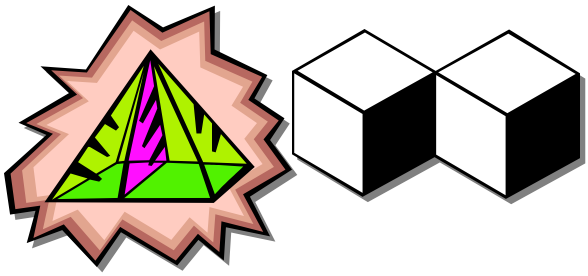

#9571

EXPLORING GEOMETRY

DISNEY EDUCATIONAL PRODUCTIONS, 2000
Grade Levels: 4-8
11 minutes
3 Instructional Graphics Enclosed

DESCRIPTION

Uses a game show format to discuss the differences between two- and three-dimensional shapes, such as squares and cubes, triangles and pyramids, and circles and cylinders.

ACADEMIC STANDARDS

Subject Area: Mathematics

★ Standard: Understands and applies basic and advanced properties of the concepts of geometry

- Benchmark: Understands that geometric shapes are useful for representing and describing real world situations (See Instructional Goal #4.)
- Benchmark: Knows basic geometric language for describing and naming shapes (e.g., trapezoid, parallelogram, cube, sphere) (See Instructional Goals #1, 2, and 3.)
- Benchmark: Understands basic properties of figures (e.g., two- or three-dimensionality, symmetry, number of faces, type of angle) (See Instructional Goals #5 and 6.)

INSTRUCTIONAL GOALS

1. To introduce line segments and vertices.
2. To review the two-dimensional shapes of triangle, rectangle, circle, and square.
3. To introduce polyhedrons such as cubes, prisms, pyramids, and cylinders.
4. To depict geometric shapes in a real-world context.
5. To point out the attributes of two- and three-dimensional shapes.
6. To demonstrate that two-dimensional shapes can be used to make three-dimensional shapes.

VOCABULARY

1. line segments
2. vertex (vertices)
3. dimension
4. polygons
5. depth
6. rectangular prism
7. sphere
8. pyramid
9. cylinder (cylindrical)
10. pentagon
11. attribute

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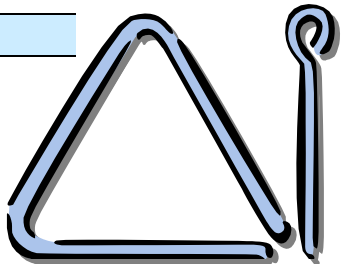
BEFORE SHOWING



1. What is a two-dimensional shape? What is a three-dimensional shape?
2. How are two- and three-dimensional shapes alike? How are they different?
3. What are some two- and three-dimensional shapes commonly seen?

DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause when the boy with springy pop-out glasses appears. Point out the significance of his glasses.
3. Pause at the section after Contestant Number Two's thank you speech. Point out the reason for the acceptance speech.
4. Pause at the beginning of the "Three Little Pigs" pantomime. Discuss the details of the original story.

AFTER SHOWING

▶ Discussion Items and Questions

1. What are the attributes of two-dimensional shapes?
2. Of three-dimensional shapes?
3. What is a vertex?
4. What is a polygon?
5. What is an edge? Do all three-dimensional shapes have edges?
6. What is a base? What shapes are the bases on a cube, a pyramid, and a cylinder? What happens to the base when the shape is rotated?
7. What are some games that use a variety of shapes?

▶ Applications and Activities

1. With construction paper, cardboard, or heavy paper stock cut out two-dimensional shapes. Use these shapes to create a three-dimensional object. Identify the object and make blueprints.
2. Each student gets one empty three-dimensional container such as a cardboard box, a cylindrical container, a pyramid, or a cone.
   a. Imagine cutting open the containers and laying them flat. Draw the two-dimensional pattern, or net. Write a description of the containers using attributes such as edges and vertices.
   b. Use a marker to trace the edges on the container that should be cut in order to lay the container flat. Cut open the containers and compare the actual net to the predicted net.
3. Each student gets a copy of the "Make a Cube Activity Sheet." (See Instructional Graphics.) Circle the shaded patterns of six squares that will fold into a cube. Answer the following questions:

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a. Can the six squares fold into a cube if four of the squares are next to each other making a larger square? (No, at least one square would be folded into the cube, so its face would be lost.)
b. Can the six squares fold into a cube if four squares form a row and the other two are on the same side? (No, two of the squares would overlap.)
c. What is a general rule of placement if the squares are to be folded into a cube? (At least two squares would have to be on opposite sides.)

