

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.



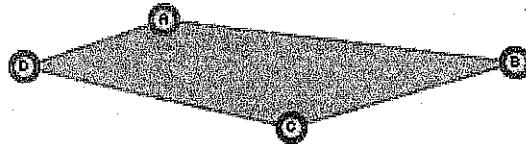
A. How are the two animals the same? _____

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.)

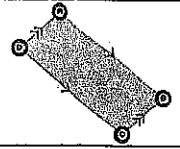
A quadrilateral is a _____ with _____ sides.

2. Sketch an example of a quadrilateral in the space below.

Classifying by traits

Get the Gizmo ready:

- Be sure **Quadrilateral** is selected.



1. Under **Condition**, choose **One pair of opposite sides parallel**. Drag the vertices to see a variety of these figures.

- A. Create a quadrilateral of your choice. Sketch your quadrilateral in the space to the right.
- B. Name the pair of opposite, parallel sides. _____
- C. Turn on **Show name of shape**. What is this shape called? _____
- D. 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 _____
- E. Select **Isosceles trapezoid**. Create a variety of these figures by dragging the vertices. Sketch one of them in the space to the right.
- F. When is a trapezoid **isosceles**? _____
- G. Which pairs of angles of this isosceles trapezoid appear to be congruent?

_____ Use the Gizmo protractors to verify this.

2. Select **Quadrilateral** and **Two pairs of opposite sides parallel**. Be sure **Show name of shape** is checked.

- A. Drag the vertices around to see a variety of these figures. Sketch an example in the space to the right.
- B. Name the two pairs of parallel sides. _____
- C. What is the shape you drew above called? _____
- D. Select **Parallelogram** and drag the figure's vertices. What defines a **parallelogram**?
- A parallelogram is a _____ with _____
- E. How do you think the lengths of the parallel sides of a parallelogram compare?

_____ Use the Gizmo rulers to check.

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

A. Under **Condition**, select **All sides are congruent**.

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 degrees** 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 degrees and all sides are congruent** 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 congruent**. 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 _____

Assessment Questions:

1. Which quadrilateral has exactly one pair of parallel sides?

- A. kite
- B. rhombus
- C. parallelogram
- D. trapezoid

2. Which of these conditions describe a rectangle?

I. Opposite sides are parallel II. Opposite sides are congruent III. Adjacent sides are perpendicular IV. Adjacent sides are congruent V. All sides are congruent

- A. I and II only
- B. I, II, and III
- C. I, II, and IV
- D. I, II, and V

3. Is a square always, sometimes, or never a rhombus?

- A. always
- B. sometimes
- C. never
- D. cannot be determined

4. A parallelogram has sides measuring 10 units and 15 units. A rhombus has the same perimeter as this parallelogram. What is the length of each side of this rhombus?

- A. 6.25 units
- B. 10 units
- C. 12.5 units
- D. 25 units

5. Find the value of x in this isosceles trapezoid.

- A. $x = 1$
- B. $x = 7$
- C. $x = 10$
- D. $x = 25$

