Rigid Transformations

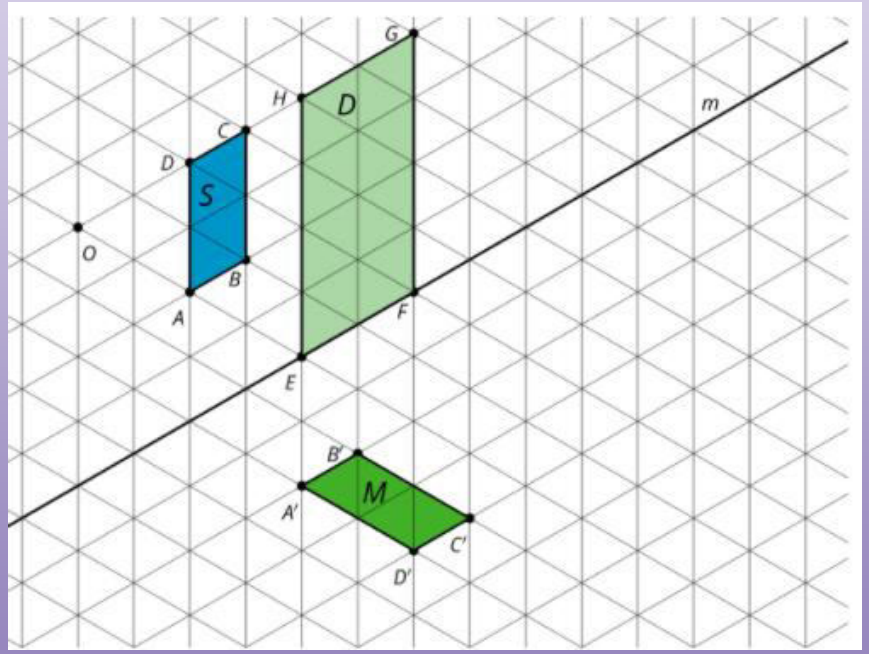
Illustrative Mathematics®

Learning Goal

- Given a figure and the description of a transformation, I can draw the figure's image after the transformation.
- I can describe the sequence of transformations necessary to take a figure onto another figure.
- I know that rigid transformations result in congruent figures.

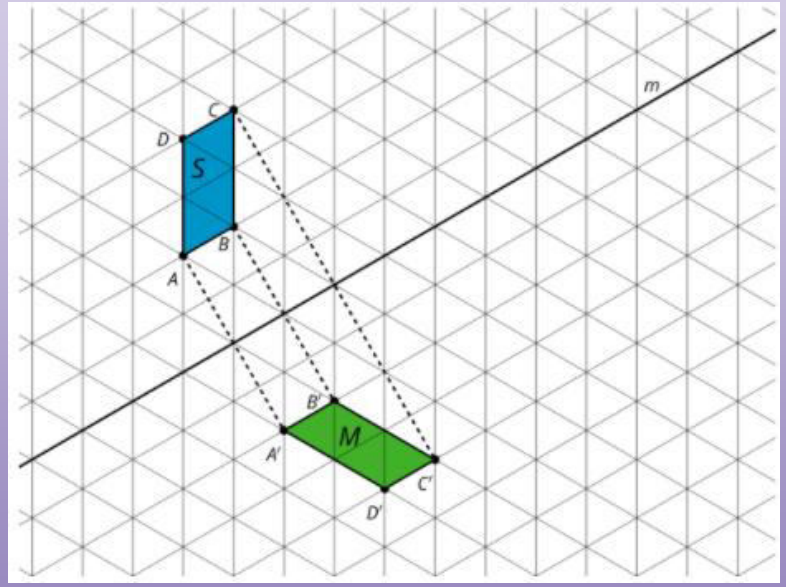
10.1 Transformed

what do you notice?



what do you wonder?

