

The learner will identify, describe, draw, and build basic geometric figures.

Notes and textbook references

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3.01 Identify, build, and name parallelograms, squares, trapezoids, and hexagons.

A. Prepare flash cards with pictures of hexagons, trapezoids, and parallelograms in a variety of orientations. Prepare an equal number of cards with the names of the figures. Shuffle the cards and lay them face down in front of the players. A student chooses two cards hoping to match a shape with its name. If a match is made the player keeps the cards and takes another turn. If a match is not made the player returns the cards, face down, and the next player takes a turn. When all the cards have been matched the game is over.

B. Place models of hexagons, trapezoids and parallelograms in a bag. Ask a child to reach in and take hold of a shape without looking at it. He/she should describe the shape as completely as possible and give its name. After naming the shape, the child removes it from the bag to check.

C. Provide materials such as play-dough, toothpicks, marshmallows, gumdrops, pipe cleaners, or other suitable materials and allow students to create models of hexagons, trapezoids and parallelograms.

D. Arrange a scavenger hunt at home or at school to find examples of the shapes. Share the results with the class. A class scrapbook with pictures from magazines and newspapers would be a suitable project to complete this activity.

E. Have student make figures on a geoboard, telling about each figure. How many different hexagons can you make? Make a square and a trapezoid on the geoboard; how are they alike? How are they different? Use the geoboard to review plane figures. Have children build a triangle. Compare the triangles built. Have children record on geoboard or dot paper. Graph the geoboards on the floor by rules the children decide. Then make a pictorial graph by gluing the paper geoboards to bulletin board paper. This same activity can be used for rectangles, etc. See Blackline Master III - 51.

Children will learn through their experiences that the polygons they are identifying are the faces of 3-D figures.

F. Mystery Shapes: Place one figure in the student's hands (child has eyes closed). Have student identify the figure by touch. Place several models in a box or bag. Ask student to find, by touch not by looking, a specific shape. Relationship shapes, and pattern or attribute blocks are good sources.

G. Have students use pattern blocks to build a design. Have students write a description of their designs using appropriate geometric terms. Pair students and have each read the description as the partner tries to duplicate it.

H. Using toothpicks and index cards and have students make a set of shape cards by gluing toothpicks to the cards. Label the plane figures. Have a partner, with eyes closed, gently feel the card's surface and name the shape.

I. Show students a picture of a plane figure. Have them tell you everything they know about the figure. Ex. Square: four sides, four square corners, all sides equal, four lines of symmetry.

J. Have children draw two different shapes from a container. Working with a partner, write all the ways the shapes are alike, and all the ways they are different. Ex. Hexagon and rectangle: alike - straight sides, corners, plastic; different - numbers of sides, numbers of corners (angles) size of angles, size of sides, colors, etc.

K. Ask students to identify basic shapes in common objects. What shape are your desk tops?, The top of a milk jug, the face of the clock, the tiles on the floor. What shapes are the signs on the highway? Stop, yield, speed limit, miles to the next town?

H. Have students make books about the shapes they are learning. Include pictures from magazines and their own drawings. Write sentences on each page to tell about the shapes. Share books with another class or save them to help show next year's class.

L. Have students group shapes by the number of sides or edges. Have students find all shapes that have right angles, or all sides equal. *Students should begin to recognize right angles but do not need to know that they measure 90° . Since a degree is a measure used to describe turns, students should have the opportunity to "act out" the opening and closing of rays to make angles.*

3.02 Identify, build, and name cylinders, cones, and rectangular prisms.

A. Create a 3-dimensional shape museum. Introduce one figure a day. Show and discuss several examples and label the figure. Challenge students to find and bring examples or pictures from home. After all the figures have been introduced, create a class scrapbook with the pictures and a display (museum) with the shapes.

B. After introducing a 3-dimensional shape, write the name on the top of the poster and draw it. Have children give examples of objects that have that shape and record on the poster.

