes.		
I focus my gaze on the speaker.		
Discussing: I provide verbal and nonverbal feedback, such as nodding, clapping, taking notes, answering questions when asked, interjecting when appropriate, providing relevant comments, and asking clarifying questions.		
I ask probing questions to gain insight and consider other perspectives.		
I respond with elaboration using details, examples, and facts.		
I ask clarifying questions.		
I paraphrase information.		
I can use language that is appropriate to the situation:		
I choose language that builds relationships (supportive,		

	Check	Examples
encouraging, and constructive).		
I express myself in ways that promote the honest exchange of ideas.		
I select language that is respectful of others' feelings and rights.		
I adjust language to the situation depending on the purpose, role, or age of the people I am communicating with.		
I can show respect for others' ideas.		
I choose language to influence others (persuade, correct, or disagree).		
I allow others to speak without interruption.		
I take turns.		
I provide examples, illustrations, or elaborations to clarify concepts when I infer that group members have questions.		
I respond to indirect and direct indications that others need clarification by interpreting voice tone and body language.		
I pay attention to the pause time, pace, volume, intensity, and body language of other speakers.		
Small Group Work: I support the group's progress by suggesting solutions and checking for group understanding through brainstorming, problem solving, compromising, and building consensus.		

	Check	Examples
I refute others' suggestions in non-hurtful ways by disagreeing with ideas and not people.		
I ask for feedback and input from others.		
I assess group members' and my own interactions and work, and I adjust to help in the group's success.		
I extend and focus conversations by soliciting comments or opinions. I ask questions such as, What do you think? How would you do it? Do you agree with that?		
Oral Presentation: I select the most relevant information from multiple resources to appeal to the interest and background knowledge of the audience.		
I plan a presentation for a specific purpose, such as to entertain, inform, explain, or persuade.		
I organize and structure the presentation to help the audience understand by thinking about the process, procedure, chronological order, problem, and solution.		
I use details, examples, anecdotes, or experiences to enhance the message.		
I use technology, visual aids, equipment, props, artifacts, or drawings to enhance the message.		
I plan a presentation for a specific purpose, such as to entertain, inform, explain, or persuade.		
I select the most relevant information from multiple		

	Check	Examples
resources to appeal to the interest and background knowledge of the audience.		
I organize and structure the presentation to help the audience understand by thinking about the process, procedure, chronological order, problem, and solution.		
I use details, examples, anecdotes, or experiences to enhance the message.		
I practice and use feedback to improve my presentation and develop confidence.		
I speak with expression and change my volume, delivery, and pace to keep my audience engaged.		
I use posture, body language, and gestures to heighten and emphasize message.		
I use correct grammar to complement the message.		
I use casual or formal language depending on the audience, such as peer-to-peer or small group versus large group.		
I use language that engages my audience and addresses the purpose (such as precise language, action verbs, and sensory details).		
I use notes and outlines rather than a script.		

Middle School Discussion Checklist

	Date Observed	Notes
Student enjoys discussions.		
Student thinks deeply about others' comments.		
Student listens to all ideas with an open mind.		
Student communicates engagement with appropriate body language.		
Student contributes an appropriate amount of personal experiences and opinions.		
Student enhances and builds on others' comments.		
Student asks clarification or elaboration questions of classmates.		
Student summarizes and paraphrases others' comments.		
Student supports opinions with good reasoning and credible information.		
Student enthusiastically contributes to discussion without monopolizing.		
Student encourages classmates to participate.		
Student responds respectfully to opposing opinions.		
Student considers criticism of own ideas respectfully.		
Student changes mind when persuaded of a different point of view.		
Student follows class discussion rules.		

Middle School Communication Rubric

4	3	2	1
Speaking Content: Introduction			
When I present, I begin with an introduction that informs my audience of my presentation's theme and engages my audience.	When I present, I begin by introducing the topic.	When I present, I try to introduce the topic, but my introduction may leave my audience confused about my presentation's topic.	I do not begin my presentation by introducing my topic.
Speaking Content: Speaking Content: Body			
When I present, I provide details and supporting information that clarify the main ideas and elaborate on thoughts, ideas, and opinions.	I provide details and supporting information that clarify the main ideas.	I provide some details and supporting information that clarify some of the main ideas.	I do not provide any details or supporting information to clarify the main ideas.
Speaking Content: Conclusion			
I conclude my presentation in a memorable way to reinforce my presentation's theme.	I conclude my presentation by reinforcing my presentation's theme.	I conclude my presentation in a generic way	I do not end my presentation with a conclusion.
Speaking: Voice and Mannerisms			
When I present, I speak naturally with poise, precision, animation, and proper volume. I effectively use nonverbal cues, such as facial expressions, gestures, posture, and proximity.	When I present, I enunciate clearly and speak audibly, avoid clumsy pauses and fillers, maintain eye contact with my listeners, and use gestures and facial expressions to keep the audience engaged.	When I present, I sometimes use a voice too soft for listeners to comfortably hear and understand, use fillers such as "uh" and "um", have difficulty maintaining eye contact, and forget to use nonverbal cues.	When I present, I speak inaudibly, enunciate poorly, mispronounce words, distract listeners with fillers such as "uh" or "um", pause awkwardly, frequently look down to avoid eye contact, and use distracting gestures and other nonverbal cues.
Speaking: Audience Awareness			
I recognize and effectively vary my speaking based on	I recognize different types of audiences and vary my	I try to take into account different types of audiences,	I do not consider different types of audiences.

4	3	2	1
audience characteristics, such as group size, gender, and age.	speaking to meet their needs.	but I am not effective in varying my speaking to meet their needs.	
Speaking: Purpose			
I vary my word choice, tone, animation, gestures, pauses, and opinions according to the purpose of my speaking, such as to inform, persuade, or entertain.	I vary my speaking according to the purpose, such as to inform, persuade, or entertain.	I try to vary my speaking according to the purpose, but I have difficulty sounding credible.	I do not consider the purpose for my speaking.
Speaking: Audio or Visual Aids			
I effectively use a variety of audio and visual aids to enhance my message.	I use audio or visual aids to enhance my message.	I try to use audio and visual aids, but they may not enhance my message.	I do not use audio or visual aids, or if I use them, they distract the audience from my message.
Listening: Body Language			
I listen attentively by facing the speaker, making eye contact, and paraphrasing what is said.	I usually listen attentively, face the speaker, make eye contact, and paraphrase what is said.	I try to listen to the speaker but my attention sometimes wanders, I frequently break eye contact, or I have difficulty recalling what is said.	I do not listen attentively, I create disruptions, and I cannot recall what is said.
Listening: Questions			
I ask and respond to questions effectively and appropriately about presentations.	I ask and respond to questions appropriately.	I rarely ask questions and make limited responses to questions asked of me.	I do not ask or answer questions.
Listening: Interpretation			
I identify and interpret multiple messages and purposes intended by the speaker. I can:	I identify and interpret some messages and purposes intended by the speaker. I can:	I try to identify and interpret messages and purposes intended by the speaker, but I have trouble	I can not identify or interpret messages and purposes intended by the speaker.

