Richmond Public Schools
Curriculum Framework
7th Grade Math

Strand: Measurement and Geometry
7.7   **The student will apply translations and reflections of right triangles or rectangles in the coordinate plane.**

Suggested Pacing
Third Nine Weeks – 5 days

Spiraling Standards	

Spiraling Down:
 	
6.8   The student will
     a) identify the components of the coordinate plane; and
     b) identify the coordinates of a point and graph ordered pairs in a coordinate plane.
 	
5.14   The student will
     a) recognize and apply transformations, such as translation, reflection, and rotation
	Spiraling Up:
	
	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.

Essential Questions	Common Misconceptions
How does the translation and reflection of a figure affect its size, shape, orientation and location? *Translating a figure requires moving it. Its shape, size and orientation do not change, just its location. Reflecting a figure flips it over the axis, changing its orientation and location but not its size and shape.* **How does a translation differ from a reflection?**	- Students confuse the x- and y-axis. - Students have trouble distinguishing between a translation and a reflection. - Students have trouble plotting a point on the coordinate plane. - Students invert the x and y values. - When reflecting or testing for a reflection, students forget to count the distance from the axis as a check.

A translation is a slide whereas a reflection is a flip. **What is the relationship between the reflected image vertices and the pre-image vertices?** *They are equidistant from the axis it was reflected across.*	● Students have difficulty remembering what horizontal and vertical mean.

Understanding the Standard	Essential Knowledge and Skills
· 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. · 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	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** · 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. · 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.

preimage of a figure that has been reflected over the x- or y-axis and then translated.	· 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	**Instructional Activities Organized by Learning Objective**

Transformation
Translate
Reflect
Pre-Image
Image
Polygons
Triangles
Quadrilaterals
Coordinate Plane
Quadrant
x-axis
y-axis
x-coordinate
y-coordinate
Plot
Graph
Vertical
Horizontal
	VDOE
	Translation and Reflection
	
	Textbook
	Virginia Math Connects, Course 2, ©2012, Price, et al, McGraw-Hill: Translations, page(s): 700 – 704; Reflections, page(s) 711 – 716(in part);
	
	Notes
	7.7 – Geometric Transformations Notes
	
	Resources
	● **Print**
	   ○ Virginia Coach, New SOL Edition, Mathematics, Grade 7, @2018, Triumph Learning pg(s) 105 - 111
	   ○ Algebra Readiness – Translations pg(s) 112 – 115; Reflections pg(s) 134 - 139
	● **Technology-based**
	   ○ Gizmo
	      ■ Reflections
	   ○ NLVM
	      ■ Reflections
	      ■ Translations
	
	Stations
	Transformations Match

Assessment	

Cross-Curricular Connections	Tiered Differentiations
Art: Geometric transformations can be used to create tessellation murals. **Language Arts:** Students use transformations to create maps of their school and home. Then, in complete sentences, students are to write how to get to school from home. Finally, classmates are tasked to read the directions, and without the map, recreate the route from school to home.	(Tier 1) Students will be given a practical problem involving performing translations and reflections. (Tier 2) Students will be given a list of 2 translations and 1 reflection along with a pre-printed coordinate plane with a given shape already traced. The teacher will guide students through the first translation, stopping to sketch the new shape. Next the teacher will perform the second translation and reflection, stopping at each to sketch the new shape. The students will continue this activity on new coordinate planes, following the same process so their final product has an original shape, 3 sketched shapes which coordinate with their given lists of transformations, written coordinate for one point on each transformation, and a written description of what transformations occurred. (Tier 3) Students will participate in sensory based activity utilizing physical models of shapes. Students will be given a right triangle, and asked to trace the triangle in Quadrant II, with one point on coordinates (-4, 3). Next students will follow the teacher as he/she guides them in physically reflecting the triangle across the y-axis. Students will flip their triangle and trace the triangle at the new location, with that same point now at coordinate (4, 3). The teacher will pause to allow students to color in their new shape and to allow time to walk around and monitor progress. Next the teacher will have students translate the triangle -3 spaces vertically. The teacher will use vocabulary cards to assist in giving directions and guiding students through the process of sliding their shape, tracing and finally checking solutions as students color their new shape. The teacher will repeat this process, guiding students through 3 more transformations on separate, pre-printed coordinate planes. Each graph will contain 2 transformations, written coordinates of one point for each transformation, a description of what occured and accompanied by a physical model of the transformed shape.

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