Shapes in Architecture

What shapes can we find in buildings throughout our neighborhood?

Theme
This lesson explores simple geometric shapes found in the built environment.

Student Objectives
- sort, classify, and compare familiar two-dimensional shapes found in prominent Chicago-area buildings
- identify and locate basic shapes in their own environment

Activities
- cut out, sort, and discuss shapes
- play *Concentration* game with building shapes
- take a shape-search walk around the block
- draw shapes seen on the walk
- make a "shape book" that includes students' own drawings and the provided drawings of Chicago buildings

Type
- indoor, desktop activities
- outdoor, walk-around-the-block activity

Timeframe
four class sessions of 20–30 minutes each

Materials
- **Handout A** - six geometric shapes
- **Handout B** - line drawings of six Chicago area buildings
- **Handout C** - photographs of six Chicago area buildings that match the line drawings
- drawing paper
- pencils or crayons
- scissors, glue
- envelopes *(one per student)*

Teacher Prep
- photocopy **Handout A–C** onto cardstock *(one complete set per student)*
- photocopy **Handout A** onto cardstock and cut apart *(one shape per student)*

Vocabulary
square

rectangle

triangle

circle

oval

diamond

congruent (optional Extension activity)

Interdisciplinary Connections

Fine Arts
Cut plastic lids into geometric shapes and have students make crayon rubbings of the shapes. Ask students to draw an animal or a building that incorporates that shape.

Fine Arts
Cut out a geometric shape from the center of a plastic lid to use as a template for sponge painting geometric shapes on white t-shirts. (Note: Be sure to slip a piece of heavy cardboard inside the t-shirt so the paint doesn't bleed through to the back side.) Your class can wear their t-shirts on the "shape walk" you take.

Language Arts
Play a "Who am I" game and use adjectives to describe a shape. When you are finished, ask students to guess which shape you have been describing.

Resources

Alphabet City, Stephen T. Johnson. New York: Viking, 1995. A beautiful wordless book and a Caldecott winner.

Architecture: Shapes, Michael J. Crosbie and Steve Rosenthal. New York: John Wiley & Sons, Inc., 1993.

City by Numbers, Stephen T. Johnson. New York: Viking, 1998. Another beautiful book, the companion to *Alphabet City*.

Grandfather Tang's Story, Ann Tompert, Robert Andrew Parker, illust. New York: Crown Publishers, 1990.

Activity Procedures

DAY ONE

1 Talk about geometric shapes that students can see in your classroom. Review the six two-dimensional shapes with your class (square, rectangle, triangle, circle, oval, diamond).

2 Pass out the shapes of **Handout A** and drawings on **Handout B**. Have students write their name on each shape and drawing before cutting them out.

3 On their desktops, have students sort, group, and classify the shapes into different categories. (In some cases, there will be more than one shape seen in a drawing. Let the students explain their thinking and decide the category into which it should be placed.)

4 Pass out copies of the building photographs on **Handout C**. Explain that the photographs are similar to the first set of drawings. Have students work alone or in pairs to cut out these photographs and match them with the simple line drawings and the shape pieces. Save each student's cut-out shapes and pictures in an envelope labeled with their name. All pieces will be used for a later activity.

DAY TWO

5 Play the game *Concentration* (also called *Memory*) in pairs. Mix up the 12 cards that show photographs and line drawings of Chicago buildings. Place the cards face down in a 4 x 3 grid pattern. Students take turns flipping over two cards at a time, while attempting to match the photographs with the line drawings of the same image.

DAY THREE

6 Take a walk around the block (or around your school) and talk about the shapes that you see. Give each student one of the six shapes you have copied onto cardstock and cut out from **Handout A**. As you walk, have students hold up their card if they see that shape. Stop and ask the rest of the class if they can see that shape also. You may need to trace the outline of the shape in the air with your hand and have students follow along so that everyone can distinguish it.

7 Discuss the shapes they see in terms of the location of the shape. For example, have students describe what they see by using phrases such as: "The circle on that building is above the rectangle door." "The square window is to the left of the triangle-shaped sign", etc.