4	3	2	1
▪ Summarize the main ideas thoroughly and precisely ▪ Distinguish between fact and opinion Identify supported and unsupported statements ▪ Recognize persuasive appeals ▪ Draw sound, thoughtful conclusions with supporting details ▪ Follow the speaker's reasoning	▪ Summarize main ideas clearly and accurately ▪ Distinguish between fact and opinion ▪ Draw appropriate conclusions	understanding some pieces. I can: ▪ Summarize some of the main ideas ▪ Sometimes distinguish between facts and opinions ▪ Draw basic conclusions	
Listening: Following Instructions			
I accurately follow instructions that require action over an extended period of time. I ask questions to clarify instructions and directions.	I restate and carry out multi-step oral instructions. I ask questions to clarify instructions.	I have trouble carrying out multi-step oral instructions.	I need to hear oral instructions repeatedly before I can carry them out.
Discussing: Body Language			
I pay attention when others are speaking by maintaining eye contact; listening with openness, interest, and awareness; and giving appropriate verbal and nonverbal cues.	I pay attention when others are speaking by maintaining eye contact and giving some appropriate verbal and nonverbal cues.	I usually pay attention when others are speaking, but sometimes, I interrupt or give inappropriate nonverbal cues, such as rolling my eyes, yawning, or looking away.	I seldom pay attention when others are speaking, or I create disruptions.
Discussing: Participation			
I contribute by responding directly and thoughtfully to others' ideas and	I contribute by connecting to what others say and by sharing my	I occasionally contribute by connecting to what others say, but	I seldom make an effort to connect to what others say, and I rarely share

4	3	2	1
opinions; actively and consistently sharing my thoughts, opinions, and ideas; and sometimes leading the group by asking higher-level questions or by drawing others out.	thoughts, opinions, and ideas.	often I am hesitant to share my thoughts, opinions, and ideas.	my thoughts, opinions, or ideas, or I only share when prompted to do so.
Discussing: Critical Thinking			
I look for points of agreement in all points of view, even those I disagree with, and I question all opinions critically, even those I agree with.	I seriously consider all points of view in a discussion.	I consider some points of view in a discussion, but I may accept opinions I agree with or reject opinions I do not agree with without much thought.	I rarely think seriously about viewpoints that I do not agree with in a discussion.

Creativity and Intellectual Curiosity

Elementary Risk-Taking Checklist

	Date Observed	Comments	Goals
Student likes to try new tasks and activities.			
Student likes to try challenging experiences.			
Student weighs the benefits of a risk against the possible negative consequences.			
Student learns from mistakes			
Student believes that success in new activities depends on hard			

	Date Observed	Comments	Goals
work and being careful.			
Student does not give in to peer pressure on important subjects			

High School Creativity Checklist

	Consistently	Sometimes	Rarely	Dates Observed	Notes
Student uses knowledge, skills, and appropriate strategies to generate ideas.	☐	☐	☐		
Student notices what is unusual in concrete and abstract environments.	☐	☐	☐		
Student uses language in meaningful, novel ways.	☐	☐	☐		
Student generates ways to improve everyday objects.	☐	☐	☐		
Student determines whether ideas are worth pursuing.	☐	☐	☐		
Student independently and reasonably evaluates the quality of products and performances.	☐	☐	☐		
Student shows confidence in the quality of work based on knowledge of the relevant content.	☐	☐	☐		
Student engages in novel experiences	☐	☐	☐		

	Consistently	Sometimes	Rarely	Dates Observed	Notes
without worrying about failure.					
Student adds details necessary for implementing and improving ideas.	☐	☐	☐		

Elementary Creativity Rubric

	4	3	2	1
Fluency	I can think of many ideas.	I can think of some ideas.	If I get some help, I can think of ideas.	I have a hard time thinking of ideas.
Flexibility	I notice what is surprising, unusual, and interesting in everyday objects and situations.	I notice unusual things around me.	When someone reminds me, I notice unusual things in the world around me.	I hardly ever notice unusual things in the world around me.
Evaluation	I know several ways of deciding which of my ideas are worth working on.	I can tell which of my ideas are worth working on.	With help, I can tell which of my ideas are worth working on.	I cannot tell which of my ideas are worth working on.
Risk-taking	I like to try new projects and ideas. I do not worry about making mistakes while I am learning.	I try new projects and ideas. I do not worry very much about making mistakes while I am learning.	Sometimes, I do not try new projects and ideas because I worry that I will make mistakes.	I do not try new projects and ideas.
Seeking Challenges	I challenge myself to meet goals that others think are too difficult for me.	I challenge myself to meet goals that are difficult but within my reach.	I only set goals for myself that I know I can reach easily.	I do not set goals for myself.
Elaboration	When I know I have a good idea, I add details to make it a great idea.	I can usually add details to a good idea to make it better.	Sometimes, I cannot think of any ways to make an idea better.	I do not know how to make ideas better.

Critical Thinking

Elementary Interpretation Rubric

	4	3	2	1
Description	I describe the most important parts correctly and in detail.	I describe the most important parts without any mistakes.	I leave out some important parts and make some mistakes with the information.	When I describe the information, I make lots of mistakes.
Personalization	I explain many ways in which the information is special to me.	I show how the information is special to me.	With help, I describe a way that the information is special to me.	I cannot describe ways that the information is special to me.
Creativity	My interpretation surprises the audience and shows something unusual and important about the information.	My interpretation shows something interesting and important about the information.	My interpretation shows expected but important information.	My interpretation shows only expected information.

Middle School Argumentation Rubric

	4	3	2	1
Claim	I clearly state a claim that expresses a reasonable position on a topic.	I clearly state a claim that expresses a position.	With help, I state a claim that expresses a position.	I do not state a claim, and I confuse claims with other kinds of statements.
Evidence	I apply standards of quality to the evidence I use to support my claim.	I use evidence from good sources to support my claim.	I support my position with evidence, but some of my evidence may be irrelevant or come from unreliable sources.	I often use poor-quality evidence to support my claim.
Audience Awareness	I consider the characteristics of my audience when I form an argument, and I include information that is most likely to persuade my audience to agree with my claim.	I think about my audience when I organize my argument, and I address my audience's concerns and needs.	I try to think about my audience when I form my argument, but I often fail to address my audience's concerns or needs.	I do not think about my audience's needs or concerns when I put together my argument.
Opposing Viewpoints	I predict what people who disagree with my position will say, and I address their points in my argument.	I explain why positions I do not agree with are wrong.	I sometimes do not address positions that disagree with my position in my argument.	I do not address positions that disagree with my position in my argument.
Communication	I clearly and thoroughly describe my claim and the evidence supporting it.	I organize my argument to be effective.	With help, I organize my argument, but it may be confusing and unclear.	My argument is confusing and does not persuade people to agree with my claim.

	4	3	2	1
Citations	I cite sources correctly when I use information developed by others.	I usually cite sources correctly.	Sometimes, I forget to I cite sources or cite them incorrectly.	I do not cite sources, or I cite them incorrectly.

