Measurement and Data

In Kindergarten, children begin building a foundation for data collection and analysis in future grades. They describe measurable attributes of objects, such as length, weight, or color. They may describe one pencil as short and another as long, one book as light and another as heavy, and may describe several measureable attributes of a single object, such as a large, blue ball.

Additionally, Kindergarteners directly compare two objects with a measurable attribute in common to see which has "more" or "less" of an attribute and describe the difference. For example, children may directly compare the heights of two children and describe one child as "taller" or line up blocks and determine one row is "a lot longer" than another.

Children identify similarities and differences between objects based on size, color, and shape, for example, and use the identified attributes to sort a collection of objects. Once objects are sorted, children count the amount in each set, or once a set is counted then children are asked to group each of the sets by the amount in that set. As an example, children may sort cars by color (blue cars in one group, red cars in a second group, green cars in a third group) then count the cars in each group and organize them by the size of the group.

The Kindergarten Common Core State Standards for Measurement and Data specify that children should:

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.

The following hands-on activities provide children with opportunities to explore various manipulatives and use them to investigate mathematical concepts. Numerous opportunities using concrete objects to solve problems enable children to become more proficient at making decisions about which objects are most helpful in given situations. When solving a problem, such as five children were playing at the park and two children came to join them, children may decide that the situation calls for role playing. They may decide that another problem, such as determining how many of Julie's four grapes remain after sharing two with a friend, calls for using cubes to model the situation.

Measurement and Data

Contents

LESSON 1

Objective

Explore the concept of height using nonstandard units.

Common Core State Standards

- **K.MD.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Measurement and Data

Nonstandard Measurement of Height

Children may be familiar with height. They may have been measuring their growth on a wall at home, comparing their height to that of a family member, or waiting to be tall enough for a certain activity. In this lesson, children will learn to measure height in nonstandard units, which lays a foundation for later being able to use more abstract standard units of measure, such as inches and feet.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *What are some things that people measure for height?* Help children think of objects, such as buildings, trees, and so on.
- **Say:** *Explain how you find out how tall something is by using Link 'N' Learn® Links.*

Solve It

With children, reread the problem. Have children draw a picture showing how Jordan could measure the height of the jar with links.

More Ideas

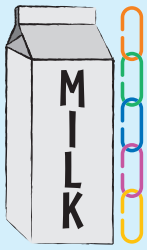
For other ways to teach about nonstandard measurements of height—

- Have children work in pairs. Each child will trace his or her partner on a large piece of paper. Then children will attach their outlines to the wall and measure the height using Link 'N' Learn Links.
- Have children work in pairs to play a guessing game. Children choose a classroom object and each child guesses the object's height in Link 'N' Learn Links (or Snap Cubes®). Then children measure the object's height with links (or cubes) to see whose guess was closest.

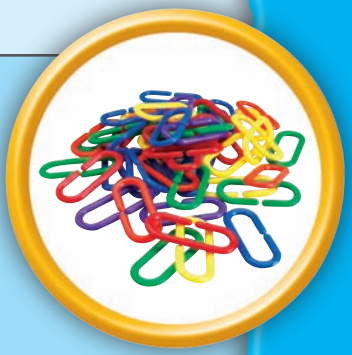
Formative Assessment

Have children try the following problem.

How many links tall is the milk carton?



Try It! 10 minutes | Pairs



Here is a problem demonstrating how to use nonstandard units to measure height.

In Jordan's classroom, there is a jar in which children put paintbrushes when they are not using them. Jordan's teacher asks the class to find out how tall the jar is. She says that they will measure the jar using Link 'N' Learn® Links. How can Jordan find out the height of the jar?

Introduce the problem. Tell children that they will use links to find the height of classroom objects. Explain that height tells how tall something is. Demonstrate for children how to make a chain of links that is the height of a classroom object, such as the leg of a chair. Then have children do the activity to solve the problem. Distribute links to children.

Materials

- Link 'N' Learn® Links (50 per pair)

1. Ask children to choose an object in the classroom and estimate its height. Encourage them to make a chain that is the same height as the object.

2. Now have children check their chains against the object they are measuring. For example, if children choose a table to measure, **say:** *Hold your chain beside the table to see if they are the same height.* Children may have to add or take away links to make their chains the same height as the objects they are measuring.

3. Have children make sure their chains match the height of the object. Then ask children to share their final measurements with the class.

⚠ Look Out!

Some children may choose objects to measure whose height cannot be expressed with an even number of links. If children are confused by this, tell them that some items may be "almost" or "close to" a certain number of links.

Answer Key

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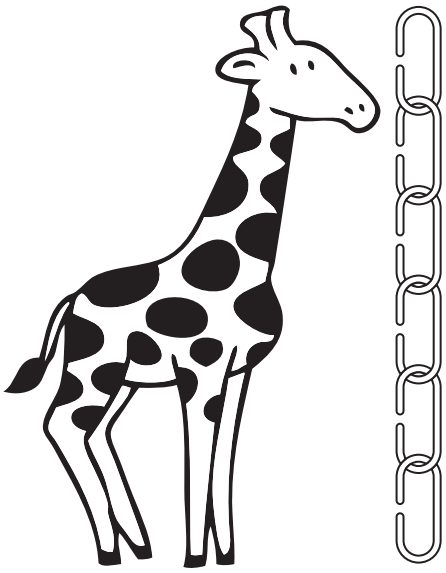

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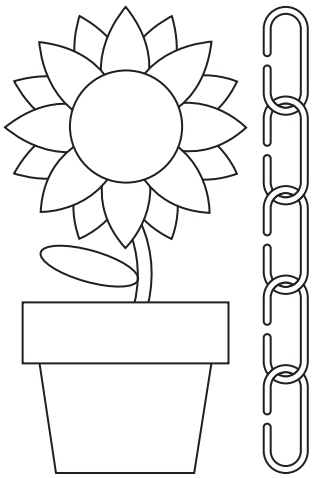

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Directions

1. How many links tall is the toy giraffe? **2.** How many links tall is the flower?

Answer Key

Check children's work.