4. Using "The Three Little Pigs" idea, rewrite common fairy tales or fables from a geometric viewpoint.
5. Obtain models of three-dimensional shapes such as triangular prisms and rectangular prisms.
   a. What are the attributes of each shape?
   b. How are the prisms different?
   c. What would a prism be called if it had squares on both ends? Pentagons? Hexagons?
   d. How many vertices, edges, and faces does each kind of prism have?
6. Demonstrate a shape-in-a-shape pattern.
   a. Draw a triangle on the board. Draw a square around the triangle.
   b. Copy this figure to the right of the first one. Then draw a pentagon around the second figure.
   c. Copy this new figure to the right of the second figure. Now draw a hexagon around this figure.
   d. Continue the pattern by copying each figure, placing it to the right, and adding a shape around it with one additional edge.
7. Photocopy the "From Plane to Solid Activity Sheet" on heavy-weight paper. (See Instructional Graphics.)
   a. Using multiple copies of the activity sheet, cut out the shapes and make two- or three-dimensional shapes with some or all of the figures.
   b. If an unusual shape is created, name the shape and write down its distinguishing attributes.
8. Complete a "What's My Shape? Activity Sheet." (See Instructional Graphics.) Write descriptions for other shapes.
9. Draw the following two-dimensional shapes on the overhead projector: triangle, square, pentagon, hexagon, heptagon, and octagon. Write the number of edges and vertices for each shape. Look for a pattern.
10. Obtain models of three-dimensional figures. Draw the top view and side view of each
11. Write these words on the board: cube, rectangular prism, triangular pyramid, square pyramid, cone, cylinder, and sphere. Under each word, list objects, landmarks, or buildings that have these shapes.
12. Write a description of a sports event in geometric terms similar to the baseball game description in the video.

RELATED RESOURCES

- All Sorts #8609

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World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **TEACHERS FIRST**

http://www.teachersfirst.org/lesn-math.shtml

Contains lesson plans and Internet resources grouped by grade level and subject. Use "geometry" in the keyword search to locate a variety of plans and activities.

- **MATH LESSON PLANS**

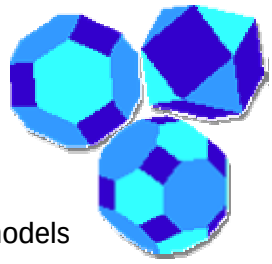
http://www.lessonplanspage.com/Math.htm

Contains lessons developed by teachers that are listed by grade level and topic. Includes an activity using toothpicks and chick peas to construct two- and three-dimensional shapes.

- **STUDYING POLYHEDRA**

http://mathforum.org/alejandre/applet.polyhedra.html

Includes a definition of polyhedrons and a Java applet to help explore five regular polyhedrons. Denotes how many faces, vertices, and edges each polyhedron has.



- **POLYHEDRA IN THE CLASSROOM**

http://mathforum.org/alejandre/workshops/unit14.html

Contains links to sites and lesson plans for middle school student geometry activities including construction of a rectangular prism, construction of paper models using nets, and a cube coloring problem.