High School Analysis Checklist

	Date Observed	Proficiency: Consistent, Frequent, Seldom	Comments
Student accurately describes all components within complex systems and networks of systems.			
Student uses logical thinking combined with experiences and subject-area knowledge to draw conclusions about relationships within and among systems.			

Elementary Reasoning Checklist

	Dates Observed	Comments
Student identifies matters important enough to spend time thinking about.		
Student gets information from multiple sources.		
Student locates more information when necessary.		
Student uses personal knowledge and understanding of the subject area to make predictions.		
Student revises predictions when necessary.		
Student uses personal knowledge to draw conclusions		
Student checks conclusions to determine accuracy and revises if necessary.		
Student displays an understanding that effects may have multiple causes.		
Student recognizes that some causes may be more important than others.		
Student differentiates between causation and correlation in simple situations.		
Student makes detailed diagrams illustrating causes and effects.		
Student explains several good reasons for beliefs.		

High School Critical Thinking Rubric

	4	3	2	1
Identifying Important Information	I can assign levels of importance to concepts and relationships in complex systems and use these values to think about the information.	I can differentiate between main concepts and relationships and minor ones in complex systems.	I can usually tell the difference between important points and minor points in systems.	I often confuse main points and supporting details.
Making Inferences	I use my own experiences, knowledge of the content and conventions, and tools of the subject matter to make inferences about new information I am learning.	I use reliable information from a variety of sources to make reasonable inferences about new information.	With help, I can make reasonable inferences about new information.	I rarely think beyond the exact information I have been given.
Evaluating Sources	I use in-depth knowledge of the subject area and sound reasoning strategies to determine the credibility of sources.	I use knowledge of the subject area and reasoning strategies to determine the credibility of sources.	Sometimes, I use my knowledge of the subject and reasoning strategies to determine the credibility of sources.	I rarely use my knowledge of the subject area or reasoning strategies to determine the credibility of sources.
Learning Independently	I make an extra effort to find out as much as I can about the different points of view on a topic. I determine how I think various points of view	I make the effort to find out as much as I can about an important topic.	I sometimes make an effort to find out about an important topic.	I am usually satisfied with what I already think about a topic. I do not make an effort to learn more about it.

	4	3	2	1
	are important for the assignment as well as for my own benefit.			
Communicating	I clearly and thoroughly explain my opinions, address different points of view on the subject, and support my opinions with credible evidence.	I explain my opinions clearly and support them with credible evidence.	I sometimes explain my opinions in vague and confusing ways. I sometimes support my opinions with questionable evidence.	I rarely provide reasons for my opinions.

Information and Media Literacy Skills

Elementary Research Rubric

	4	3	2	1
Generating a Question	I pose a thoughtful, creative question that interests and challenges me.	I pose a focused question that interests and challenges me.	I pose a question that is easy to answer.	I rely on the teacher to pose my question.
Selecting, Sorting, and Evaluating Information	I collect, sort, and evaluate relevant, balanced, reliable information on my own.	I collect and sort relevant information on my own.	I collect and sort some information, but I am not sure if it is accurate or useful.	I go from source to source and have trouble determining what will be the most helpful.
Organizing Information	I organize my ideas and important supporting information related to my question.	I organize information related to my question and look for missing information.	I try to organize the information I find, but I make some mistakes. I have difficulty staying focused on information that will answer my question.	I lose track of the most important information.
Analyzing Information	I carefully analyze the information and draw logical, well-reasoned conclusions supported by the evidence I collected.	I analyze the information and draw logical conclusions supported by the evidence I collected.	My analysis could be deeper. My conclusion could be supported by stronger evidence.	I restate the information in my conclusion. My conclusion is not supported by evidence.
Synthesizing Information	My information is logically and creatively organized with smooth transitions.	My information is logically organized, and I make good connections	My information could be better organized.	My information is not logically or effectively organized.

	4	3	2	1
		among the ideas.		
Creating a Product	I create an original product that clearly answers my question with accuracy, detail, and understanding.	I create a product that answers my question with detail and accuracy.	I create a product that offers some insight but only partially answers my question.	I create a product that is missing details and is not completely accurate.

High School Research Information Processing Checklist

	Always	Sometimes	Hardly Ever	Goal
I am responsible in my use of information.	☐	☐	☐	
I document all my sources and base my conclusions on credible information.	☐	☐	☐	
I sometimes paraphrase, or restate, information in my own words.	☐	☐	☐	
I cite paraphrased information when necessary.	☐	☐	☐	
I filter information for point of view, bias, and propaganda techniques.	☐	☐	☐	
I determine the credibility and timeliness of information.	☐	☐	☐	
I identify important information and leave out unimportant or trivial information.	☐	☐	☐	
I organize information for clarity.	☐	☐	☐	
I integrate concepts, facts, and opinions, using lists,	☐	☐	☐	

	Always	Sometimes	Hardly Ever	Goal
outlines, webs, or concept maps.				
I determine themes and patterns.	☐	☐	☐	
I classify and select important information to divide into categories and thoroughly describe each category.	☐	☐	☐	
I compare and contrast pieces and systems of information and describe the important similarities and differences among them.	☐	☐	☐	
I break down information into its parts (analyze) and describe how those parts relate to one another and to the whole.	☐	☐	☐	
I use my own knowledge to draw conclusions (infer) to create my own meaning from information.	☐	☐	☐	
I recognize cause-and-effect relationships by presenting reasons, motives, or	☐	☐	☐	

	Always	Sometimes	Hardly Ever	Goal
origins of events and then presenting the results or consequences.				
I draw conclusions by making a decision or forming an opinion after considering the relevant facts or evidence.	☐	☐	☐	
I synthesize information by combining various ideas, opinions, and decisions into new ideas with fresh insights and logical conclusions.	☐	☐	☐	

Collaboration

Collaboration Checklist

	Sometimes	Hardly Ever	Always	Examples
I identify goals.	☐	☐	☐	
I define tasks.	☐	☐	☐	
I outline approaches.	☐	☐	☐	
I suggest new ideas and directions.	☐	☐	☐	
I volunteer to tackle difficult tasks.	☐	☐	☐	
I ask questions.	☐	☐	☐	
I seek facts.	☐	☐	☐	
I request clarification.	☐	☐	☐	
I find and share resources.	☐	☐	☐	
I contribute facts and opinions.	☐	☐	☐	
I respond enthusiastically to others.	☐	☐	☐	
I invite everyone's participation.	☐	☐	☐	
I make people feel good about what they contribute to the group.	☐	☐	☐	

	Sometimes	Hardly Ever	Always	Examples
I summarize points of discussion.	☐	☐	☐	
I simplify complicated ideas	☐	☐	☐	
I put points in perspective.	☐	☐	☐	
I keep the discussion on track.	☐	☐	☐	
I help create a timeline and set priorities.	☐	☐	☐	
I help direct division of tasks.	☐	☐	☐	
I help identify necessary changes and encourage group action for change.	☐	☐	☐	
I stimulate discussion by presenting different points of view.	☐	☐	☐	
I respectfully challenge weak ideas.	☐	☐	☐	
I seek alternative solutions.	☐	☐	☐	
I help my group reach fair, well-reasoned decisions.	☐	☐	☐	

