



## Grade 3 Geometry Exploration with Geogebra - Teacher version

**Mathematics topic:** Attributes of quadrilaterals, using attributes to define categories

**Mathematics standard:** 3.G.1

**Focus CT ideas:** Abstraction

**Technology tool:** Geogebra (free online dynamic geometry system),

<https://www.geogebra.org/?lang=en>

Specific applet: <https://www.geogebra.org/m/h9ztnrbm> (Note that this is a simplified version of the applet explored in the [PD version](#) of this activity)

### **Activity directions:**

1. Share your screen showing the applet at <https://www.geogebra.org/m/h9ztnrbm>
2. Ask children to look at the four shapes on the screen. Ask:
  - a. What do you *notice* or *wonder* about these shapes?
  - b. What is the same about these shapes?
  - c. What are some differences between the shapes?
  - d. What are your ideas about what the words on the screen mean?
3. Explain that these shapes were created with a special kind of computer program so that when you drag the corners, some things about the shape will change while other things stay the same.
  - a. Drag one corner of the rhombus to a different place on the screen. Ask students to share their thoughts about what changed, and what stayed the same.
  - b. Drag a different corner to a new position. Ask again: What changed and what stayed the same?
  - c. Repeat this process a few more times as needed. Then ask: What are the things that have always stayed the same every time I moved a corner?
  - d. Guide a discussion that helps students identify that the shape always had 4 sides and the 4 sides always stayed the same length. Explain that the word *rhombus* is a name for the category of shapes that have four sides of the same length. A rhombus is a special kind of four-sided shape.
4. Tell students that in a few minutes, they will have a chance to drag the corners of the other shapes. Ask them to share some predictions about what might change and what might stay the same based on what they know about the other words on the screen.

Ask:

  - a. Will the number of sides stay the same?
  - b. Will the length of the sides stay the same?



- c. Will the angles stay the same size?
- d. Why do you think so?

If you are interested in discussing CT, you might explain that when students are looking for the attributes that stay the same, they are focusing on important features, which is abstraction.

- 5. Introduce the [student pages](#). Explain that students should use the digital shapes to help them answer the questions.
- 6. If you are able to conduct a follow-up discussion after students have completed the pages, be sure to discuss the idea that rhombuses, squares, and rectangles are all examples of special kinds of quadrilaterals. Ask students to explain how they know this is true.



## Geometry Exploration Student Pages

With your teacher, you used digital shapes to figure out that a rhombus is a shape that always has 4 sides and the 4 sides are the same length. Now you will explore three other shapes.

1. Open the digital shapes: <https://www.geogebra.org/m/h9ztnrbm>

2. Write down two things you notice about the quadrilateral.

\_\_\_\_\_

3. Drag a corner of the quadrilateral. Write down one thing that changed and one thing that stayed the same.

Changed: \_\_\_\_\_

Stayed the same: \_\_\_\_\_

4. Drag a different corner of the quadrilateral. Write down one thing that changed and one thing that stayed the same.

Changed: \_\_\_\_\_

Stayed the same: \_\_\_\_\_

5. What do you think always stays the same about a quadrilateral?  
Complete this sentence: A quadrilateral is a shape that always has

\_\_\_\_\_

\_\_\_\_\_



6. Write down two things you notice about the square.

\_\_\_\_\_

7. Drag a corner of the square. Then drag another corner. Write down one thing that changed when you dragged a corner. Then write down as many things as you can that stayed the same.

Changed: \_\_\_\_\_

Stayed the same: \_\_\_\_\_

\_\_\_\_\_

8. What do you think always stays the same about a square? Complete this sentence: A square is a shape that always has

\_\_\_\_\_

\_\_\_\_\_ .

9. Write down two things you notice about the rectangle.

\_\_\_\_\_

10. Drag a corner of the rectangle. Then drag another corner. Write down one thing that changed when you dragged a corner. Then write down as many things as you can that stayed the same.

Changed: \_\_\_\_\_

Stayed the same: \_\_\_\_\_



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11. What do you think always stays the same about a rectangle?  
Complete this sentence: A rectangle is a shape that always has

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12. Rhombuses, squares, and rectangles are all special kinds of quadrilaterals. All of these shapes always have four sides.

a. Drag the quadrilateral to make it look like a rhombus.  
Draw it below.

b. Drag the quadrilateral to make it look like a square.  
Draw it below.

c. Drag the quadrilateral to make it look like a rectangle.  
Draw it below.



## Grade 3 Geometry Exploration with Geogebra - Student Version

You will explore shapes on the computer. The shapes are stretchy! When you drag their corners, sometimes they will get bigger or change shape.

1. Open the stretchy shapes: <https://www.geogebra.org/m/h9ztnrbm>
2. Find the shape labeled **quadrilateral**.  
Draw what the shape looks like.
3. Click and drag a corner of the quadrilateral.  
Draw what the quadrilateral looks like now.
4. Drag another corner of the quadrilateral.  
Draw what it looks like now.
5. Look at your three drawings.
  - a. What is always the same about a quadrilateral?

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- b. What can change about a quadrilateral?

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6. Find the **rhombus**. Draw what you see.
7. Drag a corner of the rhombus.  
Draw what you see.
8. Drag another corner of the rhombus.  
Draw what you see.
9. Look at your drawings of rhombuses.



a. What is always the same about a rhombus?

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b. What can change about a rhombus?

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10. Draw three different **squares**.

Drag the corners of the stretchy square to help you.

11. Look at your drawings of squares.

a. What is always the same about a square?

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b. What can change about a square?

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12. Draw three different **rectangles**.

Drag the corners of the stretchy rectangle to help you.

13. Look at your drawings of rectangles.

a. What is always the same about a rectangle?

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b. What can change about a rectangle?

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