### Ohio Standards Connection

#### Geometry and Spatial Sense Standard

**Benchmark C**
Sort and compare two-dimensional figures and three-dimensional objects according to their characteristics and properties.

**Indicators**
1. Match identical two-and three-dimensional objects found in the environment and in play situations (e.g., 2 squares of same size, 2 stop signs).
2. Sort and classify similar two- and three-dimensional objects in the environment and play situations (e.g., paper shapes, 2 balls of different sizes).
3. Identify, name, create and describe common two-dimensional shapes in the environment and play situations (e.g., circles, triangles, rectangles and squares).

#### Patterns, Functions and Algebra

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

**Indicator 1**
Sort, order and classify objects by one attribute (e.g., size, color, shape, use).

### Lesson Summary:

**During this lesson,** children become “shape detectives” as they identify, name, create and describe common shapes within pictures and objects found within the learning environment. Suggestions include incorporating shapes into all learning areas and daily activities within a preschool learning setting.

**Estimated Duration:** Thirty minutes, short sessions extended over several days.

### Commentary:

Learning Centers are an integral part of the preschool classroom. In centers or interest areas, the children explore and practice skills and concepts that have been introduced, as well as construct knowledge about the world around them.

“Children begin forming concepts of shape long before formal schooling.” (NCTM, 2000) Young children begin by using their own vocabulary to describe and compare objects. Provide materials and an environment to encourage students to explore shapes and their attributes. Allow students to create and manipulate shapes and explore the use of shapes in the real world.

### Pre-Assessment:

The pre-assessment only focuses on the children’s abilities to match and sort shapes. Before beginning this assessment, collect the following materials: a set of the four basic shapes (circles, squares, triangles, and rectangle) for each child and a large shape for the teacher.

- During circle time or with a small group of children, share a picture book about common shapes (e.g., circle, square, rectangle, triangle).
- Provide a set of attribute blocks or cardboard forms depicting the four basic shapes (circle, square, rectangle, triangle). Display the shapes on the table or floor for easy access by all children. Have a greater number of each shape manipulative than the number of children in the group.
- Stop at appropriate points during the reading for children to find, match, explore and talk about the different shapes found in the text and among the manipulatives. As each child finds matching shapes among the manipulatives, ask each child to touch and talk about its unique characteristics. Use prompts such as the following to guide and facilitate discussion:
Shape Detectives – Pre-Kindergarten

Ohio Standards
Connection
Mathematical Processes
Benchmark
H. Recognize the mathematical meaning of common words and phrases, and relate everyday language to mathematical language and symbols.

- Look at the shape on this page. Can you find a shape like this among these (blocks or cardboard forms)?
- Touch and explore the shape. What can you tell me about the shape? Does it have straight lines/edges?
- How many straight lines does it have? Count with me.
- Are the straight lines/edges the same size? How do you know?
- Does the shape have corners? How many corners are there? Count with me.
- What is the name of the shape?

- After the story and discussion, describe one of the shapes and have the children hold up the described shape.
- Ask, “What is the name of the shape?”
- Repeat the process with each shape.
- Place large shape cards on the floor. Select children, two at a time, to sort their shapes by placing each shape on the appropriate large shape on the floor. (“Put your shapes on top of the shape it matches.”)

Scoring Guidelines:
Use an observation-based assessment. Make annotations of children’s ability or inability to identify, match, name and describe shapes. Make note of vocabulary children use to describe shapes. Use Attachment A, Pre-Assessment Checklist, to record children’s understandings about shapes.

Post-Assessment:
Post-Assessment should be embedded within the lesson activities and context of daily routines, activities and play, such as:
- Listen to and observe children as they explore the learning environment during the “shape hunt” portion of the lesson. Engage children in related learning experiences (e.g., opportunities provided within learning centers). Use anecdotal records, checklists, photographs, audio and video recordings to assist with data collection.
- Culminating Activity: Children create pages for class shape books, such as Circles Around Us, Squares Here and There, etc. Encourage children to visit the art interest area/learning center to create a collage for a page of a shape book by drawing, cutting pictures from magazines or using stamps or pre-cut shapes. This small group or learning center activity takes approximately one week to complete. Use Attachment B, Shapes Pages, as templates for pre-cut pages of the shape books. Talk with children as they create their pages, using comments and prompts such as:
  a. Tell me about the shape of this page? Its name? Number of sides?
Shape Detectives – Pre-Kindergarten

b. What pictures did you draw or find that are the same shape as the page?
   • Record the children’s responses on the bottom of their shape page. Bind the individual pages to create shape books.