INSTRUCTIONAL GRAPHICS

- MAKE A CUBE ACTIVITY SHEET
- FROM PLANE TO SOLID ACTIVITY SHEET
- WHAT'S MY SHAPE? ACTIVITY SHEET

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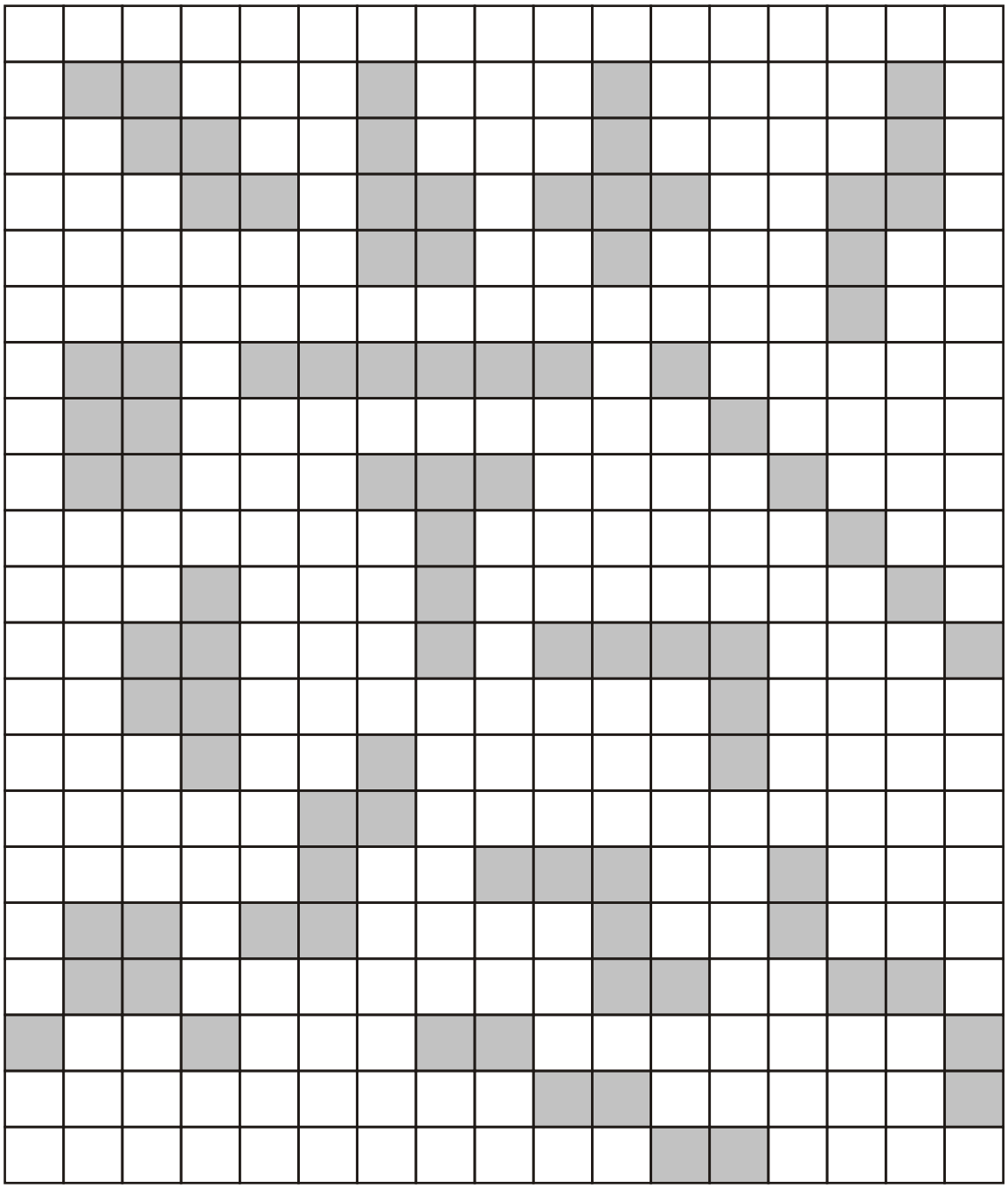
Name: _____

Make a Cube

Activity Sheet

Circle the patterns of shaded squares that will fold into a cube.



Using a piece of graph paper, make your own cube patterns.
How many different ones can you make?