8 Once back in the classroom, have students draw a picture of a building that incorporates the shape they held on the walk.

DAY FOUR

9 Have each student make a small "shape book" that is approximately 5-1/2" x 8-1/2". (Students may choose to make a "triangle book" or a "circle book" or a "square book", etc. depending on their favorite shape or what they have drawn / seen on the walk.) On the book cover, they can draw or glue the shape found inside the book. Inside the book they can include their own drawing from the neighborhood walk, together with the simple line drawings and the Chicago building photographs used in earlier activities.

Extensions

- Photocopy and distribute another set of the large shapes to each student. They can cut out the shapes and experiment with different ways of folding them. Can they fold the shape so that it becomes exactly half the size of the original shape (congruent parts)? Does this work with all the shapes? Does it work in any direction they fold the shape?
- Cut out the interior space of geometric shapes you have drawn on cardboard or heavy cardstock. Students can use these viewfinders to help them identify shapes in buildings.
- Have students glue various short pieces of straws onto paper to make rectangles, squares, triangles, and diamonds.
- Invite students to create an assortment of geometric shapes using craft sticks.
- Bring in several sets of tangrams and have students spend time creating new figures with the pieces. Read *Grandfather Tang's Story* while students are working.

BUILDING PHOTO CREDITS Frank Lloyd Wright Home and Studio, Oak Park, Illinois (COURTESY KEITH BAKER, 2002); Glessner House, Chicago (COURTESY KEITH BAKER, 2002); Railway Exchange Building, Chicago (CAF COLLECTION); Aon Building, Chicago (CAF, 2002); 150 N Michigan, Chicago (CAF, 2002); Prentice Women's Hospital, Chicago (CAF COLLECTION). (Note: Prentice Women's Hospital was demolished in 2013.)

Resources (continued)

Sam Johnson and the Blue Ribbon Quilt, Lisa Campbell Ernst. New York: Lothrop, Lee & Shepard Books, 1983.

Shapes, Shapes, Shapes, Tana Hoban. New York: Greenwillow Books, 1986.

The Tangram Magician, Lisa Campbell and Lee Ernst. New York: Harry N. Abrams, 1990.

Illinois Learning Standards and Benchmarks

9A Demonstrate and apply geometric concepts involving points, lines, planes and space.

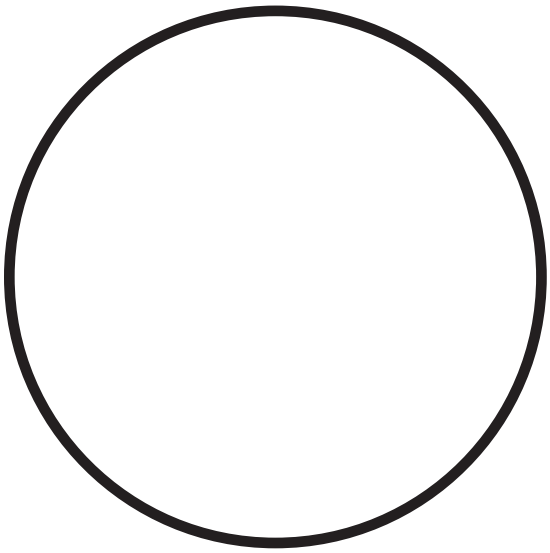
9.A.1a Identify related two- and three-dimensional shapes including circle-sphere, square-cube, triangle-pyramid, rectangle-rectangular prism and their basic properties.

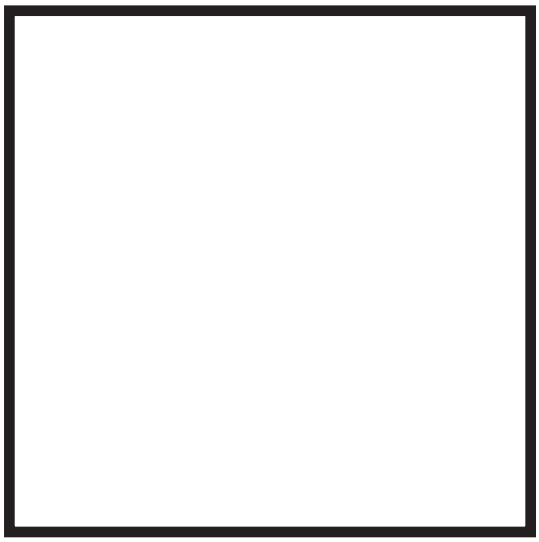
9B Identify, describe, classify and compare relationships using points, lines, planes and solids.

