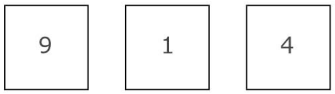
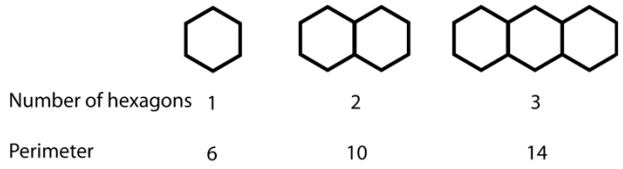
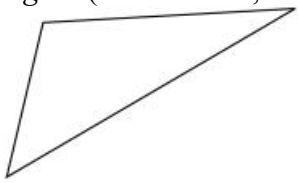
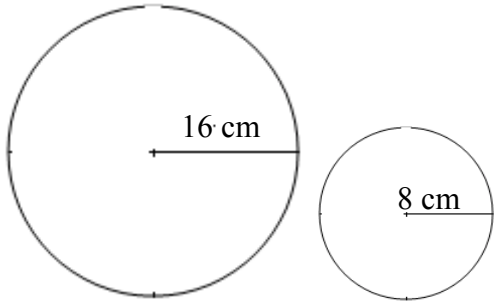
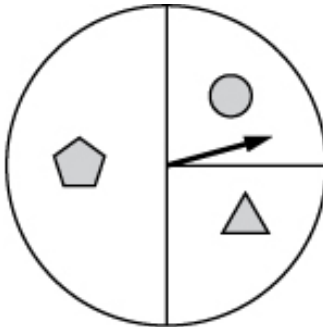
Examples of "local" and "global" explanations

Strand	Local explanation	Global explanation
Numbers and Operations: *Which is larger 2/3 or ¾?*	The 2/3 is missing 1/3 and the ¾ is missing ¼. One third is bigger than ¼. Because for the 1/3 we're taking a bigger piece than for the ¼, 2/3 is smaller than ¾.	Both fractions are missing one piece to complete the whole: 2/3 is missing 1/3 and ¾ is missing ¼. One third is bigger than ¼ because *the larger the denominator, the smaller the pieces*. So, for the 2/3 we're taking away a bigger piece from the whole compared to what we're taking for ¾. So, 2/3 is smaller than ¾.
Numbers and Operations: *Which is the largest number you can make using the following digits*? 	The biggest number is 941. This is how I thought: I first put the 9 in the hundreds place and then considered what numbers I could make by switching the order of 4 and 1. This gave me 914 and 941. I did the same with 1 and 4. So, I got the following numbers: 914, 941, 149, 194, 491, and 419. And 941 is definitely the largest.	The biggest number is 941. This is how I thought: *the hundreds place has the most value*. So, I needed to put the bigger digit in this place. So, I put 9 into the hundreds place. Then, *the tens place also has a larger value than the ones place*. So, I put 4 in the tens place, which left the 1 for the ones place.

Algebra: *What is the perimeter of a hexagon "train" with six "wagons?"*  	Well, the first train has a perimeter of six sticks; the second a perimeter of 11 sticks, and the third a perimeter of 16 sticks. I noticed that if we join these three trains we get a train with six "wagons." So, the perimeter is 6+11+16, which is 33 sticks. However, if we join these "wagons," we need to subtract 2, because the first train will have a common side with the second train and the second train a common side with the third train. So, the perimeter will be 31 sticks.	Well, I noticed *a pattern*. The second train has five sticks more than the first train; the third train has 5 plus 5 more sticks than the first train. So, the sixth train will have 5x5 more sticks than the first train. This is because the sixth train has five more "wagons" than the first train, and *for each* additional "wagon," we're adding 5 sticks. So, the sixth train will have 5 sticks from the first train plus 25 sticks that I get from timising 5 times 5—so, it will have a perimeter of 31 sticks.
Geometry *How many right angles are there in the following triangle?* (from NAEP, 8^{th} grade) 	There is none. The biggest angle in this triangle is obtuse, so it is more than 90^0. I also measured the other two angles, and I found that each is less than 90^0. So, there are no right angles in this triangle.	*We know that if we add up all the angles in a triangle, we're going to get 180^0*. The biggest angle is this triangle seemed to be *obtuse*. Indeed, when I measured it, I found that it was more than 90^0. *That means that together the other two angles are less than 90^0*. So, no right angles in this triangle; sorry!

Measurement: *You and your friends are really hungry. You can either order two medium pizzas or one large pizza. What would you prefer?*  	Definitely the larger pizza. We know that the area of a circle is pi times the square of the radius. So, the large pizza has an area of 16x16x pi, which is about 804 square centimeters. The medium one has an area of 8x 8 x pi which is about 201 square centimeters. So, definitely the larger pizza.	Definitely the larger pizza. We know that the area of a circle is pi times the square of the radius. *Because the radius of the larger pizza is twice as big as that of the medium pizza,* the larger pizza is four times bigger than the medium pizza.

Data analysis and probability *Angie argues that if we spin this spinner, the probability of getting a pentagon is equal to the probability of getting a rhombus or a triangle. Is she right?* 	Yes, Angie is right. The probability of getting a pentagon is ½ and the probability of getting a triangle is ¼; which is also the probability of getting a rhombus. So, the probability of getting a rhombus or a triangle is equal to ¼ plus ¼, which is ½ because 2/4 = ½. So, the probability of getting a pentagon is equal to the probability of getting a rhombus or a triangle.	Yes, Angie is right because the *probability we get depends on the area that each shape covers*. The pentagon covers half of the circle. The rhombus and the triangle together also cover half of the circle. So, because these two shapes *cover the same area* as the pentagon, the probability of getting a pentagon is equal to the probability of getting a rhombus or a triangle.