C. Go on a shapes walk. Make a list of what you see. Put 3-D shapes on the overhead and trace the outlines. Match shapes to their “maps.” Use yarn, clay or string to make shapes. Use a magic marker to trace around shapes. Have students put glue on the sides or edges and then sprinkle with sand or glitter.

D. Gather cubes, cylinder, blocks and cones which children bring from home; collect decorative materials such as colored paper, tape, buttons, felt, feathers, sequins and pipe cleaners, glue or tape, scissors. Children decorate their polyhedra with the provided materials. Record for children their description of their model and display both in the art center.

Fortunately, Unfortunately

by Remy Charlip

Read the book to the class and point out the pattern of black, white, and colored pages. The children can then use this pattern to write their own books by the same title.

E. Challenge children to build figures according to your directions. For example,

- Build something that moves without using any round blocks.
- Make the tallest tower possible using only seven blocks.
- Use the blocks to build a spaceship.
- Build a place for animals to live.
- Build something that has a ramp.

F. In small groups explore polyhedra. Review the names of the 3-D shapes. Discuss the meaning of the names slide, roll, and stack. Test each solid to see whether it will slide or roll. Record findings on chart by placing the model in appropriate columns. Investigate stacking and not stacking. Discuss findings:

- Why do you think the _____ rolled?
- Why do you think the _____ didn't slide?
- Are there any shapes that can roll and stack?
- How are some shapes alike?
- What is different about these two shapes?

Be sure to leave shapes out for children to continue experimenting individually.

As an extension, have children sort models using a Venn diagram made from yarn. Discuss what each section means and how to interpret the intersection. Change the labels and re-sort. See Blackline Masters II - 39 and II - 40.

G. Using geoblocks, student builds a structure. Have the student identify which shapes are the same and which are different. Ask him/her to name blocks.

H. Give the student models of cubes, spheres, and cones to handle, compare, and identify. Go on a shapes walk. Ask student to find examples of specific figures.

I. Have student make solid figures (boxes, balls, cones) out of clay and straws (or other materials). Have student describe the figures and how they were made. The use of vocabulary, “sphere” and “cube” for ball and box respectively, should be encouraged. Adults should model new vocabulary to help students learn the terms. Note that not all boxes are cubes.

J. Place models of several different solids in a box or bag. Child removes, without looking, the one requested by the leader.

K. Have student bring to class pictures of plane and solid figures; make a book with pictures cut from magazines. Given pictures of solids, ask student to mark those representing a specific figure.

L. Have student sort and then describe blocks (ex. wooden blocks, geoblocks, and real-life models). Explain the grouping.

M. Using straws, tinker toys, toothpicks, clay or other materials, have student build models of solid figures. Ask student to organize the models in some way and make a display. Ex. Use marshmallows (or gumdrops) and toothpicks to build a cube. Each toothpick represents an edge and the marshmallows are vertices.

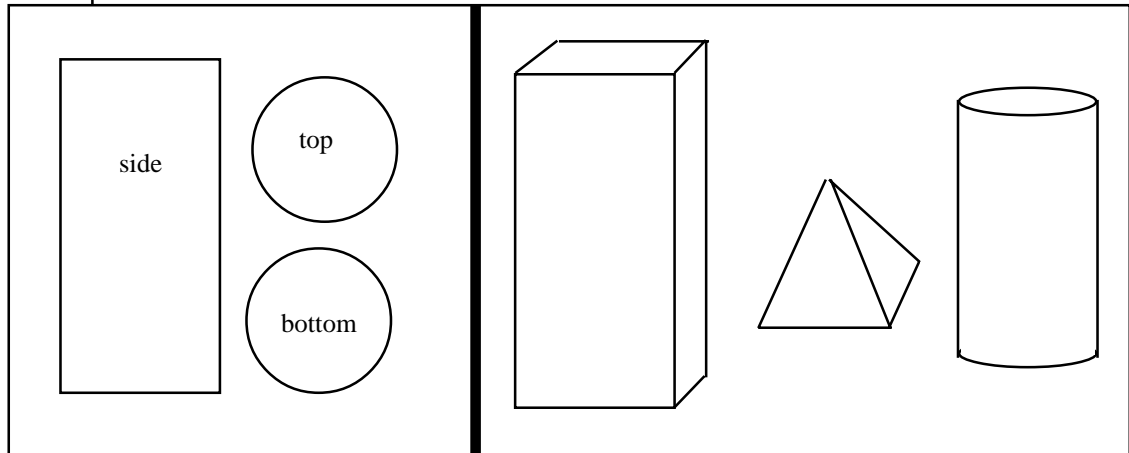
N. Given models, have student identify the one with the most (fewest) corners or edges. Ask student to explain what a corner or an edge is.