Challenge

Draw a picture of a tall building. Use links to measure how tall it is. Write how many links tall your building is.

LESSON 2

Objective

Sort objects by height.

Common Core State Standards

- **K.MD.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- **K.MD.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Measurement and Data

Sorting by Height

It is important for children to learn the correct vocabulary for comparing the heights of objects. While they may be familiar with words such as *tall* and *short,* they may need explanations and practice using comparative words such as *tallest* and *shortest.* Use several real-life examples to reinforce these terms.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Say:** *Name something in the classroom. Now find something taller.* **Ask:** *What is the tallest object in our classroom?* Make sure children understand the difference between *tallest* and *highest*. For example, a book on top of a bookshelf may be higher than other objects, but that does not mean it is taller than the other objects.
- **Say:** *In the activity we just did, we made three towers. One was the shortest, one was the tallest, and one was in the middle. We can describe other things with these words.* Give children an example. **Say:** *I saw a giraffe, an elephant, and a monkey at the zoo.* **Ask:** *Which do you think was the shortest? The tallest?*
- **Ask:** *If we are looking at several items, how can we decide which is the tallest? How can we tell which is the shortest? How could we be sure?* (measure or compare)

Solve It

With children, reread the problem. Instruct children to draw a picture of three books in the order that Ashley put them on the shelf (tallest to shortest).

More Ideas

For other ways to teach about sorting by height—

- Have each child draw a picture of a tree. Then have each child make a chain of Link 'N' Learn® Links that shows the height of his or her tree. Have groups of three children lay their chains beside each other and compare the heights.
- Have children work in groups of five. Give one child in each group one Snap Cube®, another child two cubes, another three, and so on. Each child should connect the cubes he or she has. Then children should work as a group to order the towers from shortest to tallest.

Formative Assessment

Have children try the following problem.

Use crayons to color the tallest house red. Then color the shortest house blue.

Try It! 10 minutes | Pairs

Here is a problem demonstrating how to sort by height.

Ashley is helping her teacher put books on the shelf. The teacher told her to arrange three books from tallest to shortest. How can Ashley figure out where to place each of the books?

Introduce the problem. Then have children do the activity to solve the problem.

Show three Snap Cube® towers to the children. Ask which is the tallest, which is the shortest, and which is in the middle. Have a volunteer arrange the towers in order from tallest to shortest. Ask children to point to the towers and label each using the correct vocabulary. Repeat using three new towers. Assign children to work with partners. Give cubes to each pair of children, and have them follow these steps.

Materials

- Snap Cubes® (several per pair)

1. Ask children to make three towers using different numbers of cubes.

2. Have children compare the heights of the towers. **Say:** *Tell which tower is the tallest. Tell which is the shortest. Tell which is in the middle.*

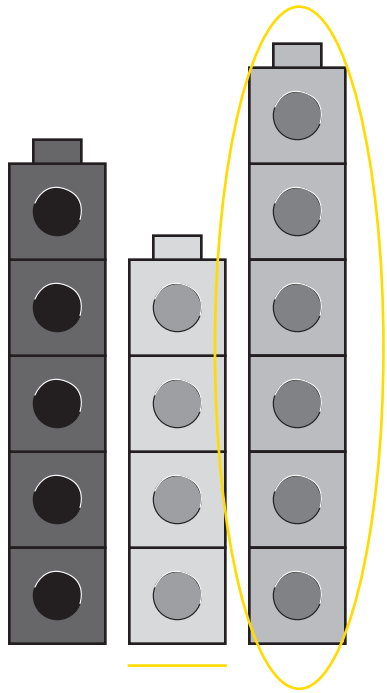
3. Have children order the towers from tallest to shortest. Then ask them to compare the heights of the tallest and shortest towers. Instruct children to remove cubes from the taller tower until it matches the shorter tower and count the removed cubes to find the difference in height between the two towers.

⚠ Look Out!

Children may confuse the terms *tallest* and *taller* and *shortest* and *shorter.* Point out that while the middle tower is *shorter* than the tallest tower, it is not the *shortest.* Emphasize the endings of the comparison words. Connect them to other comparison words such as *faster, fastest,* or *bigger, biggest.* In addition, watch for children who confuse how tall something is with how high in the air it is. For example, they may think that because a flag is high in the air, it is taller than the objects around it.

Answer Key

1.



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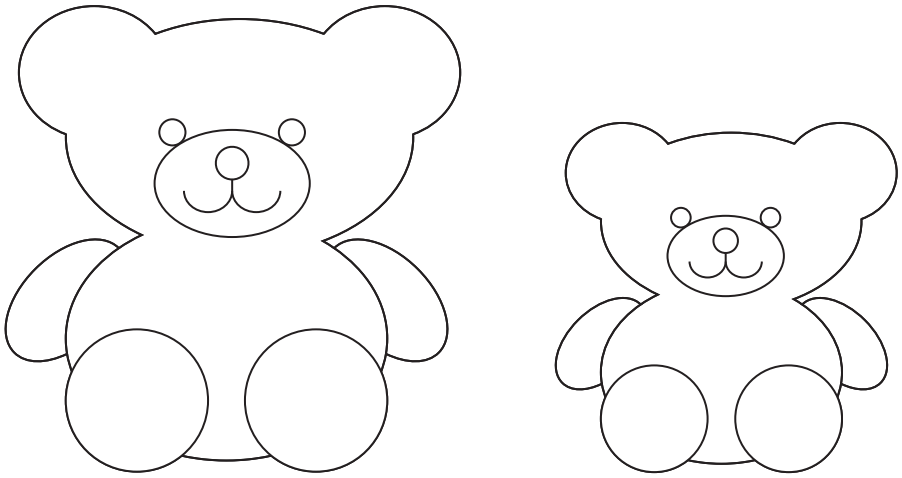


Check children's work.