Group Cooperation Checklist

	Examples
Examples of what I offered to project planning:	
Examples of what I contributed to the project's completion:	
Examples of my ideas that helped make the project successful:	
Examples of what I did to help our group stay on task:	
Examples of strategies I used to resolve conflicts or problems:	
What I enjoyed most about this project:	
What I learned from this project:	
Examples of changes I would make the next time I work on a group project:	

Elementary Collaboration Rubric

	4	3	2	1
Contribution	I always contribute actively to the group by participating in discussions. I accept and performing all of my required tasks. I help the group set goals and direct the group in meeting our goals.	I contribute to the group by participating in discussions, completing my assigned tasks, and helping to set and meet our goals.	I sometimes need encouragement to complete my assigned tasks. I need help to set and meet our goals.	I choose not to participate. I do not complete my assigned tasks, I get in the way of goal setting, and I keep the group from meeting goals.
Cooperation	I share many ideas and contribute information appropriate for the topic, and I encourage other members to share their ideas.	I share ideas when encouraged, and I allow all members to share.	I share ideas occasionally when encouraged, and I allow sharing by most group members.	I do not like to share my ideas, so I do not contribute to group discussions. I often interrupt others when they are sharing.
Active Listening within Group	I balance my listening and speaking. I am always concerned about other people's feelings and ideas.	I can listen to others. I show sensitivity to other people's feelings and ideas.	Sometimes, I listen to others. Sometimes, I consider other people's feelings and ideas.	I do not listen to others. I am sometimes inconsiderate of other people's feelings and ideas.
Metacognition	I ask the group to consider how well we are working together.	I consider how well we are working together. I participate	Sometimes, I help the group work together. I try not to hold back the	I discourage my group members from thinking about how well we are

	4	3	2	1
	I help the group work together better.	in the changes needed to help the group work better together.	group's efforts.	working together. I sometimes get us off task.
Problem Solving	I work actively with the group to solve problems. I help the group make fair decisions.	I offer suggestions to solve problems. I help the group make decisions.	Sometimes, I offer suggestions to solve problems. Sometimes, I help the group make decisions.	I choose not to participate in solving problems or making decisions. I sometimes cause problems for the group.

Problem Solving

Elementary Mathematical Processes

	4	3	2	1
Interpreting the Question	I restate the problem clearly in my own words.	I restate the problem in my own words.	I restate the basics of the problem, but I misunderstand part of the problem.	I do not restate the problem. OR I do not understand the problem.
Selecting a Strategy	The strategy I choose is at an advanced level, and I address all problem parts.	The strategy I choose is appropriate, and I address all problem parts.	The strategy I choose is effective, but may not be the best choice. I address most of the problem parts.	The strategy I choose is inappropriate, and I fail to address important parts of the problem.
Developing Solutions	My solution is correct, and short cuts are used correctly. I include no errors.	My solution is correct, and short cuts are used correctly. I include a minor error.	My solution is not correct. I include many errors in my calculations and show incomplete steps in my work.	My solution is not correct. I complete few calculations, and I do not show my work.
Demonstrating Thinking	I show exceptional mathematical thinking.	I have a clear explanation of my thinking.	I have trouble explaining my thinking.	I am not able to explain my thinking at this time.
Communicating Processes	I communicate precise and clear evidence of my reasoning.	I communicate some evidence of my reasoning.	I communicate little evidence of my reasoning.	I communicate no evidence of my reasoning.

Middle School Problem Solving Checklist

	Date	Comment
Student anticipates problems in complex projects.		
Student solves problems before they occur.		
Student determines what information is important for solving a problem.		
Student analyzes a problem carefully before solving it.		
Student uses subject area knowledge to solve problems.		
Student uses learned strategies to solve problems.		
Student uses effective problem solving strategies outside of school.		
Student reflects on problem solving processes and makes changes, if necessary.		
Student communicates processes and results clearly and thoroughly.		

High School Coping with Complexity Rubric

	4	3	2	1
Seeking Challenges	I seek out complex problems and enjoy working with them because I feel I learn from them.	I usually enjoy working on complex problems.	Unless I have a lot of help, I do not like to work on complex problems.	I will not work on complex problems.
Using Strategies	I know a variety of strategies that I can use flexibly and efficiently to solve complex problems.	I know several strategies for working on complex problems.	I try to find something to work on in a complex problem, but I usually cannot figure out what is most important to do without help.	I will not start working on a problem unless I have directions on how to do it.
Analyzing	I see complex problems as systems, and I can analyze them to choose the relationships and components where action will have the greatest positive impact on the solution.	I see complex problems as systems, and I can analyze them to identify the most important pieces to work on.	Unless I have help, I see complex problems as simpler than they are.	I usually can only see one part of a complex problem.
Persisting	I recognize that complex problems may not have clear or simple solutions, and when I do not solve them right away, I take a different perspective	I understand that some problems do not have clear or simple answers, and I can persist when I do not find a solution right away.	I like problems with clear, simple answers, and I get frustrated when I do not find them.	I quit working on a problem if I do not get a clear answer right away.

	4	3	2	1
	and try again.			
Concentrating	I can concentrate when I am surrounded by noise and activity.	I can usually concentrate when a lot is going on around me.	I have a hard time concentrating when a lot of is going on around me.	I cannot concentrate unless the area is absolutely quiet.

Elementary Problem Solving Checklist

	Consistently	Sometimes	Rarely	Comments
Student anticipates problems in time to prevent them.	☐	☐	☐	
Student identifies problems during a project.	☐	☐	☐	
Student thinks of ways to improve the process throughout the project.	☐	☐	☐	
Student takes time to think about problems before solving them.	☐	☐	☐	
Student generates multiple solutions to a problem.	☐	☐	☐	

Self-Direction

Project Management Checklist

	Goal	Date Completed	Reflection
I plan my research strategy.			
I synthesize the information with my own thoughts.			
I evaluate the results of my actions.			
I identify possibilities.			
I ask myself questions to help me think about what I know.			
I organize my current knowledge.			
I think about my audience when I communicate what I have learned.			
I use my learning to establish new actions or goals.			
I collect the necessary information to make an informed decision.			
I explore options.			

	Goal	Date Completed	Reflection
I make choices.			
I formulate a plan of action to pursue my chosen option.			
I make predictions about what I think I am going to learn.			
I create opportunities.			
I modify my plan if new information arises that warrants a change.			

