**Standards addressed by this lesson experience:**

3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

**Goal:** Students will classify quadrilaterals based on their shared attributes.

**Materials Needed:**

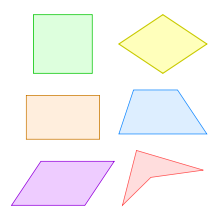
Handouts

Chart paper

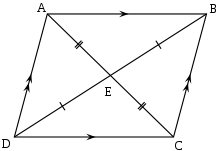
Math Notebooks

***Vocabulary:***

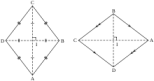
**Polygon**- a closed plane figure formed by three or more line segments called sides. Each side intersects exactly two other sides, but only at their end points. Sides that have common end points are part of the same line.

[](http://en.wikipedia.org/wiki/File:Six_Quadrilaterals.svg)

**Quadrilateral**- a quadrilateral is a polygon with four sides (or edges) and four vertices or corners.

**[](http://en.wikipedia.org/wiki/File:Parallelogram.svg)Parallelogram**- a parallelogram is a convex quadrilateral with two pairs of parallel sides. The opposite or facing sides of a parallelogram are of equal length and the opposite angles of a parallelogram are of equal measure

**Rectangle**- a rectangle is any quadrilateral with four right angles.

[](http://en.wikipedia.org/wiki/File:Rhombus.svg)

**Rhombus**- a parallelogram in which all sides have equal length

[](http://en.wikipedia.org/wiki/File:Square_(geometry).svg)

**Square**- a rectangle with four equal sides and four right angles, also a rhombus with four right angles

**Lesson Day (1)**

***In preparation for day 1, you will need to make 6 charts to post around the room. On each chart cut out or recreate the shapes from each of the six boxes on Handout B in advance in order to be ready for the gallery walk part of the lesson.***

* Put students in groups and assign each group to a chart. Tell students they will be doing a gallery walk today and that their job is to look at all the figures on the chart and list the features or attributes that they all have in common. Tell them they are not to name the figures yet, but just list how they are alike (i.e. they all have 4 sides). Give each group 3-5 minutes at each chart (adjust time based on student needs).
* When all groups have visited each chart, bring students back together at the first chart. Give students Handout B to take notes on, or have them recreate the chart in their Math notebooks. Discuss the attributes listed on the chart. Does everyone agree? Have student record the agreed upon attributes of each set of figures on the handout or in their notebooks. Ask students this question, “Based on these attributes, what do we call all the shapes in this group?” They will start with the most specific name (i.e. square), but push them to expand their thinking to include the bigger groups (parallelograms and quadrilaterals) that the shapes will also fit into.
* Continue the discussion with all 6 charts. Push students to make connections between the charts, noticing the similarities and differences, such as the fact that a square is always a rectangle, but a rectangle isn’t always a square. Students should be taking notes from each poster on the handout or in their math notebook. (You may have to stretch this into another day- that’s okay ☺)
* At the end of the lesson, have students share their big AHA! for the day.

**Lesson (Day 2):**

* Give students HANDOUT A on evaluating each statement. Have them work by themselves to evaluate each statement as always true, sometimes true, and never true. If they choose sometimes true that need to show an example that proves the first part of the statement is true, and another drawing to show that both parts are true. They may use their notes from the day before as they think through each statement.
* When all students are finished, put students in groups to discuss their decisions. Have them work together and come to a consensus. Monitor the discussions and ask questions when students are struggling.
* Once students have come to a consensus in their groups, have them come together as a whole group to share their findings and try to come to a whole group consensus. Students will need to prove their thinking with drawings or definitions. There will be a lot of disagreement, so encourage students to critique the reasoning of others.
* Once everyone has reached consensus, divide students into small groups to make posters of the sometimes true and always true items. Have students write the statement at the top and then have them draw the examples that were shared that prove if the statement is sometimes true and/or always true. Share and post in classroom.

HANDOUT A

Evaluate the following statements.

For each of the following statements, circle whether the statement is Always True (AT), Sometimes True (ST) or Never True (NT). If the answer is sometimes true then draw a picture of a shape that meets both requirements and a shape that meets only the first requirement and not the second.

A Drawing that:

Meets both Meets only 1st

1. A rectangle is a square. AT ST NT
2. A square is a rectangle. AT ST NT
3. A rectangle is a parallelogram. AT ST NT
4. A parallelogram is a rectangle. AT ST NT
5. A rectangle is a rhombus. AT ST NT
6. A rhombus with at least one AT ST NT

right angle is a square.

1. A trapezoid is a parallelogram. AT ST NT

HANDOUT B

What properties do each of these sets of shapes have in common? What is this set of shapes called?

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Possible answers

|  |  |
| --- | --- |
| Quadrilaterals, parallelograms, rhombus, rectangle, squares  4 straight sides  4 Right angles  Opposite sides parallel  Sides all the same length | Quadrilaterals, parallelograms, rhombus  4 straight sides  4 angles- can be right angles or not  Opposite sides parallel  Sides all the same length |
| Quadrilaterals, parallelograms, rectangles    4 straight sides  4 Right angles  Opposite sides parallel | Quadrilaterals, parallelograms  4 straight sides  4 angles  2 pairs of parallel sides |
| Quadrilaterals, trapezoids  4 straight sides  4 angles  1 pair of parallel sides | Quadrilaterals  4 straight sides  4 angles |