

## Mathematics: Geometry

**5.G.4**

**Cluster Heading: 5.G.B** Classify two-dimensional figures into categories based on their properties.

**Content Standard: 5.G.4** Classify the two-dimensional figures in a hierarchy based on properties.

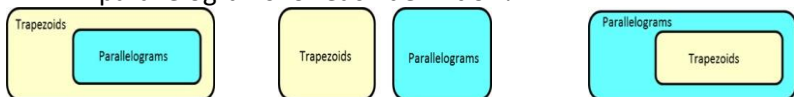
**Practice Standards: MP3** Construct viable arguments and critique the reasoning of others, **MP6** Attend to precision.

### Problem/Task Suggestions

#### What is a Trapezoid?

Niko and Carlos are studying parallelograms and trapezoids. They agree that a parallelogram is a quadrilateral with 2 pairs of parallel sides. Niko says, “A trapezoid has one pair of parallel sides and a parallelogram has two pairs of parallel sides. So a trapezoid is also a parallelogram”. Carlos says, “No, a trapezoid can have **only one** pair of parallel sides”. Niko says, “That’s not true. A trapezoid has **at least one** pair of parallel sides, but it can also have another”.

- Have partners discuss the difference between Niko’s definition and Carlos’ definition for a trapezoid.
- Some textbooks use Niko’s definition and some textbooks use Carlos’ definition. Which statements below go with Niko’s definition? Which statements go with Carlos’ definition?
  1. All parallelograms are trapezoids.
  2. Some parallelograms are trapezoids.
  3. No parallelograms are trapezoids.
  4. Some trapezoids are parallelograms.
  5. No trapezoids are parallelograms.
- Which picture represents the relationship between trapezoids and parallelograms for each definition?



#### Differentiation

#### Supports

- Provide a list of common characteristics of quadrilaterals to students.

#### Extensions

- Create examples of quadrilaterals on the geoboards or dot paper and ask another student or group to discuss the characteristics of the quadrilateral.

### Formative Assessment Suggestions

#### Observation of Students

Can the student

- Organize general shapes by attributes?
- Create an appropriate drawing for the property?
- Generalize property by looking at specific design?
- Compare different definitions of trapezoids?

#### Questions to Guide Student Thinking

- What relationships do you notice?
- Does the definition of a rectangle include all squares?
- Does Niko’s definition (inclusive) of the trapezoid include all parallelograms?

#### Misconceptions

Students may

- Not know the attributes of a shape enough to distinguish among them.
- List a characteristic that works for some, but not all.
- Not understand the relationships of rectangles and squares and rhombi (or rhombuses) and squares before discussing quadrilaterals and trapezoids.

#### Vocabulary Considerations

Trapezoid, parallelogram, rectangle, square, rhombus, quadrilateral

An example of a resource is attached.

**Source:** <http://www.illustrativemathematics.org/illustrations/1505>