Elementary Self-Direction Checklist

	Always	Sometimes	Hardly Ever	Specific Examples
I use my time wisely.	☐	☐	☐	
I can make an action plan and revise it when I need to.	☐	☐	☐	
I set goals.	☐	☐	☐	
I anticipate the resources I might need to reach my goals.	☐	☐	☐	
I keep track of my progress in my learning log.	☐	☐	☐	
I persevere when I meet obstacles or problems.	☐	☐	☐	
I ask for help when I need it.	☐	☐	☐	
I complete my tasks.	☐	☐	☐	
I set high standards for my work.	☐	☐	☐	
I review my work after I finish it.	☐	☐	☐	
I am willing to improve on my work when I need to.	☐	☐	☐	
I explain how I can learn from my successes and failures.	☐	☐	☐	

Middle and High School Accountability Rubric

	4	3	2	1
Active Learning	I always take a thoughtful, active role in my own learning, challenging myself on a daily basis so that I can contribute wholeheartedly to the group.	I consistently take an active role in my own learning so that I can contribute my best to the group.	I sometimes take an active role in my own learning, sharing relevant ideas and asking appropriate questions.	I rarely take an active role in my own learning. I often do not participate and rarely share ideas or ask questions.
Attitude	I consistently demonstrate a genuine desire to learn and share my ideas with my classmates.	I usually demonstrate a genuine desire to learn and share my ideas.	If I am persuaded, I can become interested in learning.	I do not demonstrate a desire to learn and usually I just do the minimum without enthusiasm.
Participation	I initiate discussions, ask significant questions, and act as a leader within the group. I ask thoughtful questions, and defend my opinions.	I participate regularly in discussions and frequently volunteer my ideas. I ask questions and defend my opinions.	Sometimes I demonstrate a desire to learn, but I often just do what I am told without enthusiasm or interest.	I participate only when prompted.
Risk-Taking	I am willing to assert and support an opinion, even if it may be unpopular with my classmates.	I sometimes assert and support an opinion that might be unpopular with my classmates.	I sometimes contribute to discussions.	
Listening	I listen actively to my classmates, seeking areas of agreement and disagreement.	I listen respectfully to my classmates.		I do not express opinions that others might disagree with.

	4	3	2	1
Preparation	I am always well prepared to contribute to the group as a result of having thoughtfully completed my tasks.	I complete my tasks and am prepared to contribute to the group.	I am reluctant to assert my opinion if others may disagree.	I have poor listening skills, and may be intolerant of the opinions of others.
Engagement	I am always involved in group tasks and discussions.	I am usually involved in group tasks and discussions.	I listen to my classmates and respect their opinions most of the time.	
Thoroughness	The thoroughness and quality of my work reflects my respect for learning.	The quality of my work reflects my respect for learning.	I sometimes complete my tasks and am prepared to contribute to the group.	I do not complete my tasks so am not prepared to contribute thoughtfully with detail or substance.

Products and Performances

Elementary Historical Diaries and Letters Rubric

4	3	2	1
Content			
I include details that might have happened to the person I am writing as. I make inferences about people, places, and events during the time period.	I include some details that I imagine might have happened to the person I am writing as.	I try to include some details that I imagine might have happened to the person I am writing as, but some of my details are not very logical.	I do not imagine details that might have happened to the person I am writing as, or the details I imagine are not logical.
Research			
I do research about the person and time period I am writing about. I accurately describe many people, places, and events in my diary or letter.	I do research about the person and time period I am writing about. I accurately describe some people, places, and events in my diary or letter	I refer to some specific historical people, places, and events, but some of my facts are incorrect.	I do not refer to specific historical people, places, and events, or when I do, my facts are incorrect.
Writing			
I use vivid, interesting words to create pictures in the audience's minds. My writing sounds like the character I am pretending to be.	I use interesting language in my story. Most of the time, my writing sounds like the character I am pretending to be.	I try to use interesting language in my story. Some of my language is predictable. At times, my writing sounds like the character I am pretending to be.	The language in my story is ordinary and predictable. My writing does not sound like the character I am pretending to be.
Format			
My writing correctly follows the format of a letter or diary.	My writing generally follows the format of a letter or diary.	My writing has some of the features of a letter or diary.	My writing does not follow the format of a letter or diary.
Creativity			

4	3	2	1
I include unusual and surprising features that make my diary or letter more meaningful, realistic, or interesting.	I include some features that make my diary or letter more realistic or interesting.	I try to include some unusual features that make my diary or letter more realistic or interesting, but the features are sometimes distracting.	I do not include any features that make my diary or letter more realistic or interesting. OR The unusual features I include distract from the overall meaning of the writing.
Conventions			
My letter or diary has no errors in mechanics or grammar, unless I use errors on purpose to portray the person I am writing as.	My letter or diary has no errors in mechanics or grammar that take away from the meaning.	My letter or diary has some errors in mechanics or grammar that take away from the meaning.	My letter or diary has so many errors in mechanics and grammar that my writing is difficult to understand.

Middle School Brochure Rubric

4	3	2	1
Content			
The content of my brochure reflects in-depth understanding of all relevant concepts.	The content of my brochure reflects understanding of major concepts.	The content of my brochure reflects some gaps in understanding of concepts	The content of my brochure reflects major misconceptions and misunderstandings of important concepts.
Resources			
The information in my brochure is supported by a variety of credible resources.	The information in my brochure is supported by more than one credible source.	The information in my brochure is supported by more than one source, but some of my sources may not be credible.	The information in my brochure is supported by only one source or by sources that are not credible.
Citation			
All my sources are cited correctly.	All my sources are cited, but I may have a few minor errors in format.	Most of my sources are cited, but I have several errors in format.	Few of my sources are cited, and I have numerous errors in format.
Interpretation			
My brochure offers logical interpretations, insights, and extensions based on a deep understanding of the content.	My brochure offers some interpretations based on understanding of the content.	My brochure offers a few interpretations but consists mostly of facts I got from resources.	My brochure offers no interpretations and consists of facts from resources.
Writing			
The writing in my brochure is technically skillful, interesting, and appropriate for the intended audience.	The writing in my brochure is clear and appropriate for the intended audience	The writing in my brochure is generally clear and appropriate, but some parts may be confusing.	The writing in my brochure is confusing.
Creativity			

4	3	2	1
I include unusual and surprising features, language, and ideas that enhance my brochure's message.	I include some unusual or surprising features, language, or ideas that support my brochure's message.	I try to add some unusual features, language, or ideas, but my additions sometimes detract from my brochure's message.	My brochure has ordinary, predictable features, language, and ideas.
Organization			
My brochure is organized so readers can find what they are looking for and located the different parts connect naturally.	My brochure is organized logically, so readers can find what they are looking for	My brochure has a sense of organization, but some parts are not located where they belong.	The items in my brochure are arranged in a random way without any clear purpose.
Layout/Design			
I use computer layout guidelines, positioning, and color to make my brochure neat, attractive, and interesting. I have a good balance of text and white space.	I use computer layout guidelines, positioning, and color to make my brochure neat and attractive.	I try to use computer layout guidelines, positioning, and color, but parts of my brochure look cluttered or empty.	My brochure is cluttered or too empty and looks unbalanced.
Appearance			
The pictures, fonts, and other graphic elements in my brochure enhance the message and purpose.	The graphics in my brochure relate to the topic.	Some of the graphics in my brochure relate to the topic.	My brochure has no graphics, or my graphics relate only superficially to the topic or detract from the meaning of my brochure.
Conventions			
My brochure is free of mechanical and grammatical errors, except	My brochure is free of mechanical and grammatical errors that detract from the meaning.	My brochure has a few mechanical or grammatical errors that detract from the meaning.	My brochure has so many mechanical and grammatical errors that readers are confused and

4	3	2	1
where they are designed to deliberately enhance the meaning.			have difficulty understanding the brochure's meaning.

