Unit Plan - Gr. 6/7 Geometry and Spatial Sense- Term 3

Grade 6 OEs and SEs

OEs:
- describe location in the first quadrant of a coordinate system,and rotate two-dimensional shapes

SEs:
- sort and classify quadrilaterals by geometric properties related to symmetry,angles, and sides, through investigation using a variety of tools (e.g.,geoboard, dynamic geometry software) and strategies (e.g., using charts,using Venn diagrams);
- sort polygons according to the number of lines of symmetry and the order of rotational symmetry, through investigation using a variety of tools (e.g.,tracing paper, dynamic geometry software, Mira);
- identify, perform,and describe, through investigation using a variety of tools (e.g., grid paper, tissue paper, protractor,computer technology), rotations of 180º and clockwise and counterclockwise rotations of 90°,with the centre of rotation inside or outside the shape
–create and analyze designs made by reflecting,translating,and/or rotating a shape,or shapes,by 90º or 180º (Sample problem: Identify rotations of 90° or 180° that map congruent shapes, in a given design, onto each other.).

Summative Task 1
Demonstrate understanding of reflections, translations, and rotations. EQAO question.

Grade 7 OEs and SEs

OE's
- describe location in the four quadrants of a coordinate system, dilatate two-dimensional shapes, and apply transformations to create and analyze designs.
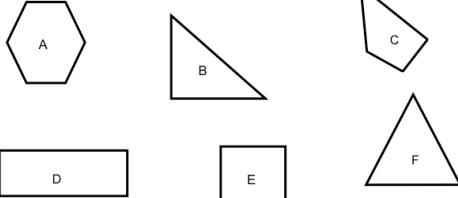
SE's
- sort and classify triangles and quadrilaterals by geometric properties related to symmetry, angles, and sides,through investigation using a variety of tools (e.g.,geoboard,dynamic geometry software) and strategies (e.g.,using charts,using Venn diagrams)
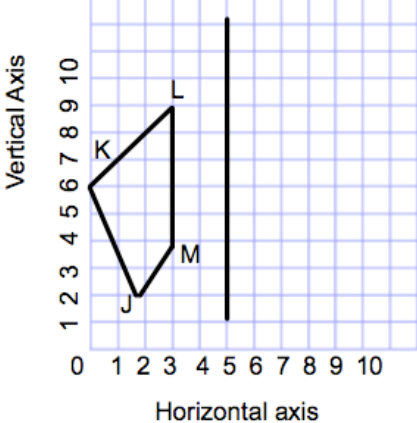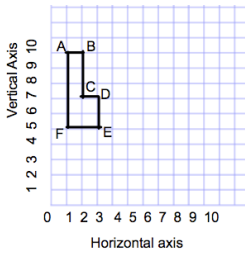– distinguish between and compare similar shapes and congruent shapes,using a variety of tools (e.g.,pattern blocks, grid paper, dynamic geometry software) and strategies (e.g.,by showing that dilatations create similar shapes and that translations, rotations,and reflections generate congruent shapes)
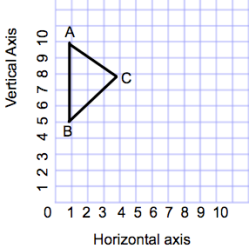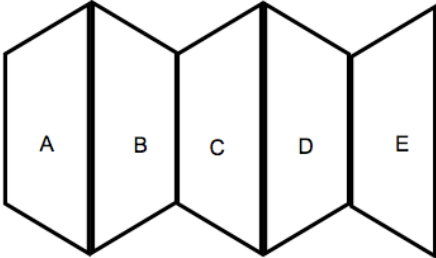**Summative Task 1** Demonstrate understanding of reflections, translations, and rotations. EQAO question.

Day	Problem/Checkpoint	Intent
1 WAAAAC	Warm-up: How many lines of symmetry does each road sign have? Activity: Use isometric dot paper. Draw a line through several dots. This line can be horizontal, vertical, or skewed. Make a design completely on one side of the drawn line that touches the line in some way. Make the mirror image of your design on the other side of the line. (Van De Walle Page 209) Consolidation: What is symmetry? Bansho Homework: Use 1 cm grid paper- Draw a design with 4 lines of symmetry. Explain how you drew the design.	*starting point to see what ideas students have about symmetry.*

