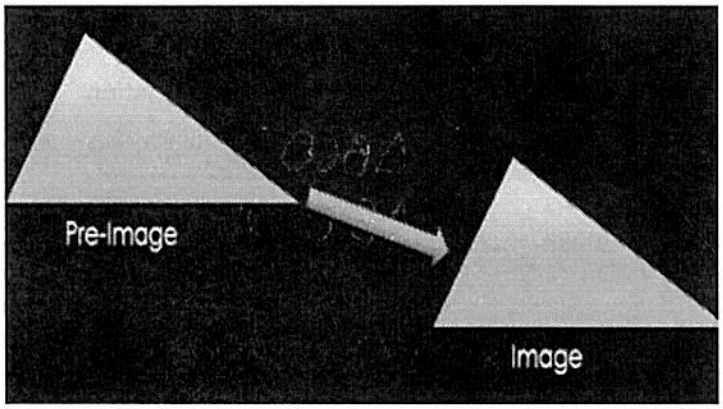
Name: Key Date: _____

UNIT 2 **LESSON 1**

AIM: WHAT ARE BASIC RIGID MOTIONS?

TRANSFORMATIONS:



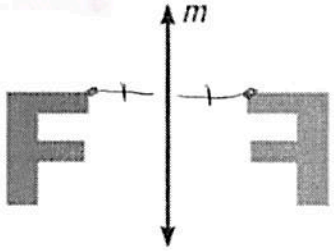
- Transformation is a term used to describe a change in size, shape or location of a figure.
- The original figure is referred to as the pre-image.
- The result of the transformation is called the image.
- If the pre-image and the image are congruent, then the transformation is called a basic rigid motion!

3 BASIC RIGID MOTIONS:

1. TRANSLATION

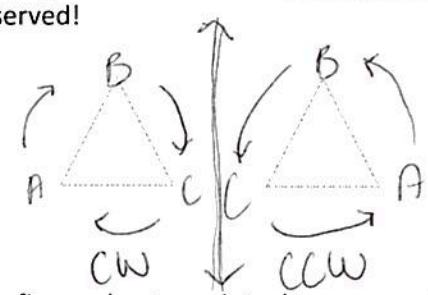
- SLIDE a figure a distance horizontally and a distance vertically.
- slides each point of a figure the same distance in the same direction.

2. REFLECTION

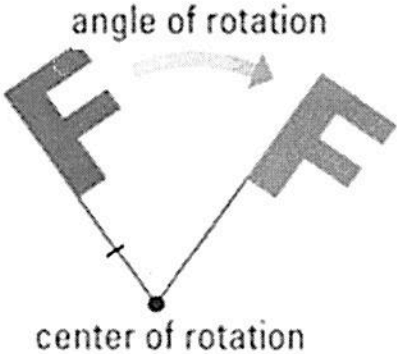


Line *m* is a line of reflection.

- FLIP a figure across a line & produces a mirror image.
- This line is called the line of reflection.
- Since all points move across the line of reflection, the image of each point will be the same distance away from the line of reflection as the pre-image.
- Reflections are the only rigid motion in which orientation is not preserved!



3. ROTATION



- TURN a figure about a point, along an arc, through a specific angle.
- A figure is turned about a fixed point, called the center of rotation.
- The figure is rotated either clockwise
- or counter clockwise.

Basic Rigid Motion's preserve:

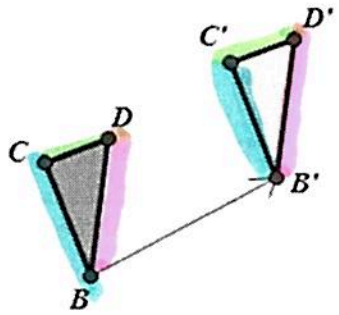
1. side length
2. angle measurement

The name suggests that it moves the points of the plane around in a rigid fashion.

Given: ΔBCD maps onto $\Delta B'C'D'$ by a tanslation.

The **pre-image** is: ΔBCD.

The **image** is: $\Delta B'C'D'$.



MAPPING – There is a correspondence between the pre-image and image if and only if each point of the pre-image corresponds to **one and only one point** of the image.