Directions

1. Use Snap Cubes®. Build the towers. Circle the tallest tower. Underline the shortest tower. **2.** Color the taller bear brown. Color the shorter bear blue.

Answer Key

Check children's work.

Challenge

Use Snap Cubes®. Build two towers with different heights. Draw a picture of your towers. Color the taller tower red. Color the shorter tower green.

LESSON 3

Objective

Sort objects by length; use the terms *shortest* and *longest.*

Common Core State Standards

- **K.MD.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- **K.MD.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Measurement and Data

Sorting by Length

Measuring brings together mathematical disciplines such as geometry and number sense. Comparison of objects helps build a foundation in measurement concepts. In this lesson, children will begin using *shortest* and *longest* to describe objects while sorting them by length.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- Emphasize the importance of left-to-right order. Make sure children understand that in the activity, they always started from the left side regardless of the order in which they placed the trains.
- **Say:** *First we put the trains in order from shortest to longest.* **Ask:** *What would happen to the middle train if we changed the order from longest to shortest?*
- **Ask:** *How can you be sure which train is the shortest? The longest?* (Look for children counting the number of Snap Cubes® or comparing by sight.)
- **Say:** *Let's make a new train that is eight cubes long.* **Ask:** *Where would we put this train if we wanted to keep our trains in order from shortest to longest?*

Solve It

With children, reread the problem. Have children draw a picture that shows what Alison drew.

More Ideas

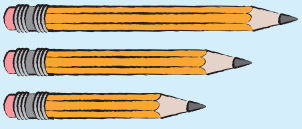
For other ways to teach about sorting objects by length—

- Give children more Snap Cubes to make trains of different sizes. Have them work with partners to sort the trains by length. Help them work on sorting more trains by first asking them to make three trains, then four, then five.
- Give children Link 'N' Learn® Links to create different-length chains and sort chains by length. Emphasize that children should lay the chains flat to measure their length.

Formative Assessment

Have children try the following problem.

Circle the pencil that is the longest.



Try It! 15 minutes | Pairs

Here is a problem demonstrating how to sort objects by length.

Alison drew a picture of three worms crawling on the ground. She showed the picture to her teacher. Her teacher said that the worms were in order from shortest to longest. How can you show the order of the worms in Alison's picture?

Introduce the problem. Then have children do the activity to solve the problem.

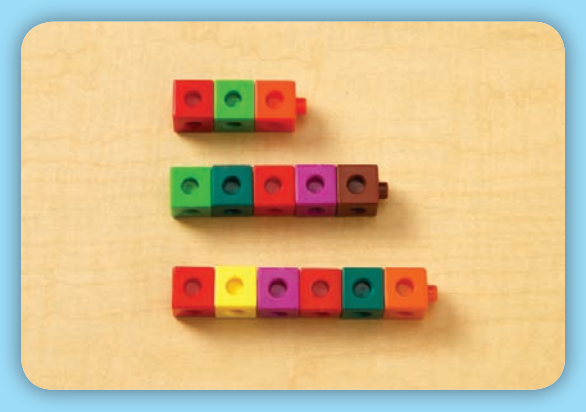
Divide the class into pairs. Pass out three trains of Snap Cubes to each pair. The three trains should be of different lengths.

Materials

- Snap Cubes® (3 trains of different lengths per pair)

1. Instruct children to count their trains. Demonstrate if necessary.

2. Ask children to stack their trains and line them up on the left-hand sides. A straightedge can be used to help align the trains.



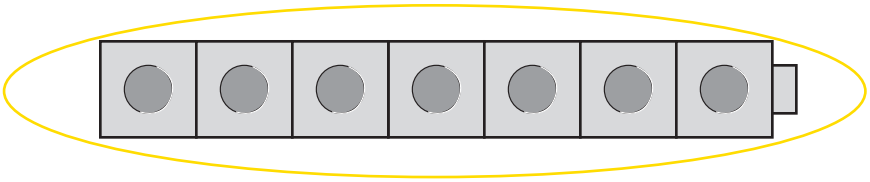
3. Now invite children to rearrange their trains from shortest to longest, with the shortest train on the top. Remind them to line up the edges of their trains correctly.

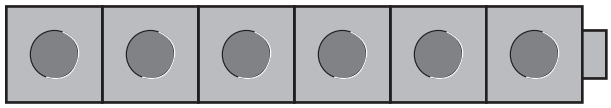
⚠ Look Out!

Watch out for the children who do not keep their trains aligned on the left ends. Model what happens when the trains are not lined up correctly to show children that the results will be skewed. Give these children a ruler or other straightedge to help them align their trains correctly. Also, make sure that children do not confuse *longest* with *tallest.* Remind children that *tallest* describes direction from the ground to the sky. Length is left to right or side to side.

Answer Key

1.





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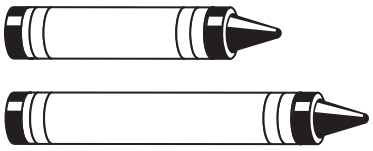


Check children's work.

Directions

1. Use Snap Cubes®. Build the trains. Circle the longest train. Underline the shortest train. **2.** Color the shorter crayon red. Color the longer crayon yellow.

Answer Key

Check children's work.

Challenge

Use Snap Cubes®. Build two trains with different lengths. Draw a picture of your trains. Color the longer train green. Color the shorter train blue.

LESSON 4

Objective

Estimate and measure length using nonstandard units.

Common Core State Standards

- **K.MD.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Measurement and Data

Estimating and Measuring Length

Estimating length incorporates number sense and spatial sense while creating a beginning foundation of reference points for linear measurements. In this lesson, children will estimate the length of classroom objects and then use Color Tiles to create actual measurements.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *How long did you think the shoe would be before you measured it? How many tiles long was the shoe? Was your guess close?*
- **Say:** *Pick another object in the room that is smaller than the length of the shoe.* **Ask:** *What do you think would be a good estimate for this object's length in tiles?* Allow children to offer their estimates for an object. Then measure the object with children to find the actual length.
- **Ask:** *If you were to measure your shoe using a board eraser, would the answer be the same? Why or why not?*

Solve It

With children, reread the problem. Have children draw a picture to show Angie's shoe being measured with tiles. Ask children to use their drawings to explain how Angie and Tim could find out who guessed correctly.