Day	Problem/Checkpoint	Intent
2 WAAAAC	Warm-up: You will need one of each type of Pattern Blocks and stickers. Place a sticker at one vertex of each block. Trace around the yellow Pattern block. The tracing is the frame. Record the position of the vertex with the sticker. Find and record the number of different ways you can place the yellow block in the frame. Do not turn the block over. Repeat the activity for each pattern block. (MMS Page 270) Activity: Construct a design using pattern blocks with different rotational symmetries. You should make a design with order 2, 3, 4, 6, and 12 rotational symmetry. Which of these designs have mirror symmetry as well? (Van De Walle Page 211) Consolidation: Bansho- discuss results What is rotational symmetry? Homework: What is the order of rotational symmetry for this figure? (MMS Page 281 #6) 	*Finding the rotational symmetry of different figures*
3	Gizmo- Rotational Symmetry	*Review of rotational symmetry*

Day	Problem/Checkpoint	Intent
4 Checkpoint	**Independent Activity: Rotational Symmetry** Complete the table for the polygons. A hexagon (A), right triangle (B), quadrilateral (C), rectangle (D), square (E), triangle (F) 	Polygon	Does it have Rotational Symmetry?	Order of Rotational Symmetry	 |---|---|---| | A			 | B			 | C			 | D			 | E			 | F			 Use grid paper to draw a figure with each order of rotational symmetry. a) order 3 b) order 2 c) order 6 Stretch your thinking Which capital letters of the alphabet have rotational symmetry?	*Demonstrate an understanding of symmetry and rotational symmetry.*

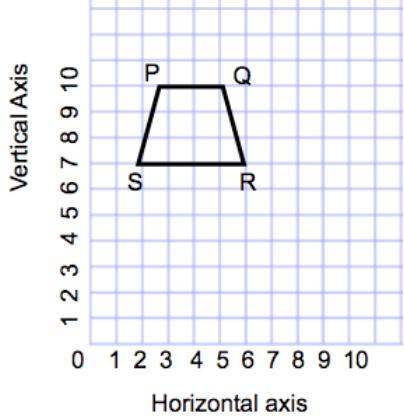| Day	Problem/Checkpoint	Intent
5	Warm-up: Figure JKLM was reflected in a vertical mirror line through the horizontal axis at 5. Draw the reflected image. (MMS Page 249) Activity: Draw a five sided shape in the first quadrant on coordinate grid paper using grid points for vertices. Label the figure ABCDE and call it Figure 1. Use the y axis as a line of symmetry and draw the reflection of the shape in the second quadrant and label the reflected points A'B'C'D'E' and call it Figure 2. Now use the x axis as the line of symmetry. Reflect both Figure 2 and Figure 1 into the third and fourth quadrants respectively and call these Figures 3 and 4. Label the points of these Figures with double and triple primes (A'' and A'''). Write in the coordinates for each vertex of all four figures. (Van De Walle Page 217) Consolidation: After a reflection, a figure and it's **image** are **congruent** and **face opposite ways.** Mention Prime in images. Bansho Homework: Reflect the Figure in a horizontal line through (0,5). What are the coordinates of the reflected image?	*Explore reflections.* - *when figures are reflected, they are called **images*** - *demonstrate an understanding that after a figure is reflected it's image is **congruent** and **faces the opposite way*** - *the coordinates of a reflection and it's image are the same distance away from the line of symmetry they were reflected through*

Day	Problem/Checkpoint	Intent
6 WWAAAC	Warm-up: Translate Figure ABC 5 squares right and 2 squares down. Draw the translated image. (MMS Page 249) Activity: Begin with a 5 sided shape in the first quadrant. Make a list of the coordinates. Next, make a new set of coordinates by adding 3 to all of the x coordinates of the initial figure and then draw this figure. Create a third figure by subtracting 4 from each of the y coordinates of the original figure. Explain what happened. What will happen if you do both, add 3 to the x coordinates and subtract 4 from the y coordinates? Next, draw lines from the vertices of the original figure to the vertices of the last figure. What do you notice about these lines? (parallel and same length). What does adding or subtracting a fixed value to all coordinates do to a figure? (Van De Walle page 219) Consolidation: Discuss parallel and same length. **What do you notice about the figure and it's translated image?** After a figure is translated, it's image is congruent and faces the same way. Homework: Identify each move as a translation or a reflection. (ONAP Page 190) From A to E	*Explore translations.* *- Demonstrate an understanding that after a figure is translated, it's image is **congruent** and **faces the same way.***