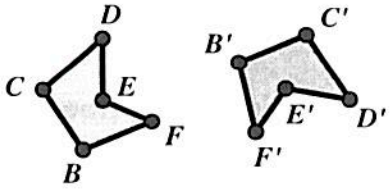
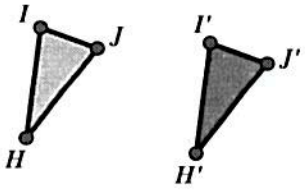
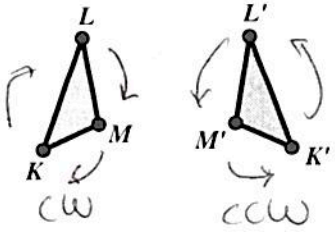
- B maps onto B'
- C maps onto C'
- D maps onto D'

Follow the letters

$\Delta BCD \cong \Delta B'C'D'$

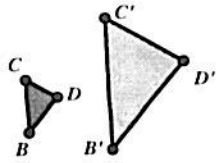
SIDE LENGTHS	ANGLE MEASUREMENTS
$\overline{BC} \cong \overline{B'C'}$	$\angle B \cong \angle B'$
$\overline{CD} \cong \overline{C'D'}$	$\angle C \cong \angle C'$
$\overline{BD} \cong \overline{B'D'}$	$\angle D \cong \angle D'$

Name the following basic rigid motions:

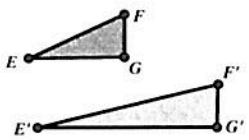
Example #1	Example #2	Example #3
 Rotation	 Translation	 Reflection

A **Non Rigid Motion:** would be a dilation b/c the size changes!

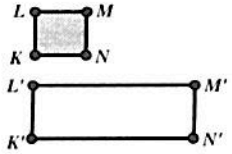
Example #1



Example #2



Example #3



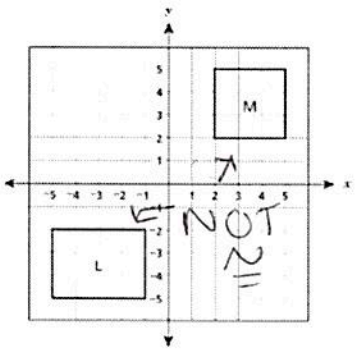
≅ figures!

PRACTICE PROBLEMS:

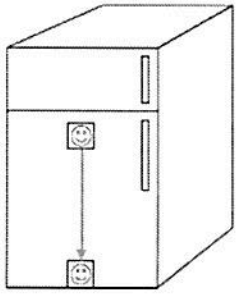
1. A sequence of transformations was applied to an equilateral triangle in a coordinate plane. The transformations used were rotation, reflection, and translation. What statement was true about the resulting figure?
   a) It must be an equilateral triangle with the same side lengths as the original triangle.
   b) It must be an equilateral triangle but the side lengths may be different from the original triangle.
   c) It may be a scalene triangle and all the side lengths may be different than the original triangle.
   d) It may be an obtuse triangle with at least one side with the same length as the original triangle.

≅ figures!

2. Figure L and figure M are shown on the grid below. Maria wants to transform figure L to figure M using only rotations, reflections, and translations. Which statement is true?
   a) The transformation can be done with a reflection followed by a rotation.
   b) The transformation can be done with a reflection followed by a translation.
   c) The transformation cannot be done because figure L is not congruent to figure M.
   d) The transformation cannot be done because figures L and M are in different quadrants.

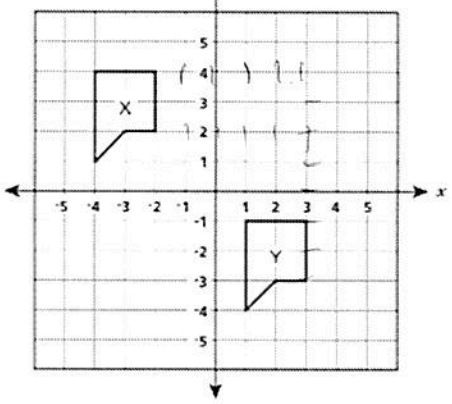


3. A picture held by a magnet to a refrigerator slides to the bottom of the refrigerator, as shown in the accompanying diagram. This change of position is an example of a
   a) translation
   b) dilation
   c) rotation
   d) reflection



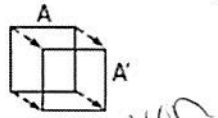
4. Figure *X* and figure *Y* are shown on the coordinate grid below. Which statement about figures *X* and *Y* must be true?
   a) A series of translations will transform figure X to figure Y, and the figures will be congruent.
   b) A 180° clockwise rotation will transform figure X to figure Y, and the figures will be congruent.
   c) A series of translations will transform figure X to figure Y, but the figures will not be congruent.
   d) A 180° clockwise rotation will transform figure X to figure Y, but the figures will not be congruent.