Scoring Guidelines:
Document children’s interest and levels of engagement during explorations and creative expressions and the oral language used with adults and peers. Observe and record children’s comments as they identify, match, sort, describe and create common shapes. Note individual children’s level of understanding and skill, using the following scoring guidelines.

<table>
<thead>
<tr>
<th>Beginning</th>
<th>Developing</th>
<th>Accomplished</th>
<th>Exemplary</th>
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</thead>
<tbody>
<tr>
<td>• Identifies shape by pointing</td>
<td>• Identifies shape</td>
<td>• Identifies shape</td>
<td>• Identifies shape</td>
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<tr>
<td>• Names shape</td>
<td></td>
<td>• Names shape</td>
<td>• Names shape</td>
</tr>
<tr>
<td></td>
<td>• Describes at least 1 distinguishing feature of the shape (3 of lines/sides/corners)</td>
<td>• Describes at least 1 distinguishing feature of the shape</td>
<td>• Describes at least 1 distinguishing feature of the shape</td>
</tr>
<tr>
<td></td>
<td>• Reproduces shape</td>
<td></td>
<td>• Reproduces shape</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identifies objects of that particular shape in the environment</td>
<td></td>
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</tbody>
</table>

Instructional Procedures:
Instructional Tip:
This is a two part lesson. Part One focuses on children sorting, identifying and naming the four basic shapes and helping children recognize that these shapes exist in the world around us; everything around us is made from shapes. Part Two deals with describing the shapes by focusing on each shape’s attributes (number of straight lines, corners, etc.).

Part One
1. Following the reading and exploration with shape manipulatives during the pre-assessment activity, conduct a shared writing experience with a small group of children.
2. Ask children to assist in creating a list of distinctive features to describe each shape pictured within the text. Record the children’s responses in a chart containing columns for each common shape (i.e. circle, square, rectangle, and triangle). Return to pages in the text or use shape manipulatives to support children’s recall and discussions. Use pictures and icons to support the written text where appropriate. Display the chart in the learning setting for future reference.
3. Conduct a shape hunt or walk to find examples of shapes (i.e., circle, square, triangle, rectangle) inside and/or outside learning environment. As children explore the environment, ask the children to act as “shape detectives” as they find and collect items or objects having the four common shapes. Provide a basket or bag for each child’s collection. Have children draw or take pictures of items too large to fit into the basket or bag. Take photographs of items found for future reference and use.
4. As children explore and discover items during the hunt, encourage them to describe what they find. Support and scaffold their oral language as the children use their own language and
mathematical language to describe (e.g., the plate has no straight lines – it is round like a circle, the seat on the swing has a rectangle – it has four straight sides – two short sides are the same and two long sides are the same).

5. Following the shape hunt, reconvene the children. Place a large graph, drawn on chart paper, on a large table or rug area for easy access by all children. Include pre-cut shapes or icons of each basic shape in the column headings.

<table>
<thead>
<tr>
<th>Circle</th>
<th>Square</th>
<th>Triangle</th>
<th>Rectangle</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Circle" /></td>
<td><img src="image" alt="Square" /></td>
<td><img src="image" alt="Triangle" /></td>
<td><img src="image" alt="Rectangle" /></td>
</tr>
</tbody>
</table>

6. Have children recall, reflect on and talk about their experiences as “shape detectives”. Use the collection of items and photos taken of their hunt to support their responses.

7. Encourage children to take turns as each child shows, talks about and sorts their items or pictures of items by shape – placing each in the appropriate column of the graph (e.g., cap from a milk jug placed in the circle column, postage stamp placed in the appropriate square/rectangle column). Facilitate the conversation with probing questions such as:
   - What item did you find?
   - Where would this item be placed on our chart or graph? Why?
   - What shape do you see in the ________?
   - How many items with circles did we find? Let us count together.

8. Revisit the posted list of shape descriptors from Step 2 to confirm the children’s ideas, discussion and sorting efforts. Help children discover that everything has a shape.

9. Display the graph for children to revisit and talk about the experience. Have children bring items from home to sort and place within the graph.

**Instructional Tip:**
Children may discover that more than one shape can be found on an object (e.g., toy car has circles for wheels and rectangles for the windows). Allow children to place the object in the column of choice or help children find ways to represent this discovery. For example, children may decide to find or draw a picture of a car so that both circles and rectangles are represented in the chart.