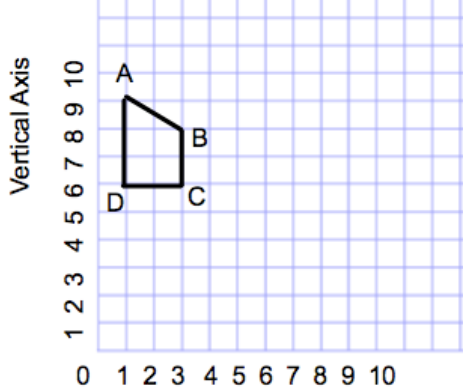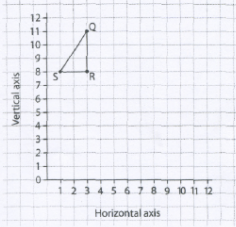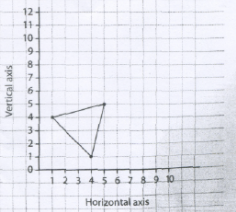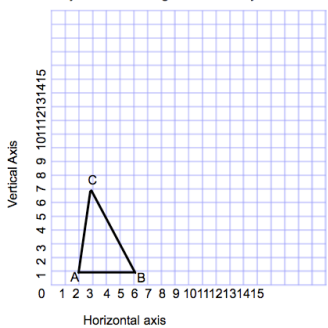| Day	Problem/Checkpoint	Intent
7 WWAAAAC	Warm up: Rotate Figure PQRS a 3/4 turn clockwise about R. Draw the rotated image. (MMS Page 249) Activity: The coordinates of my vertices are: A(1,4) B(1,9) C(3, 4) D(3, 9) I am rotated 90 degrees clockwise about (3,4). Then I am rotated 90 degrees turn clockwise about (7,2). Finally, I am translated 5 squares left. What are the coordinates of my final image? (MMS Page 254 #2) Consolidation: BANSHO- a rotated image is congruent and may face different ways. Homework: Translate the figure 3 squares right. Then rotate the translation image 90 degrees clockwise about (5,5). What are the coordinates of the final image? (MMS Page 254 #1) 	*Explore rotations. Demonstrate an understanding that after a figure is rotated, it's image is congruent and may face different ways.*

Day	Problem/Checkpoint	Intent

8 Checkpoint	Checkpoint- Independent Activity:
	
	1. a) Translate △QRS 3 squares right and 2 squares down. Then reflect the translation image in a vertical line through 7 on the horizontal axis.
	
	   b) List the coordinates of the final image.
	
	_____
	
	2. a) Draw a figure whose vertices have these coordinates:
	   A(4, 10) B(7, 10) C(8, 8)
	   D(6, 6) E(3, 8)
	
	   b) Rotate the figure 180° about D. Draw the rotation figure and label its vertices.
	
	   c) List the coordinates of the final image.
	
	_____
	
	Stretch Your Thinking . . . .
	
	Apply transformations to the triangle to make a design. Explain how you did it.
	
	_____
	_____
	_____
	_____
	_____
		Check understanding of transformations. (Translating, reflecting, rotating)

Day	Problem/Checkpoint	Intent
9	**Warm Up:** Draw the figure with the following coordinates: A(2,1), B(6,1), C(7,3). Multiply each set of coordinates by 2. Draw this figure. What do you notice? Vertical Axis C A B 0 1 2 3 4 5 6 7 8 9 101112131415 Horizontal axis **Activity:** Bob planted a rectangular garden last year that had the coordinates of A (1,1) B (1,3) C (4,3) D (4,1). This year, he wants his garden to be three times as big as his garden last year. What will be the coordinates of the new garden? Bob's friend Jim really liked Bob's garden last year but only wants it to be half the size to fit in his own backyard. What are the coordinates of Jim's garden? Homework: Choose one. Use a calculator if needed!!! Begin with a four-sided shape anywhere on the grid. Then make a list of the coordinates and make a new set of coordinates by multiplying each of the original coordinates by 3. Then plot the resulting shape. What do you notice? Begin with a four-sided shape anywhere on the grid. Then make a list of the coordinates and make a new set of coordinates by multiplying each of the original coordinates by 1/2. Then plot the resulting shape. What do you notice?	*Demonstrate an understanding of dilations.*

Day	Problem/Checkpoint	Intent
10	**Summative Task** **Grade 6 EQAO Spring 2008** **Assessment Question** **7** Mr. Lee moves a gym mat using the following four transformations. 1. Rotate the gym mat 90° clockwise about Point C. 2. Translate the gym mat 8 units to the right. 3. Translate the gym mat 6 units up. 4. Reflect the gym mat over line AB. On the grid below, show the new location of the gym mat after Mr. Lee makes the four transformations. Show all your work.	