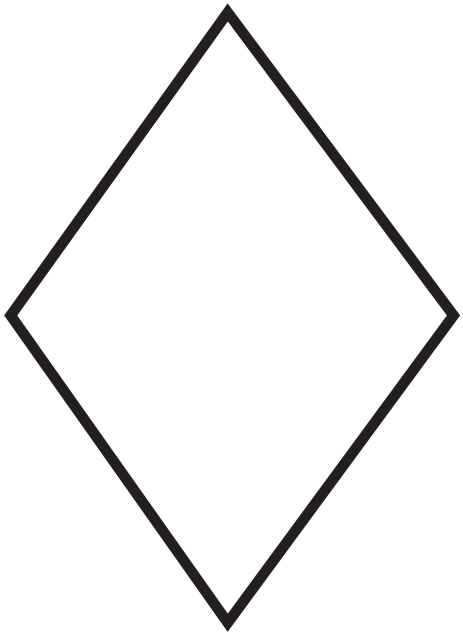
9.B.1a Identify and describe characteristics, similarities and differences of geometric shapes.

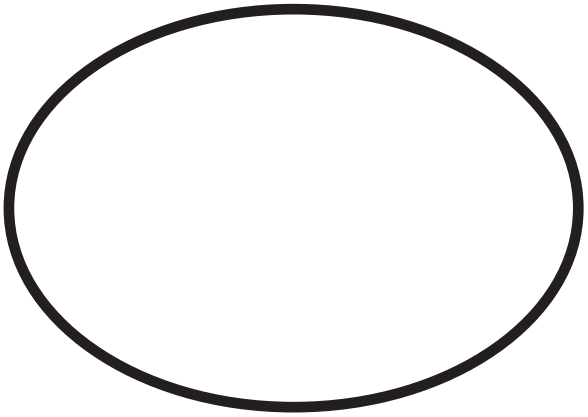
9.B.1.b Sort, classify and compare familiar shapes.

