8th Grade UNIT 14 OVERVIEW: Transformations

Unit Outcomes
At the end of this unit, your student should be able to:

- ✓ Graph translations on a coordinate plane and describe the translation.
- ✓ Graph reflections on a coordinate plane and describe the reflection.
- ✓ Graph rotations on a coordinate plane and describe the rotation.
- ✓ Verify and understand the properties of transformation in translations, reflections, and rotations.
- ✓ Identify dilation and describe its effect on the properties of the pre-image.
- ✓ Perform compositions of transformations.

Key Vocabulary
Terms to deepen the student's understanding

- ✓ A'
- ✓ Center of Dilation
- ✓ Center of Rotation
- ✓ Clockwise
- ✓ Composition of Transformation
- ✓ Counterclockwise
- ✓ Dilation
- ✓ Glide Reflection
- ✓ Image
- ✓ Isometry
- ✓ Line of Reflection
- ✓ Origin
- ✓ Pre-Image
- ✓ Reflection
- ✓ Rigid Transformation
- ✓ Rotate 180°
- ✓ Rotate 270°
- ✓ Rotate 90°
- ✓ Rotation
- ✓ Scale factor
- ✓ Transformation
- ✓ Translation

Key Standards Addressed
Connections to Common Core/NC Essential Standards

8.G.1 - Verify experimentally the properties of rotations, reflections, and translations:
a. Lines are taken to lines, and line segments to line segments of the same length.
b. Angles are taken to angles of the same measure.
c. Parallel lines are taken to parallel lines.

8.G.2 - Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

8.G.3 - Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

8.G.4 - Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Where This Unit Fits
Connections to prior and future learning

Coming into this unit, students should have a strong foundation in:

- ✓ Drawing geometric shapes with given conditions
- ✓ Graphing points on a coordinate plane
- ✓ Knowing that an ordered pair is written as (x,y)
- ✓ Turns, slides, and flips of figures in space

This unit builds to the following future skills and concepts:

- ✓ Developing definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, and line segments
- ✓ Representing, describing, and comparing transformations
- ✓ Rotations around points other than the origin
- ✓ Reflections over linear equations (i.e. y = x)
- ✓ Changing dimensions (dilations) of two- and three-dimensional figures

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Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
✓ Teaching videos made by Wake County teachers ✓ WCPSS YouTube Channel – Math Playlist ✓ Overview of all Transformations – *Includes some enrichment* ✓ Rotations Overview ✓ Rotations Practice ✓ Translations Video ✓ Translations Practice ✓ Reflections Overview ✓ Reflections Practice ✓ Transformations Overview ✓ Transformations Practice ✓ Translations ✓ Rotating 90 degrees ✓ Rotating 180 degrees ✓ Reflections over the x-axis ✓ Reflections over the y-axis ✓ Basic Dilations ✓ Composition of Transformations – *This link shows everything from the basics to enrichment through videos and practice*	✓ How does the location of a point change when the x-coordinate increases? ✓ What type of rotation will rotate back to the original point? ✓ Which transformation is the most important? Justify your response. ✓ What are the differences and similarities between transformations? ✓ How would you create a PSA (public service announcement) about transformations? ✓ How do we describe how objects are moved? ✓ How could you complete a combination of transformations? Can you create "rules" or formulas for this combination? ✓ What changes or stays the same in a figure after a translation, reflection, or rotation? ✓ When two lines are parallel and then a translation, reflection, or rotation is performed the two lines remain parallel. Why do the slopes of the parallel lines in the pre-image and image not always remain the same? ✓ Is the image of a vertical line sometimes, always, or never vertical after a translation, a reflection, or a rotation? ✓ How do we reduce or enlarge an object proportionally? ✓ How do you know that dilations create similar figures? ✓ How is a glide reflection identified? ✓ Which compositions will create congruent figures? Similar figures? ✓ Think of a career that might involve transformations. How would you use transformations if you had a job in that field?