More Ideas

For other ways to teach about estimating and measuring lengths—

- Have children work in groups and use Pattern Blocks to measure a set of classroom objects. Have each group use a different block shape. Then have groups compare measurements and discuss the different measurements they get by using different blocks. Children should conclude that they need to use the same size block to get the same answers.
- Have children measure length with Snap Cubes®. Children can estimate a length and then use cubes to measure the object to see how close their estimate is to the actual length in cubes.

Formative Assessment

Have children try the following problem.

About how many tiles would you need to measure the length of the crayon? Circle the answer.

Try It! 25 minutes | Pairs

Here is a problem demonstrating how to estimate and measure length.

Angie wants to know how many Color Tiles long her shoe is. Tim says he thinks it is 4 tiles long. Angie thinks it is 10 tiles long. How can Angie and Tim find out how long the shoe is?

Introduce the problem. Then have children do the activity to solve the problem.

Have children work in pairs. Pass out tiles and paper to each pair. Have one volunteer from each pair, remove a shoe to be measured.

Materials

- Color Tiles (about 50 per pair)
- paper (1 sheet per pair)

1. Have children place one tile next to one shoe. Tell them that they are going to measure the length of a shoe using the tiles.

2. Ask: *How many tiles long do you think the shoe is?* Have children estimate and write down their estimates on paper.

3. Say: *Now we will measure the shoe.* Have children measure the length of the shoe with tiles. **Ask:** *How many tiles long is the shoe?* Allow children to compare the estimates they wrote down to the actual measurements.

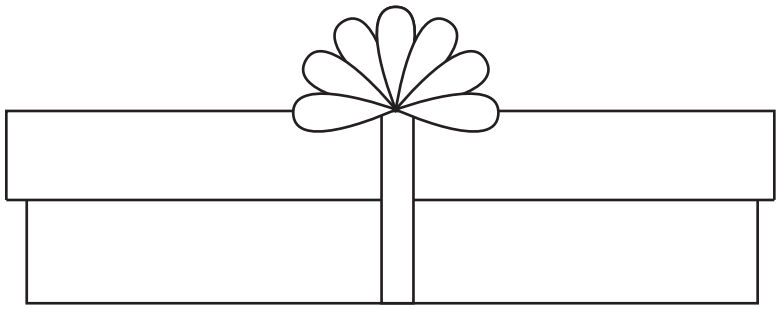
⚠ Look Out!

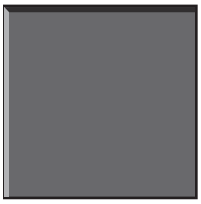
Watch for children who leave gaps between tiles as they measure. Make sure children understand that they must line up the tiles in a straight line, flush with the shoe. Also discuss measuring objects that don't match evenly to whole tiles. Suggest that children round up to the nearest whole tile, or have them measure to the nearest "half-tile" if they are unable to follow the concept of rounding.

Answer Key

Check children's work.

1.





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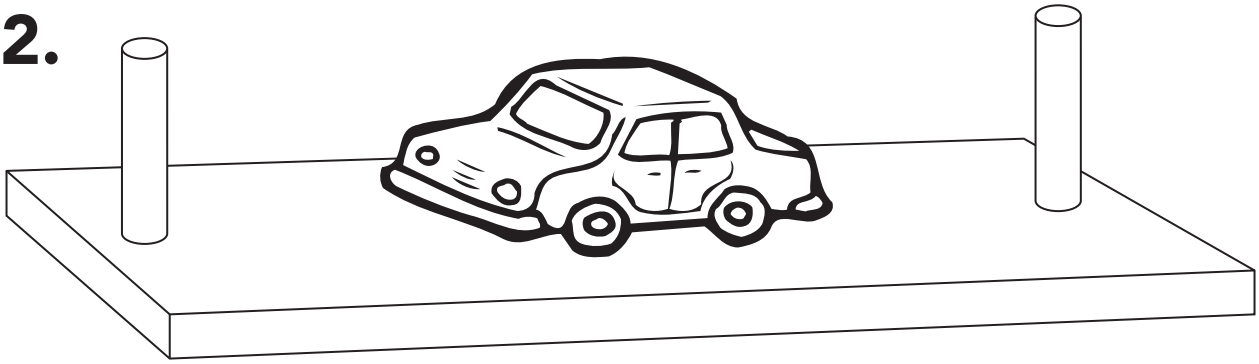
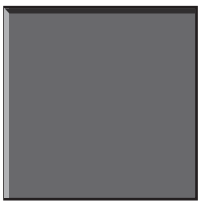




Directions

1. How many tiles long do you think the present is? Write your number on the first line. Then use Color Tiles to measure the present. Write the length on the second line. **2.** How many tiles long do you think the shelf is? Write your number on the first line. Then use Color Tiles to measure the shelf. Write the length on the second line.

Answer Key

Check children's work.

Challenge

Turn your page sideways. Draw a long snake. How many tiles long do you think your snake is? Write your number and underline it. Then use Color Tiles to measure your snake. Write the length and circle it.

LESSON 5

Objective

Sort objects by one attribute.