Middle and High School Business Letter Rubric

4	3	2	1
Content: Purpose			
I clearly state the purpose of my letter and any necessary background information.	I state the purpose of my letter and important background information.	I try to state the purpose of my letter and give some background, but some relevant information may be missing.	The purpose of my letter is unclear, and I provide little relevant background information.
Content: Action			
I succinctly describe a satisfactory response in the opening paragraph.	I describe a satisfactory response in the opening paragraph.	I describe the response I want, but it is not in the opening paragraph, or my description is confusing in some parts.	I do not describe the response I want in my letter, or my description is confusing.
Persuasion: Arguments			
I provide several compelling, well-supported reasons and detailed examples or illustrations to support the purpose.	I provide several reasons and examples to support the purpose.	I provide reasons to support the purpose, but some of my reasons are not convincing.	I do not provide reasons, or the reasons I give are unconvincing.
Persuasion: Rhetorical Devices			
I use appropriate rhetorical devices (such as appeals to reason, to character, or emotion) effectively to persuade my audience.	I use rhetorical devices to persuade my audience.	I try to use rhetorical devices to persuade my audience	I do not use rhetorical devices.
Voice: Audience			
I anticipate and thoroughly address my audience's concerns and questions.	I anticipate and address my audience's concerns and questions.	I anticipate some of my audience's concerns, and I try to address them.	I do not anticipate or address my audience's concerns.

4	3	2	1
Voice: Sincerity			
I convey a sense of sincere commitment to my letter's topic and explain why my views should be taken seriously.	My letter sounds sincere and shows that my topic is important to me.	My letter sounds sincere and credible, but some parts of my letter may sound forced or contrived.	My letter does not sound sincere.
Voice: Personalization			
My letter reflects me as a person by using personal examples and details to support the purpose.	My letter reflects me as a person by using personal details.	My letter includes some personal details, but some details are not appropriate.	My letter does not include personal details, or if it does, the details are not appropriate.
Tone			
I use a respectful tone that is appropriate for the purpose of the letter and the reader.	I use an appropriate tone.	Sometimes, my letter's tone is disrespectful or inappropriate for the audience and purpose.	My letter's tone is disrespectful and inappropriate.
Organization: Introduction			
My letter's first paragraph states the purpose of my letter in a compelling way.	My letter's first paragraph states the purpose of my letter.	My letter's first paragraph partially states the purpose of my letter, but the purpose is unclear or hard to find.	My letter's first paragraph does not state the purpose of my letter.
Organization: Body			
I support my purpose by presenting my reasons in an order that builds to what I want for a response.	I present reasons in a logical order.	I try to put my reasons in order, but the order does not help the reader understand what I am saying.	My reasons do not seem to be in a particular order.
Organization: Transitions			
I use a variety of words, phrases,	I use transitions to connect ideas, so	I attempt to connect my ideas	My writing is choppy and

4	3	2	1
and structures to connect ideas, so my ideas flow in a logical order and build on each other naturally.	my ideas flow together.	with transitions, but my writing is sometimes choppy.	unconnected.
Organization: Conclusion			
My conclusion emphasizes the response I want in a memorable way.	My conclusion emphasizes my expected response.	My conclusion tries to explain why I wrote the letter.	My conclusion does not explain why I wrote the letter.
Writing: Word Choice			
I use precise, accurate, powerful, and interesting words and phrases to create memorable pictures in the reader's mind.	I use accurate, interesting words to engage the reader.	My language is sometimes vague, general, predictable, and uninteresting.	My language is vague, general, predictable, and uninteresting.
Writing: Sentences			
My sentences are varied in length and structure to enhance meaning. My sentence beginnings are varied and interesting.	My sentences are generally varied in length and structure. My sentence beginnings are often varied.	The length and structure of my sentences rarely vary. I attempt to vary sentence beginning structures, but some are repeated.	My sentence structure, length, and beginnings are repetitive and predictable.
Conventions			
My spelling, punctuation, and capitalization are correct. I use Standard English throughout my letter.	My spelling, punctuation, and capitalization are generally correct. My letter has no errors that detract from meaning. I use Standard English throughout my letter.	Occasional errors in spelling, punctuation, and capitalization detract from my letter's meaning. My use of nonstandard English detracts from meaning.	Errors in conventions make my letter difficult to read and understand
Format			

4	3	2	1
I follow an appropriate business letter format consistently and accurately. I address my envelope correctly.	I follow an appropriate business letter format consistently. I make minor errors in addressing my envelope.	I make some errors in business letter format, or I make a few errors in addressing the envelope.	I make several errors in business letter format, and I make several errors in addressing the envelope.

High School Autobiography Checklist

	Check	Comments
My autobiography has a theme that says something important and interesting about me.	☐	
My autobiography is organized around the theme.	☐	
I include facts and supporting details that support the theme.	☐	
I include graphics, such as photos, writing, and other documents, appropriately to illustrate my autobiography's theme.	☐	
My autobiography is organized so that each idea builds on the previous ideas and connects to the upcoming ideas.	☐	
I use interesting and powerful language.	☐	
I use a variety of sentence and paragraph structures to enhance my autobiography's meaning.	☐	
I proofread my autobiography for conventions.	☐	

Middle and High School Video Checklist

	Evident	Developing	Not Present	Comments/Feedback
My video has a theme that says something important.	☐	☐	☐	
The content of my video is well-researched and accurate.	☐	☐	☐	
I include other media to enhance the theme.	☐	☐	☐	
I end my video with credits that cite sources and identify the participants.	☐	☐	☐	
My content is relevant for the assigned task.	☐	☐	☐	
Props, costumes, and scenery are appropriate for my topic.	☐	☐	☐	
I make sure that my video is appropriate for the target audience.	☐	☐	☐	
I include a variety of in-	☐	☐	☐	

	Evident	Developing	Not Present	Comments/Feedback
depth information on my topic.				
The speakers in my video speak in Standard English.	☐	☐	☐	
The video's sound is clear and easy to hear.	☐	☐	☐	
The camera work does not distract from the meaning of the video.	☐	☐	☐	
I edit my video to include only good shots and to move smoothly between scenes.	☐	☐	☐	
My video fits in the allotted time.	☐	☐	☐	