10. Have children visit various learning centers or interest areas in the learning environment to support and extend their understanding about shapes. Join children as they engage in self-selected activities using materials with the centers. Support and extend children’s oral language and use of mathematical terms related to shapes (e.g., use of words – straight line,
Shape Detectives – Pre-Kindergarten

sides, points, curves). Items and ideas for small group and independent exploration may include:

- **Block Area**: unit blocks of different sizes and shapes, toilet paper rolls/paper towel rolls. Challenge children to use blocks to make and describe different shapes.
- **Math Center/Table Toy Area**: shape puzzles; geoboards with rubber bands; plastic shapes for sorting; tangrams; pattern blocks with shape cards; shape bingo and lotto games. Geoboards and rubber bands allow children to manipulate the length and width of the sides of the shapes.
- **House Area**: props of various shapes such as birthday hats, scarves, placemats, empty food cartons, plastic food. Items provide opportunities for shape hunts and descriptions of props during dramatic play.
- **Art Area**: shape sponge painting; painting shapes at the easel; making shape prints; edges of toilet paper, paper towel, heavy pieces of cardboard for painting and printing straight and curved lines to form shapes; making shapes with toothpicks, plastic straws, clay; shape cookie cutters; shape stencils for tracing and cutting; materials such as yarn, ribbon, string, pre-cut shapes of various sizes, magazines and catalogs, paper, pencils, markers, glue, paint, scissors for creating pictures and collages of shapes.
- **Quiet Area/Library Area**: informational books about shapes; enlarged pictures of familiar environments or common objects for children to find hidden shapes (e.g., picture of a fire truck, grocery store); different shaped pillows; flannel board and pieces of various shapes.
- **Circle Time Activities**: songs about shapes; instrument play (triangles, cymbals, sand blocks.); children using different body parts (fingers, arms) to make shapes; children dancing in patterns of shapes (e.g., circle, square).
- **Snack and Meal Time**: different shaped snacks (crackers, graham crackers, tortilla chips.); using pretzel or bread dough to make shapes.

**Instructional Tip:**
Learning centers or interest areas provide children with opportunities for free exploration, as well as participation in teacher-facilitated activities. Centers should have materials to use in a variety of ways to support children’s diverse interests and developmental levels of learning. Provide sufficient time during the day for children to explore and extend their learning through manipulation of materials and conversations.

**Part Two**

**Instructional Tip:**
Before beginning Part Two, collect these materials: Attachment C, *Shape Attribute Chart* (one copy for each child and one large chart for the teacher), glue sticks; at least three pre-cut shapes of each of the four basic shapes (circle, square, triangle, rectangle). Also include triangles that are isosceles, equilateral, right and scalene (no equal sides).

- isosceles
- equilateral
- right triangle

\[
\begin{align*}
\text{isosceles} & \quad \begin{array}{c}
\text{equilateral} \\
\end{array} \\
\text{right triangle} & \quad \begin{array}{c}
\end{array}
\end{align*}
\]
11. Read the chart with the children. Have the children make observations about the attributes of the shapes.
12. Hold up each shape and have the children name the shape. Spread the pre-cut shapes on the table and have one child choose one of the shapes. Pass the shape around, allowing each child touch the shape. Generate a discussion using questions such as:
   - Where should this shape be placed on our chart? Why?
   - How many straight lines does this shape have? Count them with me.
   - How many corners does this shape have? Count them with me.
13. Glue the shape in the appropriate column. Continue until each child has had a turns to select a shape.
14. Review the chart, naming the shapes in each of the columns and identifying the distinguishing features. For example, a circle has no straight lines. Make sure to stress the difference between the squares and the rectangles; e.g., A square has four straight lines which are all the same length and a rectangle has four straight lines, but two are long and two are short.
15. Provide each student with Attachment C, *Shape Attribute Chart*. Students make their own Attribute Chart by drawing/tracing shapes or by gluing pre-cut shapes in the appropriate columns.

**Differentiated Instructional Support:**
Instruction is differentiated according to 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).
- Provide similar experiences of this lesson using three-dimensional shapes. Use the term *face* to describe the two-dimensional shapes of the solid. For example, a cube has faces that are squares.
- Intentionally pair children with varying abilities to help initiate or extend play and engagement interest areas.
- For children with significant communication delays, provide use of objects, symbol boards and appropriate communication devices to support and provide language for group discussion and commenting during the lesson.
- Modify fine-motor and art materials with enlarged handles, modified grips or knobs. Provide hand-over-hand assistance, when appropriate.
- Provide shapes cut from sandpaper as tactile support for children with visual impairments. Attach sandpaper shapes to objects to help children make the initial connections.