10.2 What's the Same?



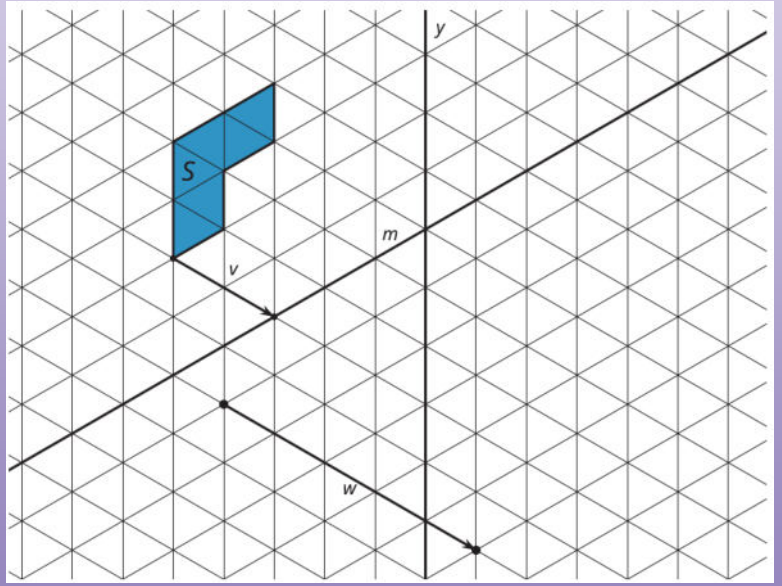
How can we define a translation?

How can we define a reflection?

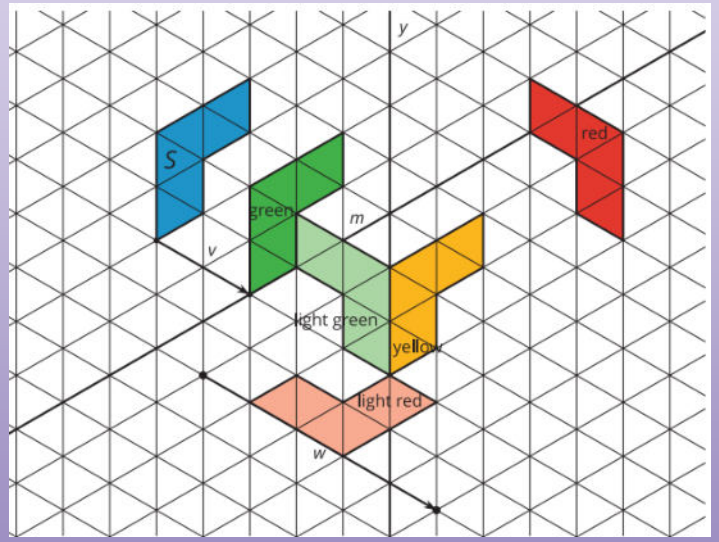
10.2 What's the Same?

Draw each rigid transformation. Use the Style Bar to choose a different color for each one.

1. **Translate** figure S along the line segment v in the direction shown by the arrow. Color:
2. **Reflect** figure S across line y. Color:
3. Reflect figure S across line m. Color:
4. Translate figure S along the line segment w in the direction shown by the arrow. Reflect this image across line y. Color:
5. How are the images the same? How are they different?



Activity Synthesis

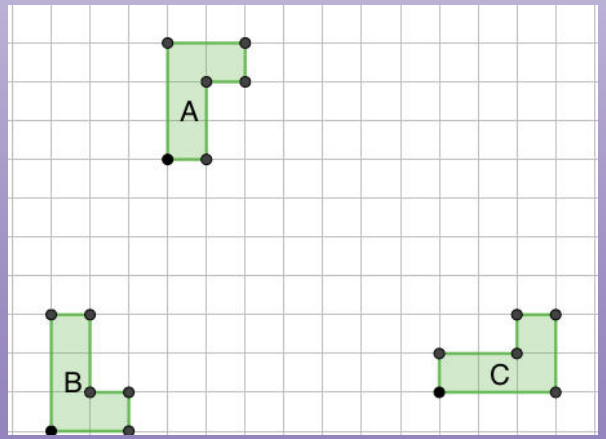


- For the reflection of S across line y , how do the side lengths of S compare to the corresponding side lengths in its image?
- What is the measures of the angle in the upper left corner of S ?
- How does this compare to the corresponding angle measure in any of the images of S ?

