

Ohio Standards Connections

Geometry and Spatial Sense

Benchmark C

Sort and compare two-dimensional figures and three-dimensional objects according to their characteristics and properties.
(Grades Pre-Kindergarten - 2)

Indicator 1

Identify and sort two-dimensional shapes and three-dimensional objects. For example:

- Identify and describe two-dimensional figures and three-dimensional objects from the environment using the child's own vocabulary
- Sort shapes and objects into groups based on student-defined categories.
- Select all shapes or objects of one type from a group.
- Build two-dimensional figures using paper shapes or tangrams; build simple three-dimensional objects using blocks.

(Grade Kindergarten)

Benchmark F

Describe location, using comparative (before, after), directional (above, below), and positional (first, last) words.
(Grades Pre-Kindergarten - 2)

Indicator 2

Name and demonstrate the relative position of objects as follows:

- place objects over, under, inside, outside, on, beside, between, above, below, on top of, upside-down, behind, in back of, in front of;
- describe placement of objects with terms such as on, inside, outside, above, below, over, under, beside, between, in front of, behind.

(Grade Kindergarten)

Mathematical Processes Standard

Benchmark I

Communicate mathematical thinking by using everyday language and appropriate mathematical language.

(Grades Pre-Kindergarten - 2)

Lesson Summary:

Students will describe, identify and compare two-dimensional figures. They will also name and demonstrate the relative position of objects using directional words.

Estimated Duration: *A circle time activity is included that will take approximately 15 minutes. The lesson will take between 20 - 25 minutes.*

Pre-Assessment:

Student readiness for, and emerging skills in, describing, identifying and comparing two-dimensional figures can be assessed through a wide variety of center activities and daily routines. For example, shapes are often used in activities designed to address other benchmarks and indicators, such as those for counting, modeling operations, and creating and extending patterns. Questions posed during those activities can provide evidence of student progress in recognizing shapes and their characteristics. The circle activity in the lesson also serves as an embedded, on-going assessment and provides information about students' skills in sorting and comparing shapes. That information can be used to plan for additional opportunities to build understanding and skill through similar group activities, learning centers and daily routines.

Assessment of students' familiarity with and use of mathematical terms for describing relative position should also be part of routine, daily classroom activities and embedded within the lesson, rather than through a formal pre-assessment. Observation and questioning during routine, classroom activities and in informal contexts provide rich evidence of student familiarity with and use of the mathematical meaning of common directional words.

Scoring Guidelines:

Student readiness and progress in meeting the benchmarks and indicators for this lesson can be summarized using a variety of observation or data collection forms. For example, student progress in identifying and comparing shapes can be classified using such general categories as:

- Extends understandings and skills to more complex tasks
- Performs task without assistance
- Performs task with some assistance
- Performs some components of the task only with assistance

Additional notations can be made about the type of assistance needed, what shapes students easily recognize, and what kinds of comparisons students can make easily and which are more challenging.

Similar categories can be used for describing student progress in using mathematical terms, such as

- Consistently uses term(s) accurately
- Sometimes uses term(s) accurately
- Rarely uses term(s) accurately

Additional notations can be made to indicate which terms the student understands and uses consistently and which terms students need additional instruction and

Other Related Ohio Standards

Patterns, Functions and Algebra

Benchmark A

Sort, classify and order objects by size, number and other properties, and describe the attributes used.

(Grades Pre-Kindergarten - 2)

Indicator 1

Sort, classify and order objects by size, number and other properties. For example:

- a . Identify how objects are alike and different.
- b . Order three events or objects according to a given attribute, such as time or size.
- c . Recognize and explain how objects can be classified in more than one way.
- d . Identify what attribute was used to sort groups of objects that have already been sorted.

(Grade Kindergarten)

practice to use accurately and consistently.

The information can be updated regularly as students engage in activities throughout the school year.

Post-Assessment:

A distinction between pre-assessment and post-assessment is not made in this lesson as assessment of student understanding and skill is on-going throughout the lesson. The activities provide rich evidence of students' progress and serve as both instruction for, and assessment of, the target benchmarks and indicators.

Student products from day two of this lesson - the work mats with stickers placed according to directions from the teacher - can be used as one piece of evidence to categorize student progress. These can be gathered and reviewed after the lesson and shared with parents to illustrate students' progress.

Scoring Guidelines:

The scoring criteria are the same as that described for the pre-assessment.

Instructional Procedures:

Day One: Circle Time Activity

1. Show students a small collection of two-dimensional shapes. It might be best to start with three rectangles, three triangles and three squares. The figures will need to be of varying sizes and color. Attribute blocks may be used if supplemented with different types of triangles (scalene, right, isosceles, obtuse, acute).
2. Begin by asking students to identify each figure. Discuss characteristics of each shape. Record characteristics on chart paper.

Commentary:

Sometimes students may think that all shapes have sides, including circles. In the results from the field test, one student tried to convince his/her teacher that the "sides of a circle could be counted the same way that you count the sides of a triangle or square." Further questioning of the student found that he/she was talking about the inside and outside of the circle. Students at this age often make associations with what they think a word means.

