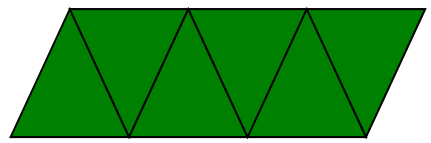
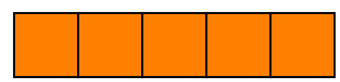
Polygon Investigation

By Jennifer and Brandon

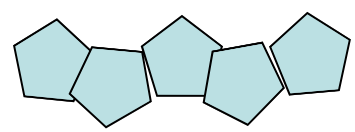
The Problem



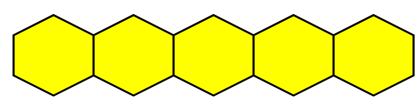
- If you line up 100 equilateral triangles in a row, what will the perimeter be? Find a rule for any number of triangles.
- What if you lined up:
  - Squares?



  - Regular Pentagons?

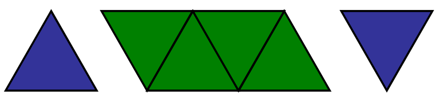
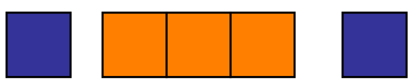
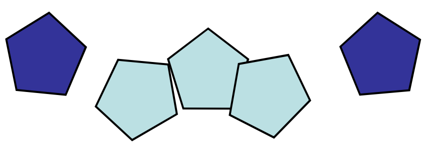
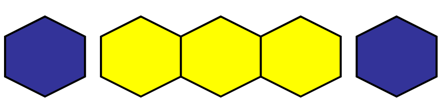


  - Regular Hexagons?



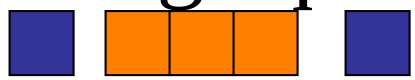
  - n-sided Polygons?

Our Mathematical Process

End + Middles + End	# of Sides	Each End Contributes	Middles Contribute
	3	3-1	3-2
	4	4-1	4-2
	5	5-1	5-2
	6	6-1	6-2
	n	n-1	n-2

Our Generalized Claim

- Visually: (using squares)



Each end contributes 3 sides

- Algebraically:

$$p = (n-2)(s-2) + 2(s-1)$$

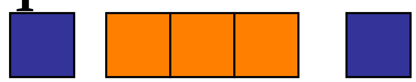
The number of middle squares (2 less than the total)

Each middle contributes 2 sides

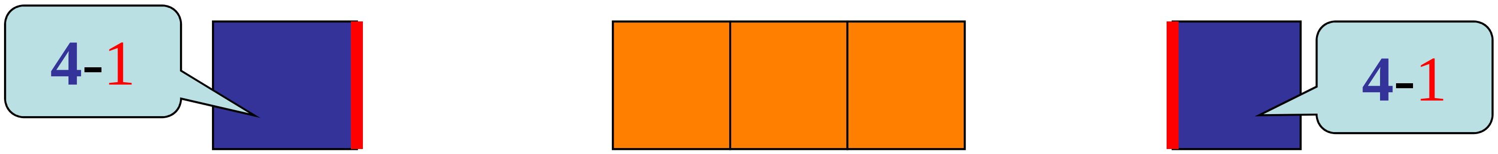
- Verbally:

Separating the row of polygons into **middle** and **end** polygons, the perimeter equals the **number of middle polygons** times the **amount contributed to the perimeter by each of the middle polygons**, plus **the amount contributed by the two end polygons**.

Our Evidence

- Still using squares to visually support our evidence: 
- Our variables represent:
  - p= perimeter of total
  - s= # of sides (squares have 4)
  - n= the # of squares

Our Evidence



- **(n-2)** equals the number of middle polygons (in this case there are 5-2 middle squares)
- **(s-2)** equals the amount of sides each middle polygon contributes to the perimeter (in this case each square in the middle contributes 2--one top and one bottom side)
- **2(s-1)** equals the two end polygons--each contributing the # of sides minus 1 to the perimeter (in this case each end square contributes 4-1--the 3 sides forming a cap

Our Conclusion

- Our claim that $p=(n-2)(s-2) + 2(s-1)$ is supported by our evidence to show that for any number of polygons lined up in a row, our rule works.

- Any questions?