Middle School Timeline Checklist

	Always	Sometimes	Hardly Ever	Goals/Comments
My timeline has a title.	☐	☐	☐	
I included all appropriate labels.	☐	☐	☐	
All facts are accurate, build on each other, and explained in detail.	☐	☐	☐	
All facts are in sequential order.	☐	☐	☐	
All facts are placed to scale in the timeline.	☐	☐	☐	
I included appropriate pictures, graphics, sound, and video.	☐	☐	☐	
My work is neat, attractive, and legible.	☐	☐	☐	
My work is free of mechanical errors.	☐	☐	☐	
I cite my sources.	☐	☐	☐	

Elementary Blog Rubric

4	3	2	1
Purpose			
My blog has a clear purpose and is about an important topic.	My blog is about a clear topic.	My blog is mostly about one topic, but sometimes my blog is off subject.	My blog appears to be about unrelated topics.
Content			
My blog entries are accurate and interesting. I use the information from my research to draw original conclusions about the topic.	My blog entries are accurate. I use information from my research to draw conclusions about the topic.	Most of my blog entries are accurate. I try to draw some conclusions, but my entries are not always based on facts. I sometimes paraphrase or quote information from other sources.	My blog entries are often inaccurate. I rarely draw conclusions. I usually just copy information from other sources.
Sources			
I get a great deal of information from reliable sources outside the classroom. I cite my sources correctly.	I get some information from reliable sources outside the classroom. I only make minor errors when citing my sources.	Most of my information comes from my own opinions without any reference to sources. When I do cite my sources, I make some errors.	My information is just my opinion without any sources to back it up.
Audience			
I think about who I want to read my blog. I write about what will interest my audience. I make statements and ask questions to get readers to respond to my blog.	I think about my audience. I try to write about what will interest them. I encourage my readers to respond to my blog.	I sometimes think about my audience. I try to write about what will interest them, but sometimes, I just write about what interests me or what is easy to find information about.	I rarely think about my audience. I write about topics that are only interesting to me.
Voice			

4	3	2	1
My writing shows that I care deeply about the topic I am writing about. I clearly want my readers to understand my point of view.	My writing shows that I care about the topic I am writing about.	Sometimes, my writing shows that I care about the topic I am writing about.	My writing shows that I am just completing an assignment and do not care about the topic.
Writing			
My writing style is interesting and appropriate for my audience. I have no errors in grammar, spelling, punctuation, capitalization, or sentence structure.	My writing style is understandable. If I have any errors in grammar, spelling, punctuation, or sentence structure, they do not take away from my message.	I try to write so my audience can understand my message. Errors in grammar, spelling, punctuation, and sentence structure sometimes make my message hard to understand.	My writing is confusing and often does not make sense.
Updates			
I write blog entries with new information and thoughts at least once a week, without being reminded.	I write blog entries with new information and thoughts at least every 10 days or so, without being reminded.	If I am reminded, I write in my blog at least once every two weeks.	Even when I am reminded, I often do not write in my blog for weeks at a time.
Extra Features			
I include features such as graphics, photos, and links to add meaning and interest to my blog.	I include features such as graphics, photos, and links in my blog.	I include some features such as graphics, photos, and links in my blog, but the features sometimes take away from my blog's purpose.	I do not include any extra features in my blog, or the features I include do not make sense.
Creativity			
I use language and blog features in surprising and unusual ways to communicate my message.	I use language and blog features in interesting ways to communicate my message.	I try to use language and blog features in surprising ways to communicate my message, but my	I do not try to use language and blog features in surprising ways.

4	3	2	1
		attempts sometimes just take away from my message.	

High School Wiki Rubric

4	3	2	1
Purpose			
Our wiki has a purpose and a message that addresses an important issue. Every component of our wiki supports the purpose.	Our wiki has a purpose. Every component of our wiki supports the purpose.	Our wiki is generally about a topic. Every component of our wiki relates to the topic, but some components have a superficial relationship to the topic.	Our wiki seems to be about more than one topic.
Information			
Our wiki provides extensive, thorough information about all sides of the issue.	Our wiki provides adequate information about at least two sides of the issue.	The information in our wiki has a few significant gaps and seems a bit one-sided.	The information in our wiki has many gaps and presents only one side of the issue.
Interpretation			
We connect the information in our wiki to different subjects and to the real world. We use the information from our research to make inferences and draw original conclusions about our site's topics.	We connect the information in our wiki to other topics and ideas. We draw our conclusions from our research.	We try to connect the information in our wiki to other topics, but some of our connections are superficial. We try to draw conclusions, but our conclusions are not always based on our research.	We rarely connect the information in our wiki to other topics. The information in our wiki is repeated or paraphrased from other sources. We do not try to draw original conclusions.
Sources			
We gather information for our wiki from a wide variety of primary and reliable secondary sources, such as print sources, Web sites, interviews, observation, databases, and	We gather information for our wiki from several reliable sources.	We gather information from several sources, but a few of them may be unreliable.	We gather our information from one or two sources, or we do not use any sources.

4	3	2	1
surveys.			
Citations			
We correctly cite all sources for our information, including direct quotes and paraphrasing, when appropriate.	We cite all sources for our information, including direct quotes and paraphrasing, when appropriate. We make a few minor errors in our citations.	We cite some of our sources, but we make some errors in our citations.	We do not cite our sources, or we make numerous errors in our citations.
Multimedia			
We use high-quality multimedia components, such as graphics, sound, animation, and video, to enhance the message of our wiki. Multimedia components work correctly and are integrated effectively throughout our wiki.	We use multimedia throughout our wiki to support our message.	We use multimedia throughout our wiki, but sometimes it detracts from our message.	We do not use multimedia in our wiki.
Copyright			
We follow copyright laws for all content in our wiki.	We follow copyright laws for all content in our wiki, but we make some minor errors.	We do not follow copyright laws for some content on our wiki.	We do not follow copyright laws with most of the content on our wiki.
Creativity			
We present information in our wiki in fresh, original ways that enhance our message. We effectively use language, organization, and Web features in	We effectively use language, organization, and Web features in original ways to communicate our message.	We try to use language, organization, and Web features in unique and surprising ways to communicate our message, but some of our attempts detract from our	We make no effort to communicate our message in original ways.

4	3	2	1
unique and surprising ways to communicate and persuade our audience to take our message seriously.		message.	
Audience			
We design our wiki to appeal to a specific audience, and we use language and rhetorical devices to appeal to that audience. We anticipate our audience's questions and concerns, and give them information they need to understand and accept our message.	We think about our audience while we design our wiki, and we address any questions or concerns they might have.	We try to think about our audience while we design our wiki, and we answer some of the questions they might have.	We do not think about our audience while we design our wiki. We only include information that is easy to find or interesting to us.
Collaboration			
We use effective decision-making and persuasive strategies to reach consensus on major components of our site. We encourage each other to express individuality in meaningful ways related to the purpose of the site. We respect each other's work by offering support and constructive criticism, and by agreeing on what changes should be made to the site	We work together to reach consensus on the major components of our site. We agree on any changes that should be made to the site before we make any changes.	We try to work together to reach consensus about our wiki's content, but some people have more input than others.	Our site is mostly the work of a few people, and other group members have very little input.

