

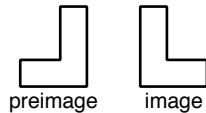
Date \_\_\_\_\_

Dear Family,

In this chapter, your child will learn more about transformational geometry. Your child will learn about congruence transformations, such as reflections, translations, and rotations, and will also learn about geometric patterns such as symmetry and tessellations.

Your child will learn that an **isometry** is a transformation that does not change the shape or size of a figure. Isometries can also be called *congruence transformations* or *rigid motions*.

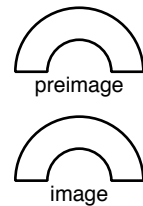
Consider the following:



This figure shows an isometry. The figure has been **reflected**, and as you can see, the preimage and the image are congruent.

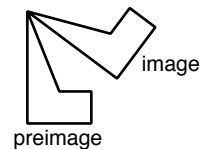
Your child will also learn that a **translation** is a type of isometry.

The figure in this diagram has been translated. This means that the figure has been transformed along a vector such that each segment joining a point and its image has the same length as the vector and is parallel to the vector.



Your child will also see that a **rotation** is an isometry. Look at the figures at right.

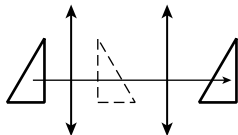
This figure has been turned around a fixed point. Note that the rotated figure is congruent to the preimage.



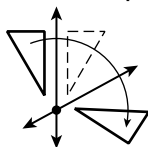
Your child will then look at combining transformations. This involves one transformation followed by another.

There are a few simple rules that can explain these compositions of transformations.

1. A composition of two isometries is an isometry.
2. The composition of two reflections across two parallel lines is equivalent to a translation.

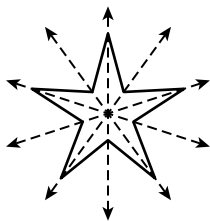


3. The composition of two reflections across two intersecting lines is equivalent to a rotation.



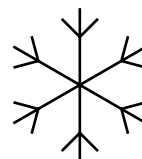
4. Any translation or rotation is equivalent to a composition of two reflections.

Your child will also explore symmetry. Consider the following shape.



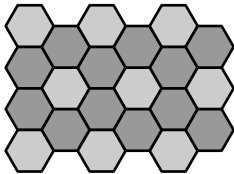
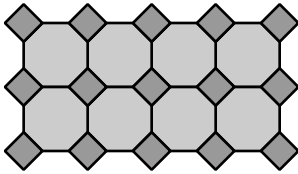
This figure shows **line symmetry**. This means that the figure can be reflected across a line so that the image coincides with the preimage. This figure has five lines of symmetry, any of which divide the figure into two congruent halves.

This snowflake has **rotational symmetry**. This means that the figure can be rotated about a point by an angle greater than  $0^\circ$  and less than  $360^\circ$  so that the image coincides with the preimage.

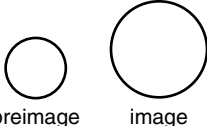
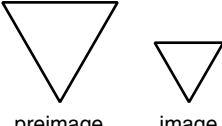


Your child will also be looking at **tessellations**. A tessellation is a repeating pattern that completely covers a plane with no gaps or overlaps. The measures of the angles that meet at each vertex must add up to  $360^\circ$ .

There are two types of tessellations.

Type	Description	Example
Regular tessellation	formed by congruent regular polygons	
Semiregular tessellation	formed by two or more different regular polygons	

Your child will also look at **dilations**, which are transformations that change the size of a figure but not the shape. There are two types of dilations.

Dilation	Definition	Also Known As	Example
Enlargement	dilation with a scale factor greater than 1	expansion	 preimage      image
Reduction	dilation with a scale factor greater than 0 but less than 1	contraction	 preimage      image

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