Common Core State Standards

- **K.MD.3** Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Measurement and Data

Sort by One Attribute

As part of sorting, children must recognize and describe the attributes of an object, such as color, shape, and size. Then children must group the object with objects that share the same attribute or attributes. This requires that children identify similarities and differences in order to tell which objects belong and which do not belong. Matching and sorting objects by one attribute lays the foundation for patterning, which is a basic part of algebra.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *What is sorting?*
- **Ask:** *When you sorted the Attribute Blocks by color, how many different groups did you make? How were the blocks in each group the same?* (Repeat questions for sorting by shape and sorting by size.)
- Display the following block shapes for children: circle, square, rectangle, triangle. **Say:** *Imagine that you have a set of blocks that are circles, squares, rectangles, and triangles.* **Ask:** *If you sorted the blocks by shape, how many groups would you make?*

Solve It

With children, reread the problem. Then instruct children to draw a picture showing one of the ways that they sorted the blocks. Encourage children in each group to show the blocks sorted in different ways (by color, by shape, or by size). Then ask children to use their drawings to explain one of the ways of sorting the blocks to the other children in their group.

More Ideas

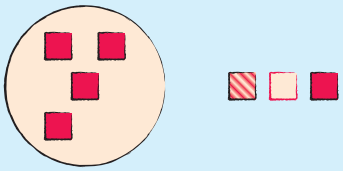
For other ways to teach about sorting objects by one attribute—

- Give each group of children an assortment of Link 'N' Learn® Links. Have children sort the links into groups by color and make one necklace of each color.
- Give each group of children a variety of Pattern Blocks in assorted shapes. Have them sort the blocks by shape.
- Give each group of children an assortment of Three Bear Family® Counters. Then have children sort the counters into groups based on size.

Formative Assessment

Have children try the following problem.

Circle the shape that belongs with the rest.



Try It! 20 minutes | Groups of 6

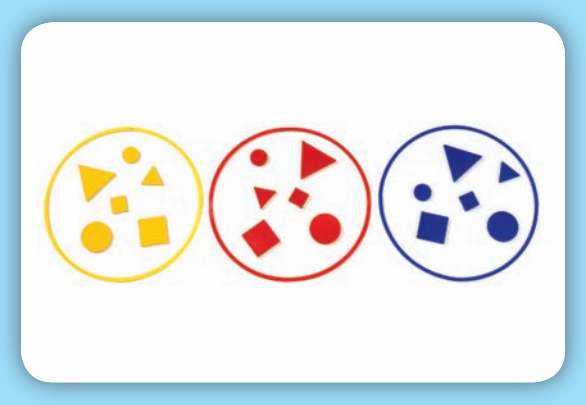
Here is a problem involving sorting objects by one attribute.

Ms. Barton divided her class into groups. Then she gave each group 3 small and 3 large circles, 3 small and 3 large squares, and 3 small and 3 large triangles. Each shape and size came in yellow, red, and blue. What are three ways the children can sort the blocks?

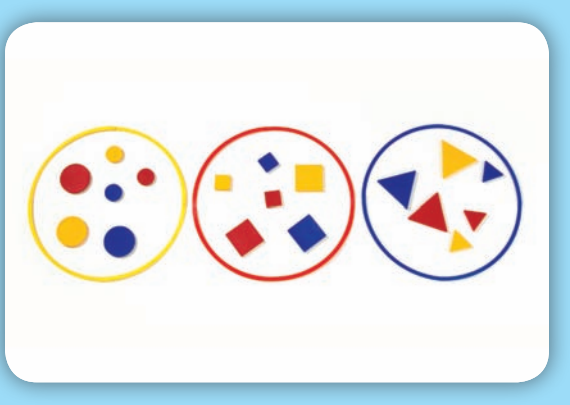
Introduce the problem. Then have children do the activity to solve the problem. Distribute materials to each group. Make sure that the Attribute Blocks you give to each group are all the same thickness to avoid possible confusion based on this additional attribute.
Say: *When you sort, you put things into groups with other things that are the same.*

Materials

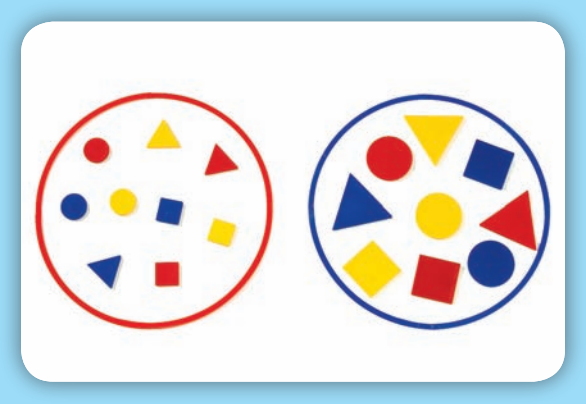
- Attribute Blocks (3 small and 3 large of each of the following shapes in yellow, red, and blue per group: circle, square, and triangle)
- Attribute Sorting Circles (3 per group)



1. Say: *You will be sorting these blocks by color.* Instruct children to place the blocks in the corresponding Sorting Circles by color. Then have children check that the blocks were sorted correctly, clear the Sorting Circles, and put all of the blocks into a pile.



2. Say: *Now you will be sorting these blocks by shape.* Instruct children to sort the blocks by shape by putting circles in the yellow Sorting Circle, squares in the red Sorting Circle, and triangles in the blue Sorting Circle. Then have children check that the blocks were sorted correctly, clear the Sorting Circles, and put all of the blocks into a pile.



3. Say: *Now you are going to sort blocks by size.* **Ask:** *How many Sorting Circles will you need?* Guide children to the conclusion that they will need to use two Sorting Circles to sort their blocks by size (large and small). Then have children sort their blocks by size.

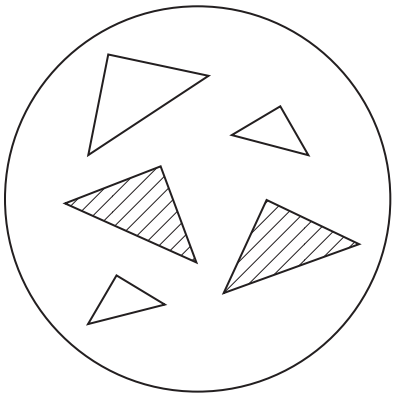
⚠ Look Out!