5 → and 5 ↓



5. Ms. Brewer's art class is drawing reflected images. She wants her students to draw images reflected in a line. Which diagram represents a correctly drawn image?

a)

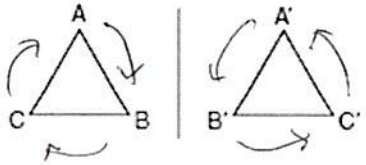


translation

b)

dilation

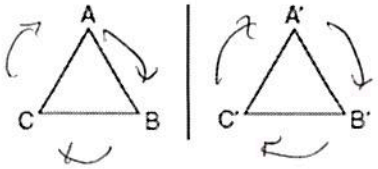
c)



CW CCW

d)

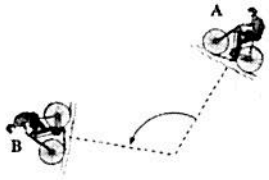
CW CW



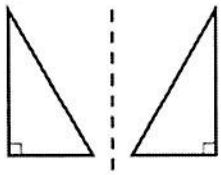
rotation

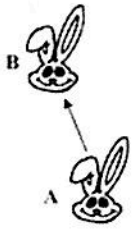
6. Identify each of the following rigid motions as a Reflection, Rotation or Translation:

REFLECTION	ROTATION	TRANSLATION
		

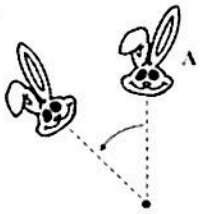
1. 

rotation

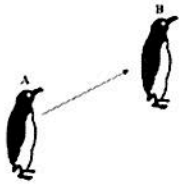
2. 
reflection

3. 

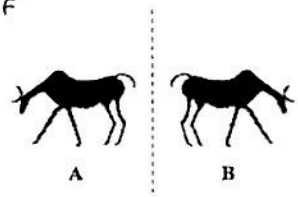
translation

4. 

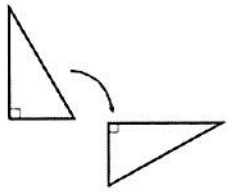
rotation

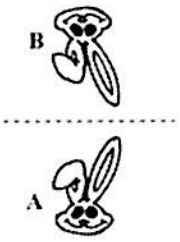
5. 

translation

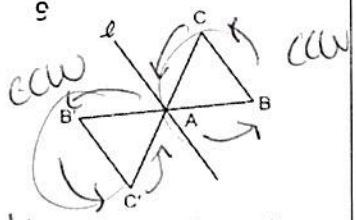
6. 

reflection

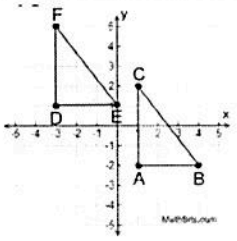
7. 
rotation

8. 

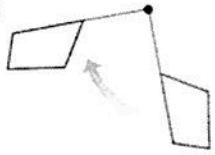
reflection

9. 

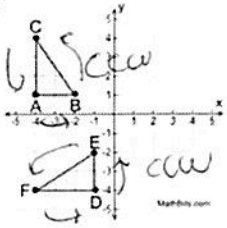
rotation!

10. 

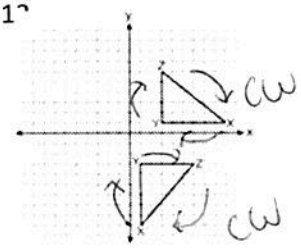
translation

11. 

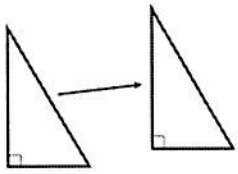
rotation

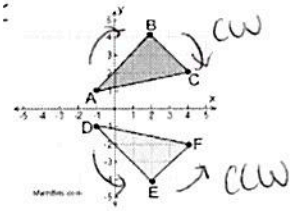
12. 

rotation

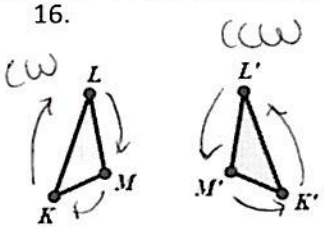
13. 

rotation

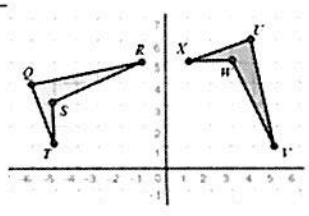
14. 
translation

15. 

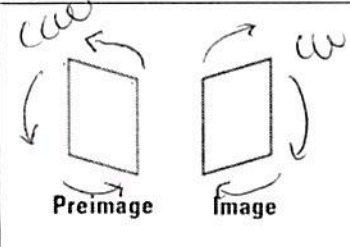
reflection

16. 

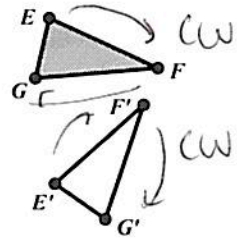
reflection

17. 

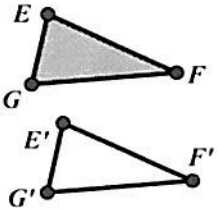
rotation

18. 

reflection

19. 

rotation

20. 

translation