

Dilation

Reporting Category	Geometry
Topic	Dilate a polygon
Primary SOL	7.8 The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.
Related SOL	7.4 solve single-step and multistep practical problems, using proportional reasoning
	7.6 determine whether plane figures—quadrilaterals or triangles—are similar...

Materials

- Graph paper or individual whiteboard with the coordinate plane (one per student)
- Dilation Activity Sheet (attached)

Vocabulary

polygon, ordered pair, origin, quadrant, x-axis, y-axis, coordinate plane (earlier grades)
dilation (7.8)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Show the class a picture in its original size, an enlargement of the picture, and a reduced copy of the picture. Use the pictures to introduce dilations.
2. Open a picture in a software program that allows you to resize the picture; project the image so that the students can see it clearly. Increase only the width of the picture, and facilitate a discussion of the distortion of the picture. Return the picture to its original size, and increase only the height. Is there distortion? Demonstrate that the only way to have no distortion is to increase both the height and width by the same scale factor.
3. Give each student a Dilation Activity Sheet, and have students graph the trapezoid. Guide students in completing the sheet. Explain that when applying a scale factor of 2, both the x and y of each ordered pair is multiplied by 2.
4. Give students additional practice with a scale factor of $\frac{1}{2}$, 3, and 4. Individual whiteboards could be used for this practice.

Assessment

- **Questions**
 - How does dilating a figure affect the size, shape, and position of that figure?
 - Where do we see dilations in the world outside the classroom?
- **Journal/Writing Prompts**
 - Describe what a polygon dilated by a scale factor of 3 would look like.

- **Other**
 - Give students a polygon and its dilation. Ask students to describe the dilation.

Extensions and Connections (for all students)

- Have students design posters that include the definitions and examples of each transformation.

Strategies for Differentiation

- Use a chart to record the original ordered pair and the new ordered pair.

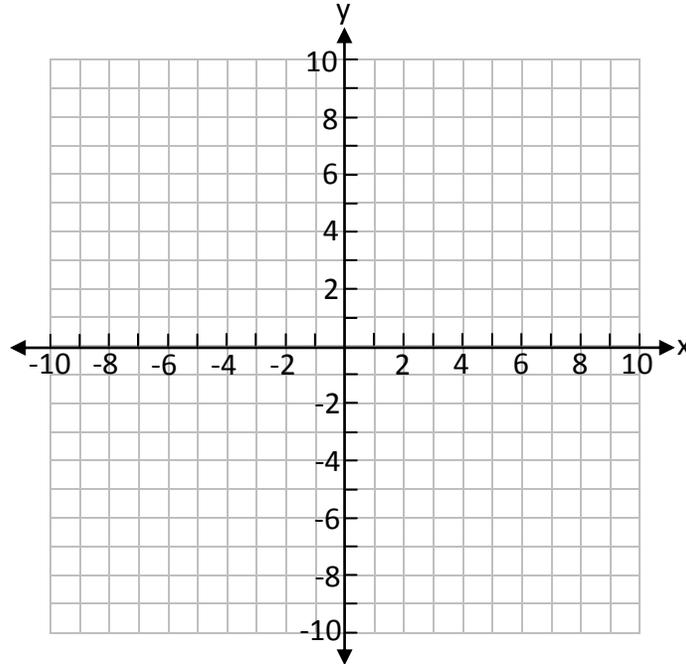
	(2,2)	(3,4)	(5,2)	(5,4)
Dilate x2				
Dilate x3				
Dilate x4				

- Enlarge the coordinate plane.

Dilation Activity Sheet

Name _____ Date _____

1. Graph and connect these points: (2,2) (3,4) (5,2) (5,4).



2. Graph a new figure on the same coordinate plane by applying a scale factor of 2. When applying a scale factor of 2, multiply both the x and the y coordinate of each ordered pair by 2. Compare the original figure to the rotated figure, including coordinate pairs.

3. Graph a new figure on the same coordinate plane by applying a scale factor of $\frac{1}{2}$ to your original coordinates. Compare the original figure to the rotated figure, including coordinate pairs.

4. What happens when you apply a scale factor greater than 1 to a set of coordinates?

5. What happens when you apply a scale factor less than 1 to a set of coordinates?

6. Predict what would happen if you applied a scale factor of 1 to a set of coordinates.
