I Spy

In this activity, participants play a game of I Spy to recognize and identify plane and solid geometric shapes based on color, shape, or position clues.

**MATERIALS**
- Transparency: I Spy

**VOCABULARY**
- plane
- solid

**TIME:** 10–15 minutes

**INTRODUCE**
- Greet participants.
- Explain to participants that today they will review a number of concepts and terms related to plane geometry and solid geometry.
- Tell participants that to begin, they will play a game of I Spy.

**DISCUSS AND DO**
- Display Transparency: I Spy.
- Explain that the simple game of I Spy asks participants to find described objects in a picture of many objects.
• Tell participants that rather than calling out when they find the described object, they give a “thumbs up” when they think they have found the object.

• Begin the game by saying “I spy a round shape. Can you find it?”

• Say, after a majority of participants have given a thumbs up, “I spy a shape that is blue and has 3 corners (vertices). Can you find it?”

• Ask volunteers to pick a secret shape and give a clue. Repeat several times.

• Give more specific grade-level descriptions to focus participants’ attention on grade-level standards. Introduce each I Spy statement with its grade level:

Kindergarten-level: size, color, and position
I spy something big.
I spy something green.
I spy something at the bottom of the picture.

Grade 1: number of corners, size, and position
I spy something blue with 5 corners.
I spy something green and small.
I spy something yellow in the center of the picture.

Grade 2: shape name and length of sides
I spy a rectangle.
I spy a shape with 4 equal sides.
I spy an octagon.
CONCLUDE

• Ask volunteers to describe the skills that were necessary to play this game of I Spy. (Basic knowledge of size, color, position, corners, shapes, lengths, and the language that describes these attributes.)

• Explain that vocabulary is a very important element in geometry. It is vital that K–2 children hear and use the appropriate geometric terms in the early grades. Suggest that participants introduce appropriate shape names and descriptive attributes as concrete manipulatives are offered for hands-on exploration. The combination of concrete materials and appropriate vocabulary will build a strong foundation in geometry.

• Illustrate that, in much the same way that children are instructed to learn the alphabet letters and phonics as the stepping stones to literacy, active experiences with circle–triangle–square will lead to emerging concepts of sphere–pyramid–cube and space in the study of geometry.

• Introduce participants to the words plane and solid. Go over the definitions and make sure that everyone is clear about the meanings.

• Discuss with participants that the I Spy game was an entertaining introduction to plane geometry.

• Ask participants what types of geometric shapes students might encounter in daily living. Some examples include:
  ♦ circle wheels on cars, bicycles, and school buses
  ♦ spheres in playground balls
  ♦ squares on a calendar
  ♦ cones for ice cream treats

• Discuss how plane and solid geometry appears everywhere—especially in mathematics.

End of I Spy
Classify and Sort Shapes by Attributes

In this activity, participants use manipulatives to classify and sort plane and solid geometric figures into attribute groups.

**MATERIALS**
- Transparency: Classifying and Sorting
- Transparency: Pattern Blocks
- Transparency/Page: Classify and Sort Shapes by Attributes (Kindergarten Activity)
- Transparency/Page: My Block House (Grade 1)
- Transparency/Page: Pattern Blocks (Grade 2)
- wooden geometric solids (basic set of 12 solids: sphere, cube, cone, 1" x 3" cylinder, square prism, equilateral triangular prism, square pyramid, 2" x 2" cylinder, hemisphere, rectangular prism, hexagonal prism, and octagonal prism)
- table blocks (set of 84 various sizes of cones, prisms, cylinders, cubes, and pyramids)
- pattern blocks (bucket of 250 blocks with basic set of 6 shapes: square, triangle, hexagon, trapezoid, rhombus, and parallelogram)
- a box of crayons or pencils for each group
- rulers or straight edges (6)

**VOCABULARY**
- classify
- plane geometric figure names
- solid geometric figure names
- 3-dimensional figure (3-D)
- attribute
- sort

**TIME:** 25 minutes
TEACHING TIP: You can focus on plane geometry by using pattern blocks in place of the geometric solids and modifying the sorting activities accordingly.