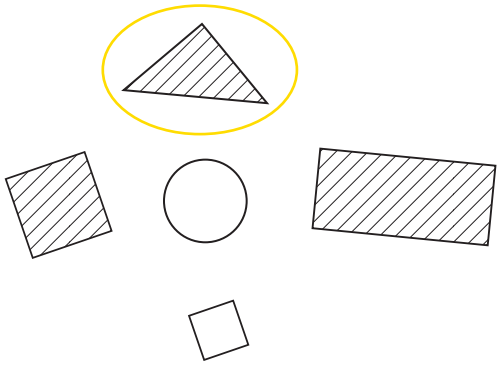
Watch out for children who are confused by the attributes that they are not sorting by in each step. For example, when sorting by color, children may become confused or focus on the different shapes and sizes of the blocks. Remind these children in each step that they are sorting by only one attribute.

Answer Key

Check children's work.

1.





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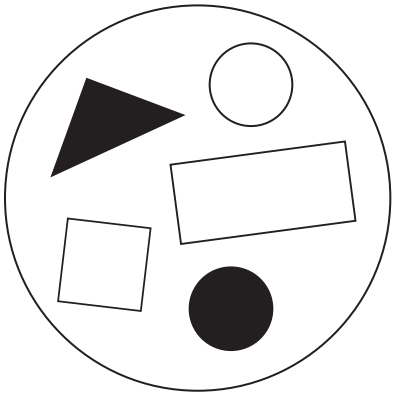
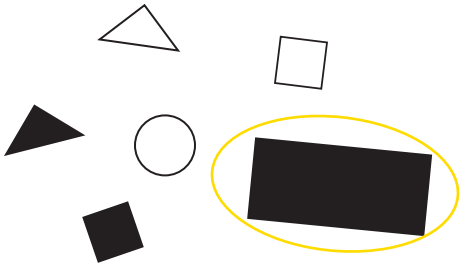




Directions

1. Circle the shape that belongs with the shapes inside the Sorting Circle. **2.** Circle the shape that belongs with the shapes inside the Sorting Circle.

Answer Key

Check children's work.

Challenge

Use Attribute Blocks. Sort the blocks anyway you like. Draw and color the blocks you sorted. Describe how you sorted them.

LESSON 6

Objective

Sort groups of objects by two attributes.

Common Core State Standards

- **K.MD.3** Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Measurement and Data

Sort by Two Attributes

When sorting by two attributes, children must be able to group and regroup the objects by different attributes—color, shape, or size. Sorting objects by two attributes lays the foundation for types of classification that will be useful in recognizing and describing complex algebraic patterns.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Say:** *Look at the Attribute Blocks in your Sorting Circles. Tell what the blocks in each circle look like.* (Point to the upper-left Sorting Circle.) **Ask:** *What color are the blocks in this circle? What size are they?* (Repeat these questions as you point to the blocks in each Sorting Circle.)
- Display an assortment of blocks. **Ask:** *How could you sort this set of blocks? Could you sort them by color? By shape? By size?*

Solve It

With children, reread the problem. Have children draw four large circles on a sheet of paper. Then ask children to use red and blue crayons to draw the chairs to show how they should be sorted into different groups. Remind children that they are sorting the chairs by size as well as by color.

More Ideas

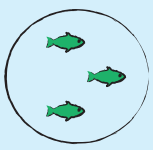
For other ways to teach about sorting by two attributes—

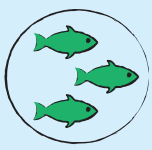
- Have children sort Three Bear Family® Counters by two attributes such as size and color.
- Tell children that they are going on a "Frog Hunt." First distribute piles of assorted Frog Counters around the classroom. Then divide the class into six groups and assign a different color of frog to each group. Have children from each group collect all of the frogs that match their color. Then have the children in each group work together to sort each color of frog into five groups, based on the shapes of the frogs.

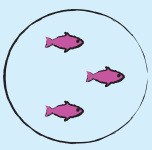
Formative Assessment

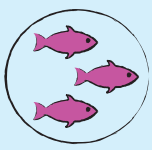
Have children try the following problem.

Which group does a belong in?

A. 

B. 

C. 

D. 

Try It! 30 minutes | Groups of 6

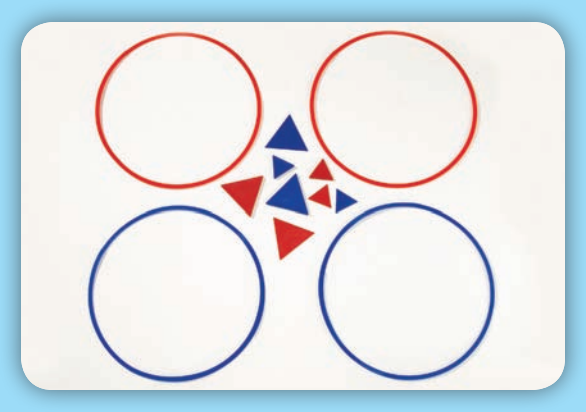
Here is a problem involving sorting groups of objects by two attributes.

Ms. Lopez needs her class to help organize the chairs in the classroom. There are small chairs that are red and small chairs that are blue. There are large chairs that are red and large chairs that are blue. How can she make a group of chairs that are small and red? How can she make a group of chairs that are small and blue? How can she make a group of chairs that are large and red? How can she make a group of chairs that are large and blue?

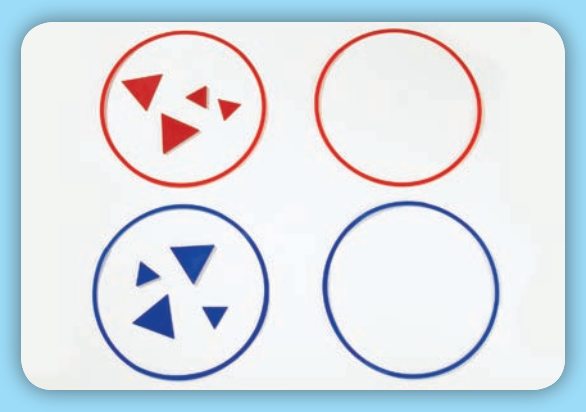
Introduce the problem. Then have children do the activity to solve the problem. Distribute Attribute Blocks and Sorting Circles to each group.

