



Name: _____ Date: _____

Student Exploration: Classifying Quadrilaterals

Vocabulary: isosceles, kite, parallelogram, quadrilateral, rectangle, rhombus, square, trapezoid

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Kim's family just adopted a Dachshund. They already have a German Shepherd.



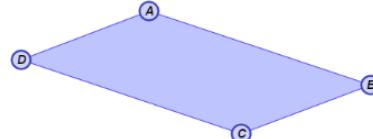
A. How are the two animals the same? _____

B. How are the two animals different? _____

2. Michael has a turtle and a hamster. What do these animals have in common with Kim's animals? _____

Gizmo Warm-up

In the *Classifying Quadrilaterals* Gizmo, you can manipulate a variety of dynamic polygons, and name them based on the conditions you put on them.

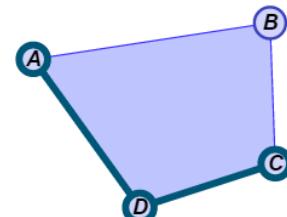


1. With **Quadrilateral** and **None** selected, drag the vertices to create several **quadrilaterals**. What seems to always be true about a quadrilateral? (Fill in the blanks below.)

A quadrilateral is a _____ with _____ sides.

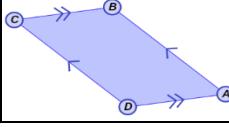
2. You can select **Show angle measure tool** to open a Gizmo protractor, and **Show ruler** to open a Gizmo ruler. Attach the "donuts" to points, as shown to the right.

Create a variety of quadrilaterals. Use the Gizmo protractor to measure all angles of each quadrilateral.



What is the sum of the angle measures of a quadrilateral? _____



Activity A: Classifying by traits	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Be sure Quadrilateral is selected. 	
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1. Under **Condition**, choose **One pair of opposite sides parallel**. Drag the vertices to see a variety of these figures.
- Create a quadrilateral of your choice. Sketch your quadrilateral in the space to the right.
 - Name the pair of opposite, parallel sides. _____
 - Turn on **Show name of shape**. What is this shape called? _____
 - Select **Trapezoid**. Drag the vertices to experiment with the figure. What seems to always be true about a **trapezoid**? (Fill in the blanks below.)
A trapezoid is a _____ with _____
 - Select **Isosceles trapezoid**. Create a variety of these figures by dragging the vertices. Sketch one of them in the space to the right.
 - When is a trapezoid **isosceles**? _____
_____ Use the Gizmo protractors to verify this.
 - Which pairs of angles of this isosceles trapezoid appear to be congruent?

2. Select **Quadrilateral** and **Two pairs of opposite sides parallel**. Be sure **Show name of shape** is checked.
- Drag the vertices around to see a variety of these figures. Sketch an example in the space to the right.
 - Name the two pairs of parallel sides. _____
 - What is the shape you drew above called? _____
 - Select **Parallelogram** and drag the figure's vertices. What defines a **parallelogram**?
A parallelogram is a _____ with _____
 - How do you think the lengths of the parallel sides of a parallelogram compare?
_____ Use the Gizmo rulers to check.

(Activity A continued on next page)



Activity A (continued from previous page)

3. Be sure **Parallelogram** and **Show name of shape** are still selected.

- A. Under **Condition**, select **All sides are \cong** . Look at a variety of these figures by dragging the vertices. Sketch one figure you create to the right. What is the name of this type of figure?

- B. Select **Rhombus** and experiment with this figure. What is a **rhombus**?

A rhombus is a _____ with _____

- C. Select **Parallelogram**. Then choose **All angles are 90°** from the **Condition** menu and drag the vertices. Sketch it to the right. What is this type of figure called?

- D. Select **Rectangle**, and vary the given figure. Describe a **rectangle** below.

A rectangle is a _____ with _____

- E. Select **Parallelogram** and **All angles are 90° and all sides are \cong** from the dropdowns. Vary the figure. Sketch an example of it to the right. What is the name of this shape?

- F. Keep manipulating this figure in the Gizmo. What defines a **square**?

A square is a _____ with _____

4. With **Show name of shape** still checked, select **Quadrilateral**.

- A. Under **Condition**, select **Two pairs of adjacent sides \cong** . Drag the vertices around. Sketch your shape in the space to the right. What is the name of this quadrilateral?

- B. Vary the figure by dragging its vertices. What is always true about a **kite**?

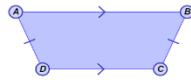
A kite is a _____ with _____



Activity B:
Using quadrilaterals

Get the Gizmo ready:

- Be sure **Quadrilateral** is selected, and the **Condition** chosen is **None**.
- Turn on **Show name of shape**.



1. Fill in the first blank with *always*, *sometimes*, or *never* to form a true statement. Then explain your answer, and check each one in the Gizmo.

A. A rhombus is _____ a rectangle.

Explain: _____

B. A parallelogram is _____ a square.

Explain: _____

C. A square is _____ a rectangle.

Explain: _____

2. Find the value of x for each quadrilateral. Show all of your work.

A. Each side of a square is $(x + 5)$ units long. The perimeter of the square is 52 units.

B.