3. Next, ask students to look at a collection of shapes and sort figures into groups, explaining how the shapes in each group are alike. Possibilities include all the same shape, all the same size (different triangles, different rectangles, as well as different orientations), and all the same color.
4. Ask students to discuss and explain differences among shapes and create collections of shapes that are all different in one way (size, color, or shape).
5. Ask students to look around the classroom to identify objects that have the same shape as a rectangle, square, circle, oval, triangle, etc.

Instructional Tip:

Explorations with Shapes — Kindergarten

Stress that the surface of the desk is a rectangle, the surface of the door is a rectangle, the surface of the clock is a circle, etc. Misconceptions continue into adulthood that a ball is a circle and a block is a rectangle.

6. Show students several examples of the same shapes such as different types of triangles (scalene, right, equilateral, isosceles, obtuse, acute) in different orientations.

Commentary:

Often, shapes are repeatedly presented to students in the same way. Students need to have experience looking and manipulating the same shape in different orientations.

Day Two

1. Provide the students with work mats (Blackline Masters #1, #2, and #3), an assortment of stickers and the shapes discussed in class made of different colors of construction paper. Pre-cut the shapes before distributing them to the students.
2. Instruct the students to sort the shapes. Do not tell them how to sort the shapes.
3. Facilitate a discussion about the way the students sorted their shapes (color, size, shape).
4. Instruct the students to put squares above the line on the work mat and the triangles below the line on the same work mat. Give them time to glue the shapes on the paper. Observe where the students are placing the shapes.
5. Instruct the students to place a star above one of the triangles.

Instructional Tip:

Students sometimes confuse "above" and "below" with "up" and "down." If some students are challenged by these words, select other students to demonstrate the placement of the stickers and give an explanation. For example, some students may hold the sticker over the paper for above or under the table for below. Modeling the placement may help the students.

6. Ask the students where they placed the star.
7. Give other directions for placing stickers on this mat. Ask the students about the placement.
8. Repeat the activity with another work mat.

Commentary:

One teacher in the field test used the following directions for the

placement of stickers with her students:

- Put the frog above the circle.
- Put the apple below the circle.
- Put the fish on top of the circle.
- Put the smiley face beside the circle.
- Put the dinosaur inside the circle.
- Put the star outside the circle.
- Put the shark under the circle.

Observing the placement of the stickers should be done as the students are working. Questions should be asked pertaining to the placement of the stickers such as "Does 'under' the circle mean the same as 'below' the circle?" For example, some students may pick up the paper and place the sticker on the desk or place the sticker at the bottom of the paper.

9. The lesson may be modified to include similar activities with three-dimensional objects.

Differentiated Instructional Support:

Instruction is differentiated according to the learner needs, to help all learners either meet the intent of the specified indicator(s) or, if the indicator is already met, to advance beyond the specified indicator(s).

- Some children may have difficulty distinguishing shapes. Model how to trace the perimeter of shapes and encourage the children before they try to identify or describe the shape.
- Have the students trace the objects in shaving cream, salt, sugar, or pudding.
- Introduce two shapes at a time as follows: This is a _____ and this is a _____; show me a _____ and show me a _____; tell me what this is _____ and what this is _____.

Extension:

These are ideas for all students to continue learning on this topic - in the classroom or outside of the classroom.

- Have a scavenger hunt for shapes that can be found in the classroom, school and community environment.

Homework Options and Home Connections:

- Ask students to bring in objects or pictures for a featured "shape of the day or week."
- Ask parents to help their children identify shapes in their environment and label them.

Materials/Resources Needed:

For the teacher: Small collection of two-dimensional shapes or attribute blocks if available, paper shapes made of different color construction paper (pre-cut), chart paper.

For the students: Manila drawing paper, markers, glue, different color paper shapes and collection of stickers.

Key Vocabulary:

- square
- circle
- triangle
- rectangle
- pentagon
- cube
- above
- under
- on top of
- beside
- below
- inside
- outside

Technology Connections:

Students can further investigate the characteristics of two-dimensional shapes as they use computer tools to build these shapes.

- Use computers during free choice time in conjunction with other shape activities taking place in the classroom. As students move between learning centers, classroom computers function as one of those centers.
- Position computers to allow students to see each other's screens to encourage learners to discuss and share their work.

Below are examples of computer activities that can be made available to students:

- Students can use computer versions of a geoboard to build two-dimensional figures. As students construct triangles, squares, rectangles, etc., using electronic rubber bands, the defining characteristics of these shapes are made explicit. Electronic geoboards provide students additional opportunities to determine the properties of these shapes. For example, learners can fill the figures they create with color - highlighting the shape enclosed by the rubber band. Functions that enable young students to easily make changes to their shapes, such as delete options, can encourage students to experiment with shapes and their properties (e.g., change the number of sides, vary the number of corners).
- Constructing two-dimensional shapes using computer graphics programs provides students another way to experiment with the properties of these shapes. For example, shape tools enable students to easily construct a variety of squares, rectangles, ovals, and circles and observe the range of figures included in each category. Learners can see these shapes develop - watching a shape stretch across the screen as they drag the mouse to create that figure. They can see the relationship between rectangles and squares as they form a rectangle by stretching out the sides of a square.

Attachments:

- Blackline Master #1
- Blackline Master #2
- Blackline Master #3