O. Have students make books about figures including pictures from magazines as well as their own drawings. Direct students to write a sentence about each page. Finding examples of solid figures in magazines helps children see the real-life application of these concepts. Another way to use magazine cut-outs is to make posters for each solid and have students glue pictures for each poster.

P. Have students solve “Who am I?” puzzles. For example, “I am a solid figure. I have six faces. All of my faces are the same (congruent). Who am I?”

Have children bring in a variety of food boxes. By cutting papers the same size as the faces of the boxes and pasting the blank papers on the boxes, children can draw buildings and create a city.

Q. Ask student to identify which solid matches the “blueprint” the teacher has drawn.



R. To help children learn the concept of “face” have them draw a face on each face of a cube. This can be a happy face or a Santa if they are to be used as decorations. See templates in Blackline Masters Volume One pages 251 - 256.

S. Review solids by providing snacks in these shapes. Some examples: sugar cubes, Bugles (cones), ice cream cones, Combos (cylinders) or softdrinks in cans, sugar wafers or Rice Krispie Treats (rectangular prisms), sour balls (spheres), etc.

3.03 Compare and contrast geometric figures.

A. Two children are chosen to stand before the group. A third child tells 3 ways they are alike and 3 ways they are different. *Alternative:* Have the two students each hold a stuffed animal. Other children tell how they are alike and are different.

B. Student chooses several objects (for example, Relationshapes, “junk” boxes, collections of teddy bears) and describes why certain ones are alike and how they differ from the others.

C. Give student two unrelated objects such as a large blue plastic comb and a blue plastic car. Student then tells as many ways as possible how objects are alike and are different.

D. Students bring a favorite stuffed animal to school. The teacher then asks the children to find an animal they think is the most like theirs. The two children then draw or write to show how their animals are alike and different. Repeat with the animals most unlike theirs.

E. Bring in two different types of cookies or crackers. Allow the children to have one of each type. Have them write in small groups all of the ways they are alike and different. Encourage the students to use all of their senses as they accomplish this task. Integrate a lesson on the senses or review the senses with this activity.

Notes and textbook references

In dividing regions into equal parts remember that equal area is the aim, not necessarily congruent parts.

3.04 Solve problems involving spatial visualization.

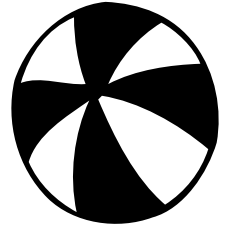
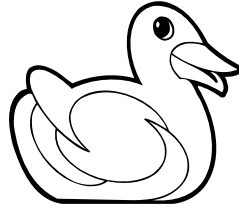
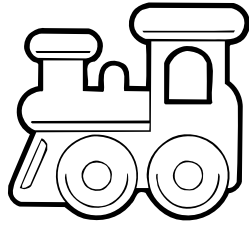
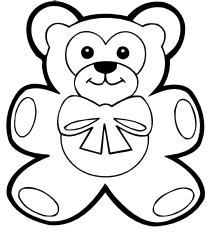
A. Using geoboards model making a shape and dividing it into two (three, or four) equal regions. “Think aloud” as you demonstrate the division. Allow students to form the shape and divide it into equal parts on their own. Ask “Is there more than one way it can be done?”. Share the different shapes and explanations with the class.