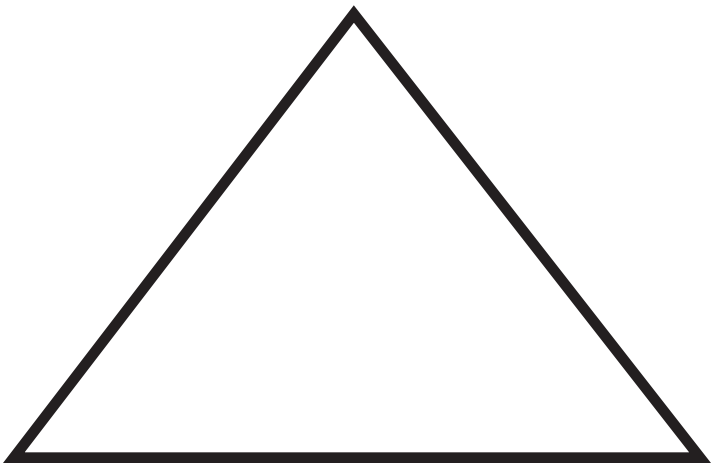
Handout A



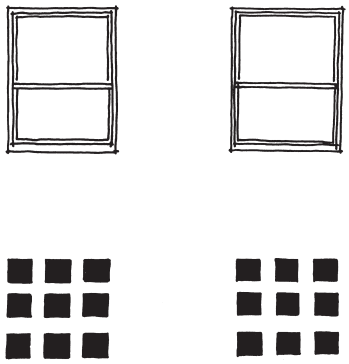


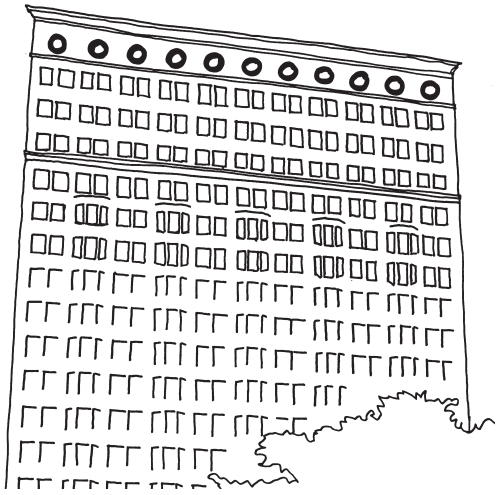


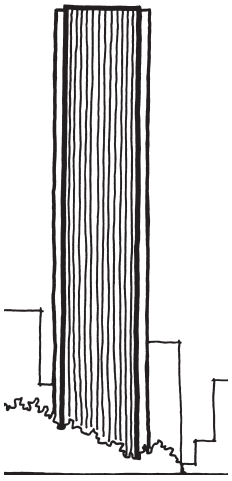


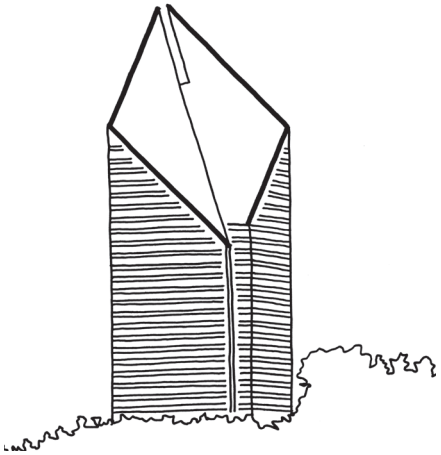


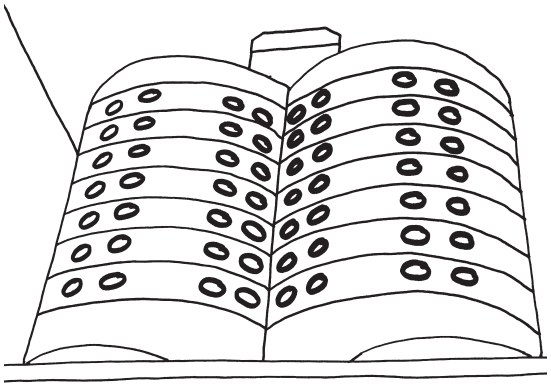
Handout B





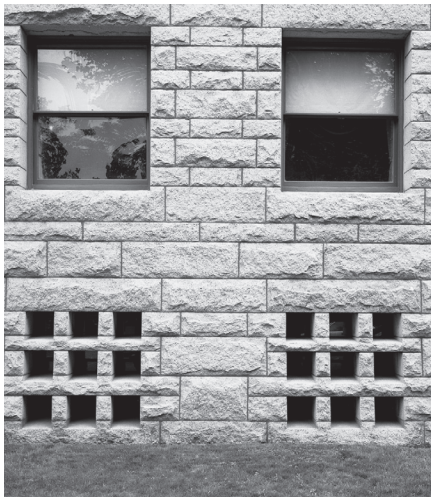


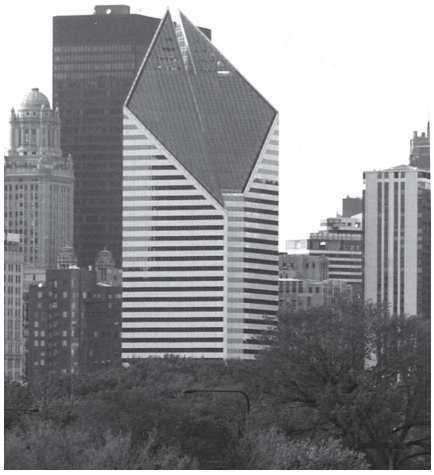




cut along the dotted lines

Handout C





cut along the dotted lines