

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- **mathforum.org/**
"Math Forum," sponsored by Drexel University, contains a wealth of information about math for students and teachers. Students can tackle the "Problem of the Week," or send a question to Dr. Math. Teachers can find lots of helpful resources for teaching math, including lesson plans.
- **www.harcourtschool.com/glossary/math_advantage/index.html**
This multimedia math glossary offers illustrations and definitions for many mathematical concepts, individualized for grades 1 through 8.
- **illuminations.nctm.org/lessonplans/prek-2/investi_shapes/index.html**
The National Council of Teachers of Mathematics presents this unit plan entitled "Investigating Shapes: Recognizing, Constructing and Identifying Triangles." Through these five lessons, students learn more about the characteristics of triangles.

Suggested Print Resources

- Adler, David A. *Shape Up!* Holiday House, New York, NY; 1998.
- Burns, Marilyn. *Spaghetti and Meatballs for All! A Mathematical Story.* Scholastic, New York, NY; 1997. Learn more about shape and perimeter with this fictional story about a chaotic dinner party!
- Friedman, Aileen. *A Cloak for the Dreamer.* Scholastic, New York, NY; 1994. In this story about geometry, a tailor's three sons each use different shapes to make cloaks.
- Murphy, Stuart J. *Let's Fly a Kite.* HarperCollins Publishers, New York, NY; 2000. This fictional story teaches about symmetry as two children take a trip to the beach.

TEACHER'S GUIDE

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TITLES

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Geometry

Grades K–4

We use math in everything we do, from catching a movie at the local theater to shopping at the grocery store! Because math is an important aspect of our everyday lives, it's crucial that students are fluent in mathematical thinking and communicating. In our ever-changing world, it's not enough for students to be able to perform calculations. Students need to be challenged to solve problems in creative ways, using various approaches. Enhancing students' mathematical understanding can help to unlock the secrets of the world around them.

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Introduction

Geometry is all around us, from the shapes found in traffic signs to the solids found in the kitchen cabinet! As students familiarize themselves with geometry, they develop a spatial sense, which is a feel for their surroundings and the objects in those surroundings. Students can build their understanding about symmetry, congruence, perimeter and area to help them make sense of the geometry present in everyday life.

Vocabulary

geometry — The study of the shape and size of things all around us.

shape — A figure that lies on a flat surface.

corner — The place where two sides of a shape meet.

polygon — Any closed shape made with straight sides.

solid — A three-dimensional shape.

face — The flat surface of a solid.

edge — The place where two faces meet.

vertex — The place where two or more edges meet.

symmetry — Having both sides match exactly if a figure is folded along a line called the line of symmetry.

congruent — Having the same size and shape.

perimeter — The distance around a polygon.

area — The number of square units needed to cover the surface of a figure.

Pre-viewing Discussion

- Brainstorm a list of the shapes and solids with which students are familiar. Where can these shapes and solids be found in the classroom? In the school? In students' homes and neighborhoods?
- Encourage students to brainstorm a list of careers that require knowledge of geometry (e.g., architect, engineer, interior designer, etc.). How do these professionals use shape and size in their jobs?

Follow-up Discussion

- Using cut out shapes as references, encourage students to identify the shapes' similarities and differences. Which shapes are the most similar? Which are the most different? Encourage students to support their answers. This activity can be repeated with models of solids.
- Discuss the usefulness of area and perimeter. Identify situations in everyday life when these skills would be used.
- Have a class discussion about symmetry. Encourage students to identify objects in the classroom with a line of symmetry. Which objects have more than one line of symmetry? Which objects are not symmetrical? Why aren't they?

Follow-up Activities

- Share some of Tana Hoban's books that represent shapes and solids in common objects, like *Shapes, Shapes, Shapes* (Greenwillow Books, 1986) and *Cubes, Cones, Cylinders & Spheres* (Greenwillow Books, 2000). Using disposable cameras, students can take their own photographs of shapes and solids in the world around them, and compile them into class geometry books.
- After measuring the dimensions, encourage students to determine the perimeter and area of your classroom. Students can then estimate how the perimeter and area of your classroom compares with that of another room in the school. Test students' estimates by calculating the perimeter and area of other school rooms.
- Share *Grandfather Tang's Story* by Ann Tompert (Crown Publishers, 1990) with your students. Encourage students to identify the shapes used to represent characters in the story. Students can use tangrams to create characters for their own stories, which they can share with classmates. To extend this lesson on tangrams, see the following Web site: standards.nctm.org/document/eexamples/chap4/4.4/index.htm
- Using dot paper, students can show slides, flips and turns of various shapes. They can challenge partners to identify which moves each figure has made. See the following Web site for lesson ideas for investigating slides, flips and turns with tangrams: mathforum.org/varnelle/ktan5.html
- Hold geoboard challenges with your students! Challenge students to create as many shapes as possible with a certain characteristic on their geoboards (e.g., shapes with four sides, square corners or lines of symmetry).
- Share images of snowflakes with students and discuss the lines of symmetry that can be discovered (see www.lewkiw.com/html/flake.html for an example). Encourage students to create their own snowflakes using thin paper and scissors. Remind students as they are cutting that part of the fold must remain intact. Students can then determine how many lines of symmetry their snowflakes have. See www.montessoriworld.org/Handwork/foldingp/snowflak.html for suggestions on making intricate snowflake designs.
- Quilt patterns are wonderful examples of geometry in the real world. Share various quilt patterns with students, and ask them to identify the shapes they find. Students can then make their own paper quilt squares which can be pieced together as a class quilt (see the following Web site for more information about geometry and quilting: illuminations.nctm.org/lessonplans/3-5/paperquilts/index.html).
- In small groups, students can create solid collages by cutting pictures of solids from magazines (e.g., a ball for sphere, a trash can for a cylinder). Students can then glue these solids to a piece of posterboard and label them to create a collage.
- In pairs, students can explore manipulatives of solids in a unique way! One student should hand her partner a solid behind his back. Just by feeling the solid, the partner should give it a name, and justify his reasoning (e.g., "I think this is a sphere, because it has no vertices, no straight edges and it feels round."). Students can then take turns with each of the solids.