B. Using pattern blocks, lead an investigation by asking questions such as: “Can the hexagon be shared equally between two? Which pieces would the parts be? Among three? Among four?” “Can the parallelogram be shared equally etc.”

C. Have students fold and crease a sheet of paper into two, three, or four equal parts. Share the different solutions with the entire class. Odd pieces of paper that turn up at various times can lead to interesting discussions.

D. Give students an outline of a shape or map. Challenge them to divide it into two, three, or four equal parts and color each part with a different crayon or marker. “How can we determine whether the parts are equal?”.

E. Teacher places five (or an appropriate number) objects on the table. Student looks at the collection for a few seconds, and then closes eyes as the teacher removes an object. Ask student what is missing.



F. Place objects (pattern blocks or unique objects) in a row. Allow student to study for a few seconds. When student's eyes are closed, scramble the objects and direct student to put them back in the original order.

G. Fill in an outline with pattern block pieces. (Or use Relationshipapes or tangram puzzles.) Given a pattern block puzzle outline, have student complete the puzzle in more than one way. Solve jigsaw puzzles. Have student create a puzzle for others to solve by cutting up old greeting cards into puzzle pieces. Store individual pieces in sandwich bags.

H. Ask student to copy a geoboard design onto another geoboard. Have student record a design from a geoboard onto dot paper. Another task is to copy a geoboard design that has been drawn on dot paper. (Designs need not be regular figures.)

I. Give student a variety of pattern blocks. Teacher makes a design with four (or an appropriate number) blocks. Child looks at design before teacher covers it up. Ask student to choose the correct blocks and make the design.

J. Given a small sample of wallpaper, have student copy that portion, extend the design, and color the entire sheet.

K. Leader builds a design with pattern blocks or other materials. Student copies the design. Important: Seat partners side by side. Student studies simple drawing or shapes on overhead then reproduces the drawing from memory.

L. Show how your partner's design would look in a mirror (reflection).

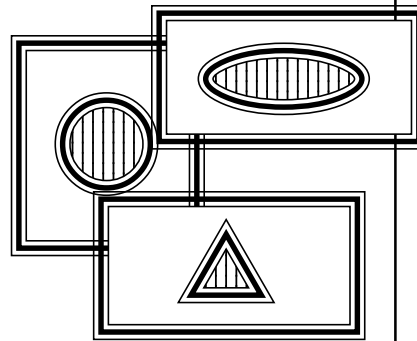
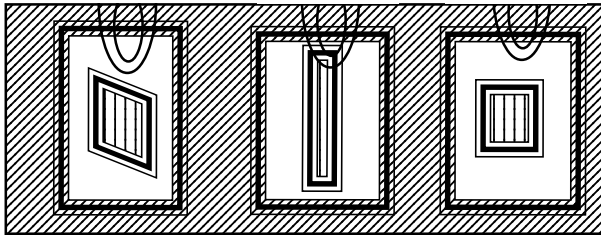
M. Students create pattern blocks or Unifix designs. Then students copy the designs by gluing construction paper shapes (pre-cut to

match pattern blocks or cubes in color and shape) to a background.

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N. Use pattern blocks to model all of the different ways to make the hexagon with the other blocks. Have children make the different ways and then record by tracing the blocks and coloring them.

O. One - Two - Three - Remember Me! Attach a paper clip to the top of each section as shown. Next, produce a set of six playing cards for each player (A set of six cards is shown). Visual Memory - The teacher or “leader” does not talk, but simply shows the card to the players for 5 - 10 seconds, removes the card, and the players must reproduce the sequential visual pattern from their cards. See Blackline Master II - 42.



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references*