

# It's a 3-D World Out There!

**Lesson Topic** \_\_\_\_\_

Polyhedra

**Grade** \_\_\_\_\_

2–4

**Lesson Length** \_\_\_\_\_

80 minutes

**NCTM Standards Addressed** \_\_\_\_\_

- Build and draw geometric objects.
- Recognize, name, build, draw, compare, and sort shapes: sphere (ball), cone, cylinder (can), pyramid, prism (box), cube.
- Describe attributes and parts of shapes; identify faces, edges, vertices (corners).
- Develop vocabulary and concepts related to two- and three-dimensional geometric shapes.

**Sample State Standards Addressed** \_\_\_\_\_

- Name and label geometric shapes in two and three dimensions (e.g., circle/sphere, square/cube, triangle/pyramid, rectangle/prism).
- Build geometric shapes using concrete objects (e.g., manipulatives).
- Construct two- and three-dimensional shapes and figures using manipulatives, geoboards, and computer software.
- Identify properties of geometric figures (e.g., parallel, perpendicular, similar, congruent, symmetrical).

**Student Objectives** \_\_\_\_\_

Students will:

- Construct polygons
- Identify attributes of three-dimensional shapes
- Name common three-dimensional shapes
- Draw three-dimensional shapes
- Sort three-dimensional shapes.

**Grouping for Instruction** \_\_\_\_\_

- Groups of three students to build, draw, and make a poster of assigned three-dimensional shapes.
- Whole class for three-dimensional shapes round-robin.

## Overview of Lesson

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Students use K'NEX™ materials sets to build, investigate, and draw three-dimensional shapes (polyhedra). The class will combine the shapes they have built and draw from the pile to begin a round-robin activity to name and determine the attributes of a selection of the shapes. Individual students will return to their desks with a single shape to draw on poster paper. Students will include lists of: names, attributes, and real world examples of their shapes.

## Background Information

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Students should have had exposure to basic three-dimensional shape names and have some knowledge of attributes.

## Materials and Equipment

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- K'NEX™ Math Manipulatives sets
- Large easel or chart paper (one page/student)
- Crayons to share
- Rulers

## Procedure

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### A. Motivation and introduction

1. Introduce K'NEX™ rods and connectors to students.
2. Provide time for creative exploration and play with the materials.
3. Select a student's model or creation that is a polyhedra. Instruct students that the rods represent edges of three-dimensional shapes and the connectors represent vertices.

### B. Development (including discussion points and feedback)

1. Assign a shape from the list below to each of the groups for building:
  - cube
  - square pyramid
  - rectangular prism
  - triangular pyramid
  - triangular prism
  - hexagonal prism
  - octagonal prism.

2. Have students take their shapes to an open area in the classroom. Have students stand in a circle and place their shapes in the circle.
3. Select a student to pick up someone's shape (other than his or her own) that he or she can name.
4. Have the student name the shape. Pass the shape to the person on the right.
5. Have that person give one of the following:
  - attribute of the shape
  - another name for the shape
  - a real world example of the shape (limit to three per shape).
6. The shape continues moving to the right in round-robin style until students are stumped.
7. The next student picks a new shape.
8. Continue for about 15 to 20 minutes. Students will learn from each others' observations and the quality of responses will improve as the activity continues.
9. Tell students that they will each complete this activity with a single shape on their own.
10. Give a shape from the floor to each group of students along with a large sheet of paper.
11. Instruct students to:
  - make a two-dimensional line drawing of the three-dimensional shapes they have been assigned
  - use crayons to color the edges of the shapes
  - place three titles below their shape leaving room below them for lists
    - Names
    - Attributes
    - Real-world examples
  - begin their posters by listing information in the three categories on their paper.
12. Have students share their posters with others and discuss lists.
13. Select a few posters and review them with the class.
14. Ask students to question entries of which they are unsure.

### **C. Summary and closure**

1. Ask students to write three things that they learned today.
2. Have them share their statements with another student or students in their group.
3. Have students share with the class.

### **D. Assignment**

Have students use other resources (text, Internet, library) to find three things to add to their lists during the next class session.

## Assessment

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- Provide each group of students with a sheet of easel or chart paper.
- Section the paper as shown below.
- Each individual member of the group is to sit in front of one of the sections of the paper.
- Each student is to list information he or she has learned about the shape.
- After a given amount of time, each group is to discuss the information they have listed and place a group listing of what they have learned in the square at the center of their page.