Materials

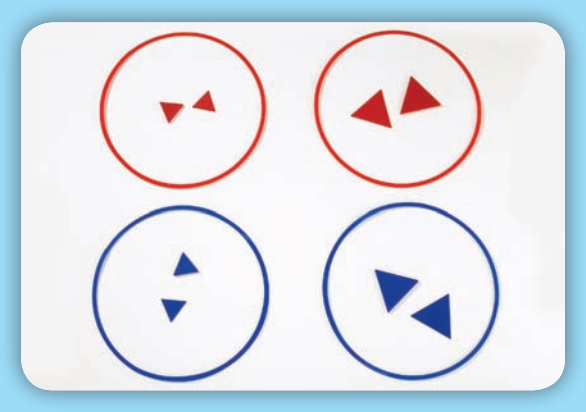
- Attribute Blocks (2 sizes of red and blue blocks of 1 shape per group)
- Attribute Sorting Circles (4 per group)



1. Have children examine their sets of blocks. Ask them to explain how the blocks in their set are alike and how they are different. Guide children to the conclusion that the blocks are all the same shape, but they are two different colors and two different sizes.



2. Have children set out their Sorting Circles in two rows of two. Have them sort the red shapes in the first circle in the top row and the blue shapes in the first circle in the bottom row. Ask children how the blocks in each circle are different now. (They are two different sizes.)



3. Have children sort all of the large shapes and move them to the second circle in each row. Then ask children to compare the blocks in each circle. (All of the shapes in each circle are exactly alike.)

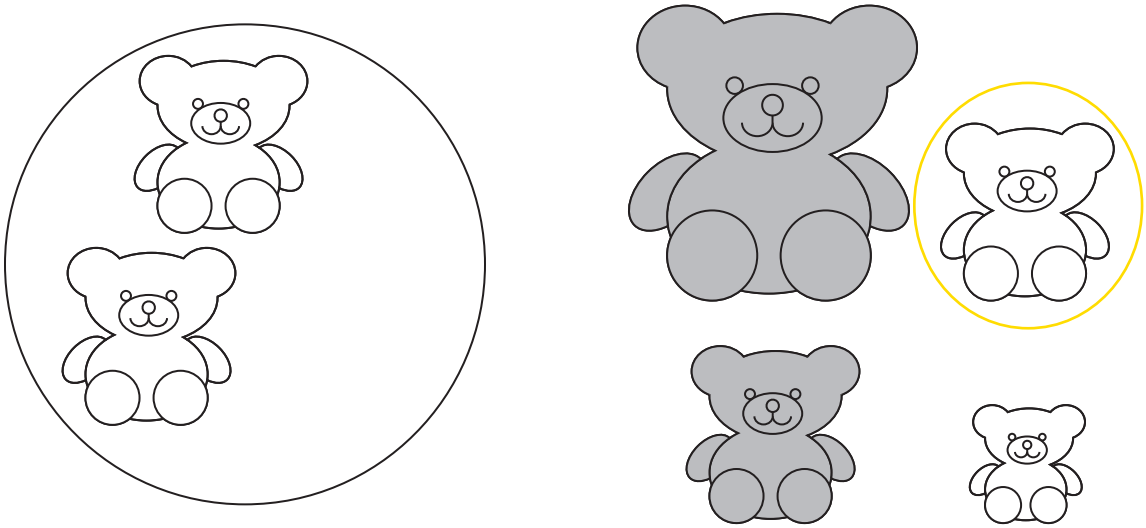
⚠ Look Out!

Children may be confused by the different thicknesses of the blocks. Either remove the thick or thin blocks from the sets, or introduce thickness as another attribute and encourage children to sort their shapes one additional step by moving thin shapes to the left of each Sorting Circle and thick shapes to the right of each Sorting Circle.

Answer Key

Check children's work.

1.



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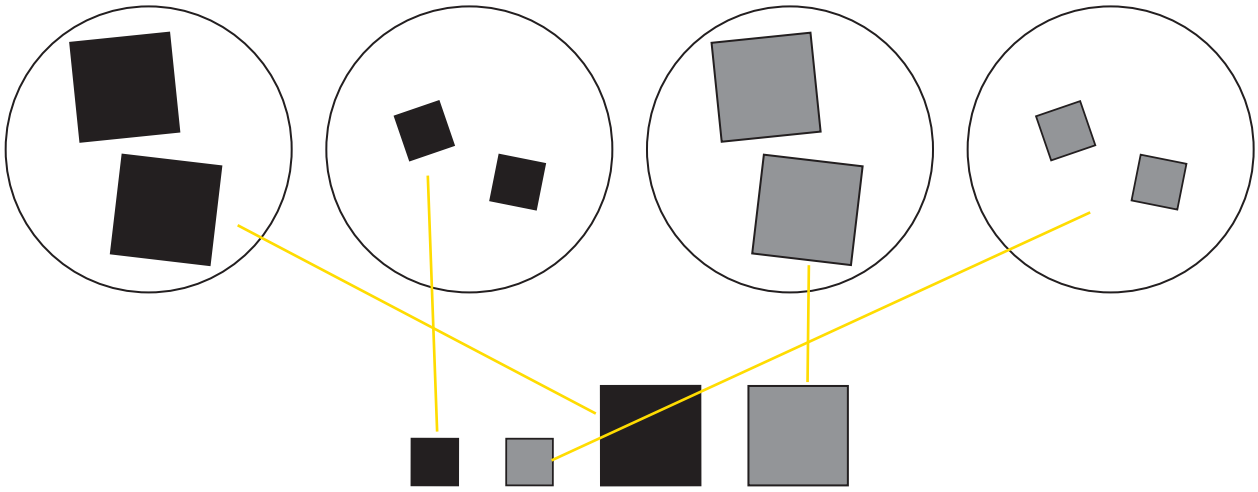


Directions

1. Circle the bear that belongs inside the Sorting Circle. **2.** Sort the squares by size and color (shading). Draw a line from each square to the Sorting Circle it belongs in.

