TIMSS

NAEP

Standard Indicators
4.4.3, 4.4.4

Quadrilateral Exploration

Purpose

Students will identify, describe, and draw parallelograms, rhombuses, and trapezoids and will identify congruent quadrilaterals and give reasons for congruence.

Materials

For the teacher: chart paper, overhead projector, overhead geoboard, geobands, overhead transparency of dot paper
For each student: old folders to use as a "shield," geoboard, geobands, 3 pieces of dot paper, pencils, scissors, math journals, copy of Black Line Master (BLM) *Quadrilaterals*

Activity

A. Teacher-Directed Activity

1. Tell students they are going to be learning about some four-sided, two-dimensional geometric shapes.
2. Hand out geoboards and geobands and review class rules about working with these materials.
3. Allow a few minutes for students to explore with the geoboards and geobands.
4. Tell students to hide their geoboard from others at their table before you give them their first direction.
5. Tell students to make a four-sided closed shape on their geoboard.
6. Have students compare with others at their table to see the different shapes that were built.
7. Ask: "Did anyone at your table make the same shape as you?"
8. Ask students to tell you about their shape. Make these shapes on your overhead geoboard and discuss their differences.
9. Say: "In geometry the name for a four-sided shape is a *quadrilateral*." Write: *"A quadrilateral is a four-sided shape"* on chart paper and have students copy the definition into their math journals. Model how to copy shapes made on the geoboard to the dot paper. Have students copy the quadrilateral they made on their geoboard onto the dot paper and label it "quadrilateral."
10. Tell students that they are going to learn about some kinds of quadrilaterals. Have students make a shape on their geoboards that is a quadrilateral with both pairs of opposite sides parallel. Say: "A four-sided shape with both pairs of opposite sides parallel is a parallelogram." Follow the procedure above to have students compare and share their shapes.

(continued)

INCORPORATING TECHNOLOGY

Use a drawing program to make and compare different quadrilaterals.

***EXTENDING THE* ACTIVITY**

Have students look at home for different kinds of quadrilaterals and bring their lists to school to share.

Standards Links
4.4.1, 4.4.2

Activity (continued)

11. Write the definition on chart paper. Have students copy it in their journal and copy the parallelogram they made on their geoboard onto the dot paper and label it *parallelogram*.
12. Ask students if they know some specific names for quadrilaterals that are parallelograms. [rectangles, squares]
13. Tell students that there is a specific parallelogram that could be another name for a square: a *rhombus*. Write: *"A rhombus is a parallelogram with all sides equal."* Have students write the definition in their math journal.
14. Say: "We know a square is a rhombus. Can you make a shape on your geoboard that is a rhombus, but not a square?" (Example: ) Share and compare shapes made, copy onto dot paper and label it rhombus.
15. Say: "There is one more kind of quadrilateral we are going to learn about. This time make a four-sided shape on your geoboard with one pair of opposite sides parallel." Share and compare shapes.
16. Write on the chalkboard, *"A trapezoid is a four-sided figure with one pair of opposite sides parallel."* Tell students to write this definition in their journal and copy the trapezoid they made on their geoboard onto the dot paper and label it trapezoid.
17. Have students place the dot paper on which they have copied and labeled figures above in their math journal for future reference.

B. Partner Activity

1. Ask students if they remember what the term *congruent* means.
2. Tell students to work with a partner to make congruent quadrilaterals on their geoboards. One partner makes a shape behind his/her "shield" and then describes it to his/her partner in specific terms so that the partner can duplicate it exactly on their geoboard.
3. Have pairs copy four of their congruent quadrilaterals onto dot paper, cut them out and glue them onto drawing paper. Below each pair they should write a detailed description of why they are congruent using geometry terms.
4. Have students complete the BLM *Quadrilaterals*.

Questions for Review

Basic Concepts and Processes

During the activity, ask students the following questions:

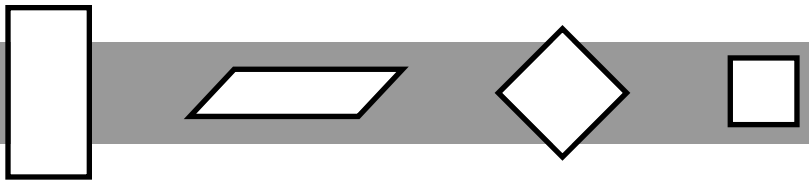
In what ways are your two quadrilaterals different?

Describe them to me, using words like *equal* and *parallel*.

How do you know that these two shapes are congruent?

Name: _____

Quadrilaterals



Fill in the blanks and then make each shape on a piece of dot paper. Then cut it out and glue it on this paper.

1. A quadrilateral is a shape with _____ sides.

2. A parallelogram is a _____-sided figure with both pairs of opposite sides _____.

3. A rhombus is a parallelogram with all sides _____.

4. A trapezoid is a _____-sided figure with _____ pair of opposite sides _____.

Quadrilaterals

Teacher Directions

Use the BLM to assess students' understanding of the properties of quadrilaterals.

Answer Key

(1) 4
(2) 4, parallel
(3) equal
(4) 4, 1, parallel

Shapes will vary.