INTRODUCE

- Ask participants to form grade-level groups for this activity.
- Get participants’ attention after they have formed their groups.
- Explain that each grade-level group will be given an activity that asks participants to name the plane or solid geometric figures, describe the geometric features, and classify and sort the figures into attribute groups.
- Display a set of colored table blocks. (84 colorful blocks of various sizes of cones, prisms, cylinders, cubes, and pyramids)
- Display the set of wooden geometric solids. (basic set of 12 solids: sphere, cube, cone, 1" x 3" cylinder, square prism, equilateral triangular prism, square pyramid, 2" x 2" cylinder, hemisphere, rectangular prism, hexagonal prism, and octagonal prism)
- Ask volunteer participants to describe how these solids are similar and different from the table blocks. (Both sets of blocks are 3-dimensional; table blocks are colored and of various sizes.)
- Have volunteer participants describe and name the geometric solids.
- Display a set of pattern blocks. (from bucket of 250 blocks with basic set of 6 shapes: square, triangle, hexagon, trapezoid, rhombus, and parallelogram)
- Discuss with participants how geometric solids and pattern blocks are appropriate manipulatives for K–2 geometry activities.
- Display a variety of pattern blocks and geometric solids and discuss if the manipulative represents a plane figure or solid figure.
- Reinforce, if necessary, the name of each pattern block and geometric solid.
DISCUSS AND DO

• Explain that each grade-level classify and sort activity will be introduced and then the groups will complete their assigned activity.

• Explain that the kindergarten group of participants will use wooden geometric solids to classify and sort them into a variety of attribute groups. (Use the basic set of 12 solids: sphere, cube, cone, 1” x 3” cylinder, square prism, equilateral triangular prism, square pyramid, 2” x 2” cylinder, hemisphere, rectangular prism, hexagonal prism, and octagonal prism. Have the kindergarten group share these 12 solids for the Classify and Sort activity.)

• Ask volunteer participants from the kindergarten group to consider possible attribute groups. (shape, roundness, number of corners, blocks that roll, blocks that do not roll, blocks that stack)

• Display Transparency: Classify and Sort Shapes by Attributes (Kindergarten Activity).

• Explain that the group will record information about their classifying and sorting work on this page by following the steps on the transparency.

  1. Make a drawing of blocks that roll.
  2. Make a drawing of blocks that can be stacked.

• Display Transparency: Classifying and Sorting.

• Explain that the first-grade group will use table blocks to classify and sort those that can be used to build a neighborhood of houses. The houses can be built by using any of the different blocks, but each house must have a roof that can keep the rain out. One or more blocks can be used to build the roof.

• Have participants review the names of the solid figures by asking volunteers to name the table blocks. (cone, prism, cylinder, cube, pyramid)

• Display Transparency: My Block House (Grade 1).

• Explain that the first-grade group will record information about the shape, size, color, and the number of faces of each of the blocks in their My Block House

<table>
<thead>
<tr>
<th>Block Shape</th>
<th>Size</th>
<th>Color</th>
<th>Number of Faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyramid</td>
<td>small</td>
<td>red</td>
<td>6</td>
</tr>
</tbody>
</table>

Write a sentence that describes your block house.

Write a sentence that describes your block house.
block houses. They can complete the handout with drawings or descriptive words. Each participant also writes a descriptive sentence about their completed block houses.

- Explain that the second-grade group will use the pattern blocks to explore the number of straight lines and angles found in the plane geometric shapes.

- Have participants review the names of the pattern blocks by asking volunteers to name them. (triangle, square, hexagon, rhombus, parallelogram, trapezoid)

- Display Transparency: Pattern Blocks (Grade 2).

- Explain that participants will use pencils, rulers, and the page’s dot pattern to create plane geometric figures. Participants can use the ruler to measure the pattern block sides and to help them make the straight lines and angles, using the dots to help them make the shapes.

- Display Transparency: Pattern Blocks.

- Ask a volunteer to read the Think About question at the bottom of Transparency: Pattern Blocks (Grade 2).

- Have participants work in the grade-level groups for about 10 minutes to complete their assigned activity.

**CONCLUDE**

- Get the group’s attention.

- Ask a volunteer from each grade level to come up and share their work.

- Ask the participant volunteers to summarize how the classifying and sorting activities would help K–2 students to identify, describe, and compare plane and solid geometric figures.

**End of Classify and Sort Shapes by Attributes**
Plane and Solid Geometry - Activity Set 1
I Spy
Classify and Sort Shapes by Attributes

(Kindergarten Activity)

Make a drawing of blocks that roll.

This is an example:

Make a drawing of blocks that can be stacked.

This is an example:

Make a drawing of some of the other blocks.

This is an example:
My Block House
(Grade 1)

My block house is made of:

<table>
<thead>
<tr>
<th>Block Shape</th>
<th>Size</th>
<th>Color</th>
<th>Number of Faces</th>
</tr>
</thead>
<tbody>
<tr>
<td>for example:</td>
<td>small</td>
<td>red</td>
<td>6</td>
</tr>
</tbody>
</table>

Write a sentence that describes your block house.
Pattern Blocks
(Grade 2)

Use a ruler to create plane geometric figures. Name the shapes.

This is an example:

Think about:

How are the figures that you made the same and different?