10.3 Does Order Matter?

A sequence of rigid transformations that takes one figure onto another, the figures are called **congruent.**

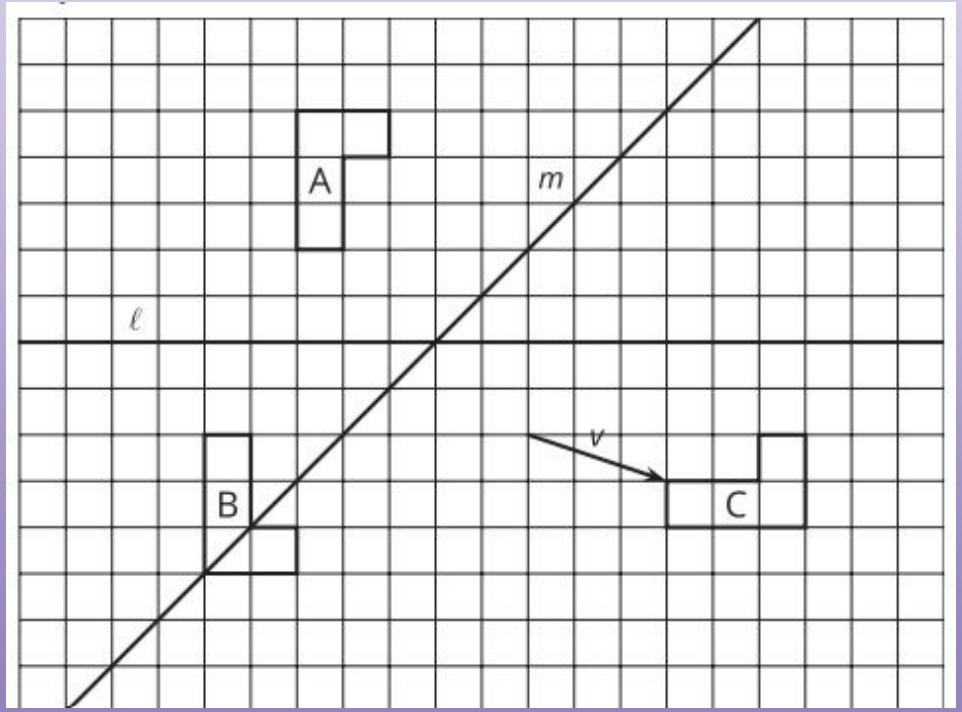
Here is an applet with 3 congruent l shapes on a grid



1. Describe a sequence of transformations that will take Figure *A* onto Figure *B*.
2. If you reverse the order of your sequence, will the reverse sequence still take *A* onto *B*?
3. Describe a sequence of transformations that will take Figure *A* onto Figure *C*.
4. If you reverse the order of your sequence, will the reverse sequence still take *A* onto *C*?

Activity Synthesis

Share your responses



Lesson Synthesis

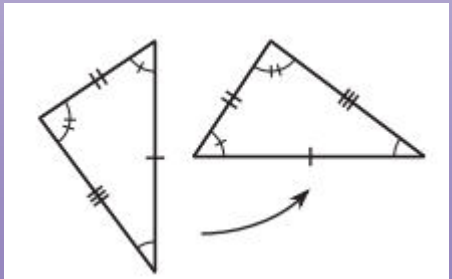
What important ideas did you learn about rigid transformations?

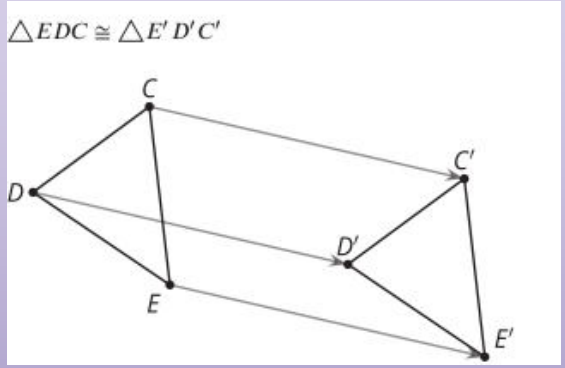
Date, Type	Statement	Diagram

In order to write convincing arguments, they need to support their statements with facts.

Lesson Synthesis

A rigid transformation is a translation, reflection, rotation, or any sequence of the three. Rigid transformations take lines to lines, angles to angles of the same measure, and segments to segments of the same length. (Assertion)





One figure is congruent to another if there is a sequence of translations, rotations, and reflections that takes the first figure exactly onto the second figure. The second figure is called the image of the rigid transformation. (Definition)