Richmond Public Schools

Curriculum Framework

Grade 7 Honors (7/8)

Strand: Measurement and Geometry
8.7 The student will **a) given a polygon, apply transformations, to include translations, reflections, and dilations, in the coordinate plane; and** **b) identify practical applications of transformations.** **7.7 The student will apply translations and reflections of right triangles or rectangles in the coordinate plane.**
Suggested Pacing
Related Standards

Spiral Down: 5th Grade: ● SOL 5.14	Spiral Up: Geometry: ● SOL G.3d
Essential Questions	**Common Misconceptions**
● What are the similarities and differences between the images and pre-images generated by translations? ● What is the relationship between the coordinates of the vertices of a figure and the coordinates of the vertices of the figure's image generated by translations? ● How can transformations be applied to real-world situations?	● Transformations: students have difficulty remembering the rules or the process for getting the new image ● Coordinate Plane: if students did not fully understand how to plot points, they will have difficulty plotting the original figure, as well as the image.
Understanding the Standard	**Essential Knowledge and Skills**
SOL 8.7: ● Translations and reflections maintain congruence between the preimage and image but change location. Dilations by a scale factor other than 1 produce an image that is not congruent to the preimage but is similar. Reflections change the orientation of the image.	SOL 8.7: ● Given a preimage in the coordinate plane, identify the coordinate of the image of a polygon that has been translated vertically, horizontally, or a combination of both. (a)

- A transformation of a figure, called preimage, changes the size, shape, and/or position of the figure to a new figure, called the image.
- A transformation of preimage point *A* can be denoted as the image *A'* (read as "*A* prime").
- A reflection is a transformation in which an image is formed by reflecting the preimage over a line called the line of reflection. Each point on the image is the same distance from the line of reflection as the corresponding point in the preimage.
- A translation is a transformation in which an image is formed by moving every point on the preimage the same distance in the same direction.
- A dilation is a transformation in which an image is formed by enlarging or reducing the preimage proportionally by a scale factor from the center of dilation (limited to the origin in grade eight).
  A dilation of a figure and the original figure are similar. The center of dilation may or may not be on the preimage.
- The result of first translating and then reflecting over the *x*- or *y*-axis may not result in the same transformation of reflecting over the *x*- or *y*-axis and then translating.
- Practical applications may include, but are not limited to, the following:
  - A reflection of a boat in water shows an image of the boat flipped upside down with the water line being the line of reflection;
  - A translation of a figure on a wallpaper pattern shows the same figure slid the same distance in the same direction; and
  - A dilation of a model airplane is the production model of the airplane.

SOL 7.7:

- A transformation of a figure called the preimage changes the size, shape, or position of the figure to a new figure called the image.
- Translations and reflections do not change the size or shape of a figure (e.g., the preimage and image are congruent figures). Translations and reflections change the position of a figure.
- Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been reflected over the *x*- or *y*-axis. (a)
- Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or a rectangle that has been dilated. Scale factors are limited to $\frac{1}{4}$, $\frac{1}{2}$, 2, 3, or 4.
  The center of the dilation will be the origin. (a)
- Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated and reflected over the *x*-or *y*-axis, or reflected over the *x*- or
  y-axis and then translated. (a)
- Sketch the image of a polygon that has been translated vertically, horizontally, or a combination of both. (a)
- Sketch the image of a polygon that has been reflected over the *x*- or *y*-axis. (a)
- Sketch the image of a dilation of a right triangle or a rectangle limited to a scale factor of $\frac{1}{4}$, $\frac{1}{2}$, 2, 3, or 4. The center of the dilation will be the origin. (a)
- Sketch the image of a polygon that has been translated and reflected over the *x*- or *y*-axis, or reflected over the *x*- or *y*-axis and then translated. (a)
- Identify the type of translation in a given example. (a, b)
- Identify practical applications of transformations including, but not limited to, tiling, fabric, wallpaper designs, art, and scale drawings. (b)

SOL 7.7:

- Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or rectangle that has been translated either vertically, horizontally, or a combination of a vertical and horizontal translation.
- Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or a rectangle that has been reflected over the *x*- or *y*-axis.

- A translation is a transformation in which an image is formed by moving every point on the preimage the same distance in the same direction.
- A reflection is a transformation in which an image is formed by reflecting the preimage over a line called the line of reflection. All corresponding points in the image and preimage are equidistant from the line of reflection.
- The image of a polygon is the resulting polygon after the transformation. The preimage is the polygon before the transformation.
- A transformation of preimage point *A* can be denoted as the image *A´* (read as "A prime").
- The preimage of a figure that has been translated and then reflected over the *x*- or *y*-axis may result in a different transformation than the preimage of a figure that has been reflected over the *x*- or *y*-axis and then translated.

- Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or rectangle that has been translated and reflected over the *x*- or *y*-axis or reflected over the *x*- or *y*-axis and then translated.
- Sketch the image of a right triangle or rectangle that has been translated vertically, horizontally, or a combination of both.
- Sketch the image of a right triangle or rectangle that has been reflected over the *x*- or *y*-axis.
- Sketch the image of a right triangle or rectangle that has been translated and reflected over the *x*- or *y*-axis or reflected over the *x*- or *y*-axis and then translated.

Vocabulary

SOL 8.7/SOL 7.7:

Polygon	Transformation	Translation
Reflection	Rotation	Dilation
Preimage	Scale Factor	

Assessment

Instructional Activities Organized by Learning Objective

Textbook

Notes

Resources
- Print
- Technology-based

Station Activities

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Cross-Curricular Connections	Tiered Differentiations