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before we make any changes.			
Site Organization			
Our wiki's information is divided logically into pages concerning different subjects, with appropriate amounts of content that expand and enhance our ideas. Sections of information are broken down into an appropriate number of subpages. Links guide users through the wiki in an intuitive way, and a link to the home page is always available.	Our wiki's information is divided logically into pages concerning different subjects, with appropriate amounts of content. Links guide users through our site, and each page has a link to the home page.	Our wiki's information is divided into pages that are generally about different subjects. Links guide users through our site, but sometimes the links are hard to find, and returning to the home page is sometimes difficult.	The pages in our wiki seem to be about random subjects. Some of our pages have links, but readers can easily get lost or stuck in one place in our site.
Page Organization			
Each page in our wiki thoroughly addresses an important topic related to our purpose. The most important information appears first on the page. We effectively use headings, subheadings, fonts, and Web features, such as anchors, lines, and boxes, to help readers find what they are looking for.	Each page in our wiki addresses a topic related to our purpose. We effectively use headings, subheadings, fonts, and Web features to help readers find what they are looking for.	Each page in our wiki is usually about one topic. We use some headings and Web features, but readers sometimes have difficulty finding what they are looking for.	Our pages are confusing and poorly organized.
Links to Outside Sources			

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All links on our wiki work and add important information related to our site's message. All linked sites are appropriate for our audience, and we provide a description of what is available on each site.	All links on our site work and relate to the topic of our site. All linked sites are appropriate for our audience.	The links on our site all relate to the topic of our site, but a few of them do not work.	We have no links on our wiki, or our links are inappropriate, do not work, or are unrelated to the topic.
Language			
We use powerful, concrete, and accurate words on our wiki. We use a minimum of technical terms and include definitions, when appropriate.	We use accurate words on our wiki and define technical terms, when necessary.	Some of our word choices are inaccurate, or we use too many technical words.	Our word choices are predictable and often inaccurate.
Conventions			
We have no errors in sentences, spelling, capitalization, grammar, or punctuation.	We check our writing for accuracy in spelling, capitalization, grammar, and punctuation, and we do not have any errors that would confuse readers	We check our writing for accuracy in spelling, capitalization, grammar, and punctuation, but we have some errors that may confuse readers.	We do not check our writing for accuracy in spelling, capitalization, grammar, and punctuation, and we have many errors that will confuse readers.

Middle School Multimedia Presentation Rubric

4	3	2	1
Content: Purpose			
My presentation has a theme that makes an important and meaningful statement about my topic. All parts of my presentation relate to the purpose or theme in a meaningful way.	My presentation has a theme. All parts of my presentation make an important statement about my topic.	My presentation has a topic. Most parts of my presentation make an important statement about the topic, but some parts may be off topic.	My presentation seems to have a topic, but many parts are off topic.
Content: Conclusions			
I synthesize my own experiences and knowledge with the research to draw important and meaningful conclusions about my presentation's theme.	I synthesize my own experiences and knowledge with the research to draw conclusions about my presentation's theme.	I try to use my knowledge and the research to draw conclusions, but some of my ideas are not logical or based on credible evidence.	I rarely draw conclusions, and when I do, they are not logical.
Content: Key Points			
I organize my presentation around a few concise points that support the theme and synthesize the most important information I have discovered and the conclusions I have drawn.	I organize my presentation around a few concise points that support the theme.	I include some main points in my presentation, but they may be wordy or missing information.	I do not identify the main points in my presentation.
Multimedia Features			
I use graphics, video, sound, and other multimedia features effectively to communicate my theme and create	I use some graphics, video, sound, and other multimedia features to enhance and	I use graphics, video, sound, and other multimedia features, but some features detract from my key	I do not use graphics, video, sound, or other multimedia features, or the ones I use detract

4	3	2	1
interest. I follow all copyright laws when I use multimedia features.	support my key points.	points.	from my key points.
Creativity			
My presentation includes unique features that communicate meaningful fresh insights and perspectives in unusual and surprising ways.	My presentation communicates insights in unusual and surprising ways.	I try to communicate fresh insights in unusual and surprising ways, but some of my methods distract rather than support my presentation's theme.	My presentation is predictable.
Organization			
My presentation begins with a slide that builds curiosity and interest in the theme, organizes information in a logical order, and leaves the audience with an important idea about the theme to think about.	My presentation begins with an introduction that describes the theme in an interesting way, organizes information in order, and concludes with a summary of the most important points.	My presentation has an introduction and a conclusion, but they may not engage the audience in thinking about my theme. The order of the information may not help me communicate the theme.	My presentation is missing an introduction or a conclusion and is organized in a way that confuses the audience.
Oral Presentation			
I have rehearsed my presentation. I speak clearly and smoothly in an engaging way. I show poise and confidence, interact appropriately with my audience, and handle unexpected problems effectively.	I have rehearsed my presentation. I speak clearly and smoothly. I show poise and audience awareness.	I could have rehearsed my presentation more carefully. Sometimes, my audience loses interest or has difficulty understanding me.	My audience has difficulty following my presentation and understanding me. I did not practice enough.

Assessment Resources on the Web

Assessment Toolkit
www.nwrel.org/assessment/toolkit98.php*
A collection of readings and activities to be used for professional development in improving assessment

The Case for Authentic Assessment. ERIC Digest
http://ericae.net/db/edo/ED328611.htm*
Discussion about authentic assessment and traditional testing

The Concept of Formative Assessment
www.ericdigests.org/2003-3/concept.htm*
A brief overview of the research on formative assessment

Critical Issue: Multiple Dimensions of Assessment That Support Student Progress in Science and Mathematics
www.ncrel.org/sdrs/areas/issues/content/cntareas/science/sc700.htm*
A research-based exploration of how different kinds of assessment can improve student achievement

Does The Use of Holistic Rubrics Affect Student Performance in Reading and Writing?
www.usm.maine.edu/cepare/pdf/meg/meg07.pdf* (PDF; 2)
Examination of the effects of using holistic rubrics

Inside the Black Box: Raising Standards through Classroom-Based Assessment
www.pdkintl.org/kappan/kbla9810.htm*
The premier research study on the use of informal classroom assessments

New Assessment Beliefs for a New School Mission
http://edustat.com/uploadedFiles/Stiggins_New%20Assessment%20Beliefs%20for%20a%20New%20School%20Mission.pdf* (PDF; 7)
Article by Rick Stiggins arguing that effective classroom assessment must support high-stakes testing

Practical Assessment Research and Evaluation
http://pareonline.net/*
A peer-reviewed journal that addresses issues of assessment

Rubrics and Self-Assessment Project
www.pz.harvard.edu/Research/RubricSelf.htm*
Research focused on the effect of instructional rubrics and rubric-referenced self-assessment on the development of 7th and 8th grade students' writing skills and their understandings of the qualities of good writing

Self-Assessment
www.aaia.org.uk/pdf/AAIAformat4.pdf* (PDF; 35)
A collection of information and activities to help students learn to assess their own learning

Resources Cited in Assessing Projects

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