Transformations Family Letter

Dear Family,

In this module, ***Transformations***, students will draw on their knowledge of graphing in the coordinate plane. By graphing transformations and identifying the coordinates of their images, students will understand how these transformations affect the x and y coordinates of a preimage. Students will apply this understanding of using coordinate notation to determine the coordinates of an image from the coordinates of its preimage.

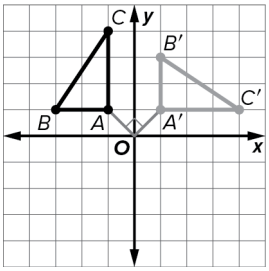
What Did Students Learn Previously?

In previous grades, students graphed points on the coordinate plane. They created symmetric figures and identified their lines of symmetry.

What Will Students Learn in This Module?

Graph Transformations and Determine the Coordinates of Their Images

- Students will **translate** (slide) figures horizontally and vertically on the coordinate plane and identify the coordinates of the translated image.
- Students will **reflect** figures across horizontal and vertical lines on the coordinate plane and identify the coordinates of the reflected image.
- Students will **dilate** figures on the coordinate plane and identify the coordinates of the dilated image.
- Students will **rotate** figures 90°, 180°, and 270° about a vertex on the coordinate plane and identify the coordinates of the rotated image. For example, in the graph shown, the triangle on the left has been rotated 90° clockwise about the vertex (0, 0). The coordinates of the rotated image are identified by an apostrophe following the coordinate name, so point B in the **preimage** is labeled B' in the rotated **image**. The coordinates of the rotated image are $A'(1, 1)$, $B'(1, 3)$ and $C'(4, 1)$.



Use Coordinate Notation to Determine the Coordinates of an Image

- Students will apply translations, reflections, dilations, and rotations to the coordinates of a preimage and determine the coordinates of the transformed image. For example, the coordinate notation shown the *Coordinate Notation* box indicates that when a figure is rotated 90° about the origin, the x and y coordinates of the preimage trade places, and the x coordinate changes sign. Using the coordinate notation for a 90° rotation, the preimage coordinates $A(-1, 1)$ $B(-3, 1)$ $C(-1, 4)$ in the graph become $A'(1, 1)$, $B'(1, 3)$ and $C'(4, 1)$.

Coordinate Notation
$(x, y) \rightarrow (y, -x)$

What Vocabulary Terms Will Students Use?

Term	Definition
center of dilation	The point from which a figure is dilated. When the center of dilation is the origin, each coordinate of the preimage is multiplied by a scale factor k to find the coordinates of the image.
dilation	A transformation that enlarges or reduces a figure by a scale factor k relative to a center point.
image	The figure that results when a transformation is applied to a preimage.
preimage	The image of a figure before a transformation is applied.
reflection	A transformation in which a figure is reflected, or flipped, across a line.
rotation	A transformation in which a figure is rotated, or turned, about a fixed point called the vertex, or center of rotation.
transformation	An operation that maps a figure to a new location, orientation, and/or size. A transformation can slide, flip, turn or resize a preimage to form a new image.
translation	A transformation that slides a figure from one position to another without turning or flipping it.

How You Can Provide Support

1. Support your child's understanding of transformations by discussing transformations in everyday life.
   - *Video Games*: Discuss with your child how video game designers and programmers use geometric transformations when creating video games.
   - *Architecture:* Discuss with your child how architects and engineers use geometric transformations when designing buildings and bridges.
   - *Interior Design*: Discuss with your child how interior designers use geometric transformations when decorating spaces for commercial or residential use.
2. Encourage your child to have a positive, growth-oriented attitude towards mathematics and their learning.
   - Encourage them to ask questions – both at home and in class. Sometimes, an answer to a question will generate more questions. That's how you know they are learning!
   - Encourage your child to embrace challenges and remind them that every challenge is an opportunity to learn something new.
   - Celebrate successes – both small and large.
3. Contact me to arrange a time to discuss the specifics of your child's performance and how we can work together to help them succeed in this module.

Sincerely,

Reveal MATH™

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(Teacher's Name) (Email/Phone)