**Extensions:**
- Use other shapes such as oval, rhombus, octagon, and parallelogram for exploration, sorting and discussion. Children can include these shapes in the class shape books.
- Have children play an “I Spy” game, where one child describes a specific shape or object by its attributes and the peers locate the item described.
- Encourage children to draw different objects in their environment by helping them realize that everything is made of shapes. Take dictation or ask children to write about their drawings. Help children discover the shapes in these drawings.
Shape Detectives – Pre-Kindergarten

- Have children lie on the carpet and create shapes with their bodies. Have two or three children create a shape together.
- Make cookie dough with children and have them make geometric shapes with cookie cutters or create free-form shapes with the dough. Bake the cookies and have the children try to identify the shapes before they eat them.
- Fold paper to make shapes. Fold a square to make rectangles; fold a rectangle to make triangles.
- Place attribute/pattern blocks of basic shapes in a “feely box” for children to touch, explore, and then guess the name of the shapes in the box.
- Display or bind the photographs taken of children and items found on the shape hunt. Use the children’s words to write captions under each photo to describe the event or item. Children enjoy “reading” and sharing the book with peers and family members.

Home Connections:
- Have children bring in items, pictures or photos of items from home to share and place in the class shape chart or add to the class shape books.
- Encourage families to provide hands-on experiences with shapes for children. Blocks, boxes, containers and puzzles provide opportunities for concrete exploration of shape concepts.
- Ask families to cut sandwiches into different shapes and talk about shapes found within different foods (e.g., circle-orange; tortilla chips-triangles; pizza-circle cut into triangles).
- Invite family members to accompany children on a shape walk. Adults can assist by tape recording, videotaping and/or photographing the class experience or by supporting individual children during the experience.

Interdisciplinary Connections:
**English Language Arts**
**Writing Applications**
**Benchmark:** A. Compose writing that convey a clear message and include well-chosen details.
**Indicator:** 2. Name objects and label with assistance from adult cues (e.g., table, door).
Children learn the names of the shapes, as well as other objects in their environment as having the characteristics of basic shapes.

**Science**
**Physical Sciences**
**Benchmark:** A. Nature of Matter
**Indicator:** 3. Sort familiar objects by one or more property (e.g., size, shape, function).
Children describe distinctive features and sort objects by shape.

**Materials and Resources:**
The inclusion of a specific resource in any lesson formulated by the Ohio Department of Education should not be interpreted as an endorsement of that particular resource, or any of its contents, by the Ohio Department of Education. The Ohio Department of Education does not endorse any particular resource. The Web addresses listed are for a given site’s main page, therefore, it may be necessary to search within that site to find the specific information required for a given lesson. Please note that information published on the Internet changes over time,
Shape Detectives – Pre-Kindergarten

therefore the links provided may no longer contain the specific information related to a given lesson. Teachers are advised to preview all sites before using them with students.

For the teacher: informational text about shapes; attribute blocks or cardboard shapes of four common shapes (sufficient numbers for small group) activity; chart paper, marker, graph for sorting items and objects by shape

For the student: baskets or bags for collecting items during the walk/hunt; pages pre-cut for each shape book; art center materials such as crayons, markers, pencils, scissors, shape stencils; pre-cut paper shapes, string toothpicks, blue, magazines; suggested materials listed for interest areas

Vocabulary:
- circle
- corner
- curves
- different
- equal
- face
- line
- oval
- rectangle
- rhombus
- round
- same
- shape
- sort
- square
- straight line
- triangle

Technology Connections:
Provide available software that reinforces children’s ability to match, sort, identify and manipulate shapes.

Research Connections:

Attachments:
Attachment A, Pre-Assessment Checklist
Attachment B, Shape Pages
Attachment C, Shape Attribute Chart
## Shape Detectives – Pre-Kindergarten
### Attachment A
### Pre-Assessment Checklist

<table>
<thead>
<tr>
<th>STUDENT NAMES</th>
<th>DATE</th>
<th>N,S,M</th>
<th>M,S</th>
<th>M,S</th>
<th>M,S</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carla</td>
<td>9/30/04</td>
<td>N,S,M</td>
<td>M,S</td>
<td>M,S</td>
<td>M,S</td>
<td>Mixed square and rectangle</td>
</tr>
</tbody>
</table>

### Codes:
- N = names
- M = matches
- S = sorts
- D = describes
Attachment B (Continued)
Reproducible Shape Pages
Shape Detectives – Pre-Kindergarten

Attachment B (Continued)
Reproducible Shape Pages
# Shape Detectives – Pre-Kindergarten

**Attachment C**

Shape Attribute Chart

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