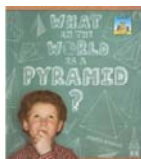


## Tips for Helping at Home

• In class, we have been exploring and creating two- and three- dimensional shapes. You and your child can extend this work by looking for and identifying examples of such shapes as you come across them in your daily life. For example, when you and your child are in the car, your child can call out shapes that he or she sees on signs and buildings.

• You and your child can use household materials to create your own polygons (such as squares, rectangles, and triangles) and polyhedrons (such as cubes, prisms, and pyramids) at home. You can use toothpicks or straws for the sides of your figures, and small marshmallows, clay, or jelly beans for fasteners.

• You and your child might visit the children's section of the local library and find books about 3-D Geometry to read together.



Hanson, A. *What in the World Is a Pyramid? (3-D Shapes)*. Sandcastle Publishers, 2007.

## Web Resources

<http://www.duvalschools.org/static/aboutdcps/departments/acadprog/mathematics/index.asp>

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=70>

Select: Geometric Solids

<http://www.rainforestmaths.com/>

Select: 3D Shapes

## Mathematical Emphasis

### Investigation 1—Sorting and Describing Solids

- Exploring, sorting, and talking about common geometric solids.
- Analyzing how solids are the same and different.
- Investigating and analyzing the parts of solids.
- Developing the ability to describe solids.

### Investigation 2—Building Polygons and Polyhedra

- Recognizing components of polygons - sides and vertices (corners)
- Recognizing how the components of polygons are put together to form whole shapes.
- Recognizing the components of polyhedra - faces, vertices, and edges
- Recognizing how the components of polyhedra are put together to form whole shapes.

### Investigation 4—How Many Cubes in a Box?

- Understanding how a pattern for a rectangular box folds to make the box
- Predicting the number of cubes that fit in a box by examining patterns that make the box.
- Determining the number of cubes that fit in a rectangular box.
- Understanding the structure of rectangular prism arrays of cubes.

### Investigation 5 - Building a City

- Problem solving involving planning, trial-and-error processing, analysis, and visualization.
- Predicting the number of cubes that will fit in the box made by a given pattern.
- Designing patterns for boxes that will hold a given number of cubes.
- Using appropriate computation techniques to determine the total number of cubes that will fit in different boxes.

Tierney, C. *Investigations in Number, Data, and Space: Exploring Solids and Boxes*. Dale Seymour Publications, 1998, 2007.

## Investigations in Number, Data, and Space



### Exploring Solids and Boxes Grade 3

#### 3-D Geometry

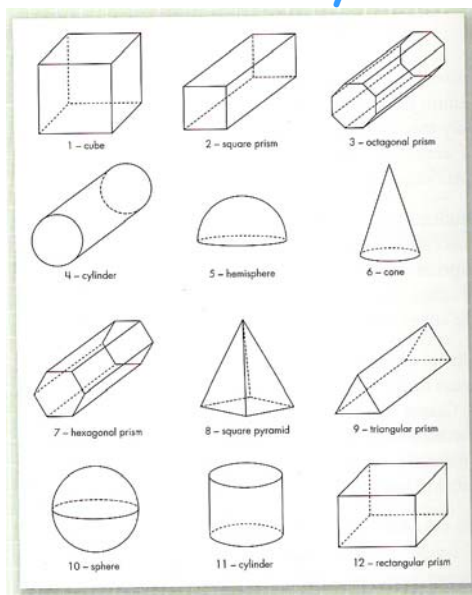
#### Unit Goals:

- Students sort, build, and describe different kinds of polygons and common geometric solids so that they become familiar with the components of these shapes and how the components are related.
- Students design patterns for rectangular boxes and explore how many unit cubes fit in the boxes.
- Students build a model of a city consisting of open-box buildings and determine the total amount of room in the buildings.

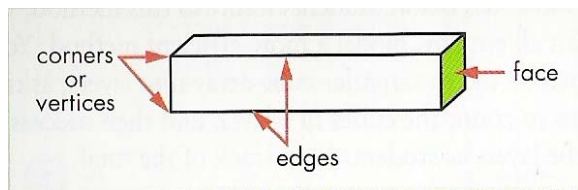
#### Proposed Time Frame:

**3 weeks**

## Vocabulary



**Geometric Solids**—There are many types of geometric solids. Several, such as spheres, cones, and cylinders (Figures 4, 5, 6, 10, and 11 above) have curved surfaces. Others (Figures 1, 2, 3, 7, 8, 9, and 12) called **Polyhedra**, have only flat surfaces.



**vertices**—point where surfaces meet, corners

**face**—flat surfaces of a three-dimensional shape

**edges**—where two surfaces join, intersect.

## How to Make Fraction Cards

Materials: 6 sheets of paper (all the same color), a pen or crayon, scissors

What to Do: Fold and label paper as shown. Write each fraction on one side only. Mark the fold lines. Cut on the lines.

Halves: Fold the sheet in the middle.

Thirds: Fold the sheet in 3 equal pieces.

Fourths: Fold the sheet in half one way, then in half the other way, to make 4 equal pieces.

Sixths: Fold the sheet the way you did to make thirds. Cut apart the thirds. Fold two of the thirds in half and cut to make long, skinny sixths. Cut the other third in half the other way to make chunky sixths.

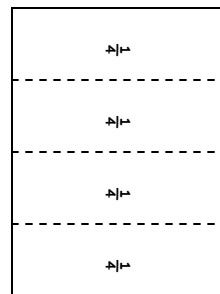
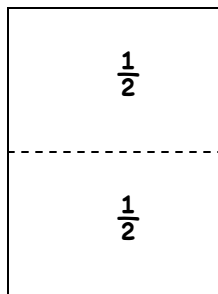
Eighths: Fold the sheet into fourths. Open the paper to see the folds. Fold each fourth in half.

Store your Fraction Cards in a plastic bag or envelope. Save these directions with them. You may want to make another set for playing games.

Ideas to Try at Home:

Turn over the cards to hide the labels. Order the cards from smallest to largest. Then turn them over. Look at the number pattern. What do you see?

Find different combinations to make one whole. Put the Fractions Cards on top of a whole piece of paper to keep track. Keep a list of your combinations.



## Fraction Card Game

Materials: 2 sets of Fraction Cards (see directions for making them to the left)

Players: 2 (or two teams of two)

How to play:

1. This game requires some space, so try to play on the floor or find a table that is clear. Each player starts with a full set of Fraction Cards that are mixed up. Turn the cards so the fraction labels are face down.
2. Both players turn up one card at a time from the top of their sets, showing the fraction label.

The player who turns up the bigger Fraction Card takes both cards (like in the card game War). If both cards are the same size, both players turn up another card. The player with the bigger fraction takes all four cards.

3. Each time you win cards, try to make a whole with them. You may use any cards you have already won.

For example, you could make some wholes out of halves, thirds, and sixths. You could make other wholes out of halves, fourths, and eighths.

Other combinations will also work together, such as 2 fourths and 3 sixths. Leave your wholes out on the table.

4. Continue taking turns and making wholes until you have used up all the cards. The person with the most wholes at the end wins the game.