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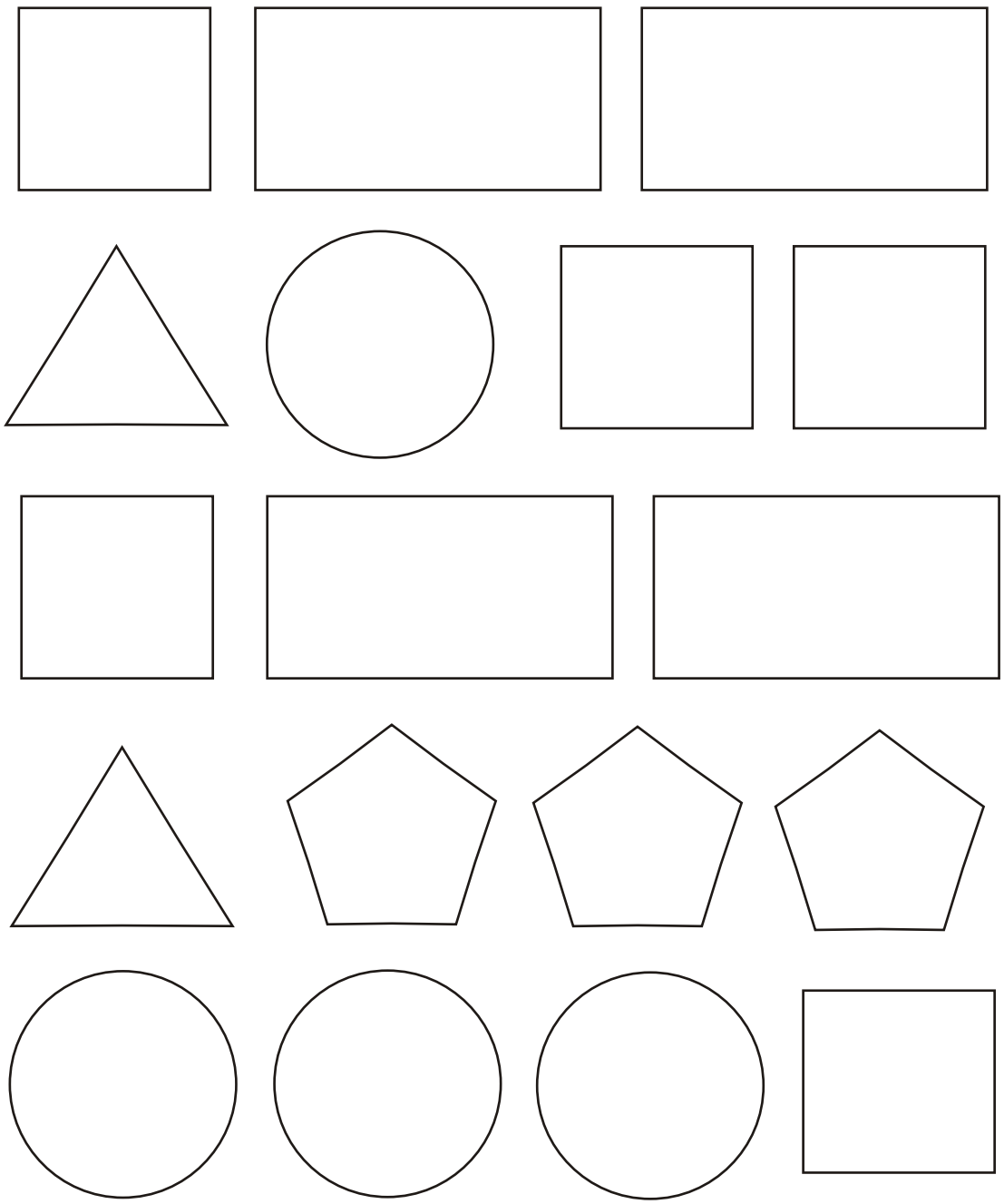
Name: _____

From Plane to Solid

Activity Sheet



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What's My Shape?

Activity Sheet

Complete the table.

My Shape Has:	Draw the Shape:	What's My Shape?
8 vertices 12 edges 6 equal size faces		
6 vertices 9 edges 5 faces		
4 triangular faces 1 square face		
0 vertices Circular base		
1 vertex Circular base		
5 vertices 8 edges 5 faces		
12 vertices 2 bases		

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