Answer Key

Check children's work.

Challenge

Use Attribute Blocks. Sort the blocks by shape and color. Draw four large Sorting Circles on your paper. Draw and color the blocks you sorted.

LESSON 7

Objective

Determine the sorting rule for sorted groups of objects.

Common Core State Standards

- **K.MD.3** Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Measurement and Data

Determine the Sorting Rule

Children need to be familiar with sorting by color, shape, and size in order to determine the sorting rule for a group of objects that has already been sorted. Determining a sorting rule involves becoming aware of a pattern. This can be done by comparing groups and recognizing how the objects are similar and different. Algebraic thinking and logical reasoning are developed as children work to determine a sorting rule. These skills are at the foundation of understanding algebraic functions.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *When I sorted the Attribute Blocks shapes for you, how did you know how I sorted them? What did you look for first? Did you look for different sizes? Different shapes? Different colors?*
- **Ask:** *When it was your turn, how did you sort the blocks? Did the rest of the group know how you sorted?*
- **Ask:** *What is another way you could sort the blocks?*

Solve It

With children, reread the problem. Have children draw a picture to show the books on two rows. Then have children use their pictures to explain how the books were sorted.

More Ideas

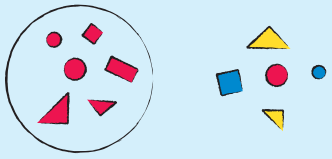
For other ways to teach determining the sorting rule—

- Have children work independently with a variety of manipulatives (one kind for each child) and sort their sets into at least two groups based on at least one attribute. Have each child keep their sorted objects at their desks. Then have children take turns going around the room, stopping at each set of sorted objects, and determining the sorting rule.
- Give each pair of children a set of objects that is sorted into two or three groups, such as two or three colors of 1" Color Cubes, two or three types of Frog Counters, or two or three sizes of Three Bear Family® Counters. Then give each pair an unsorted pile of the same objects. Have children determine the sorting rule and follow the same rule to sort the new pile of objects.

Formative Assessment

Have children try the following problem.

Draw a circle around the shape on the right that matches the shapes in the Sorting Circle.



Try It! 30 minutes | Groups of 3

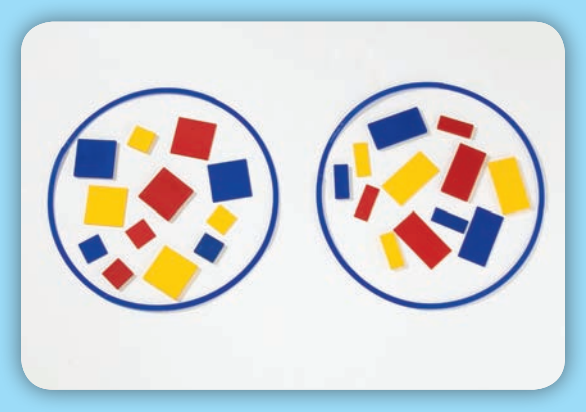
Here is a problem about determining a sorting rule.

Sam's teacher put the books in the reading area on two shelves. The colors and sizes are all mixed up, but Sam sees that the books on the first shelf are square and the books on the second shelf are rectangular. How did Sam's teacher sort the books?

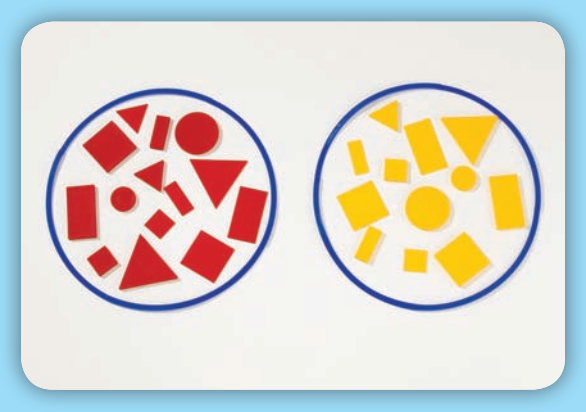
Introduce the problem. Then have children do the activity to solve the problem. Distribute Attribute Blocks and Sorting Circles to each group.

Materials

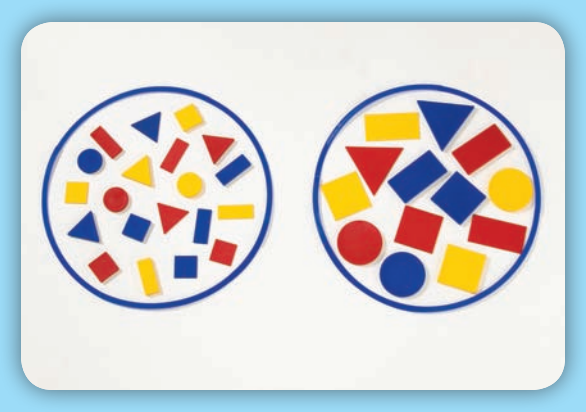
- Attribute Blocks (an assortment of sizes, shapes, and colors for each group)
- Attribute Sorting Circles (2 per group)



1. Set up two Sorting Circles that demonstrate sorting by shape for each group of children. Encourage children to work together to find that the two groups of blocks have been sorted by shape. Have children finish this sentence: The blocks have been sorted by [shape].



2. Repeat Step 1 with two new shapes. Then repeat to show two groups sorted by color and two groups sorted by size. Have children finish this sentence after determining each sorting rule: The blocks have been sorted by [attribute].



3. After children have determined the sorting rules for the blocks that you have sorted, have them take turns sorting the blocks and determining the sorting rule.

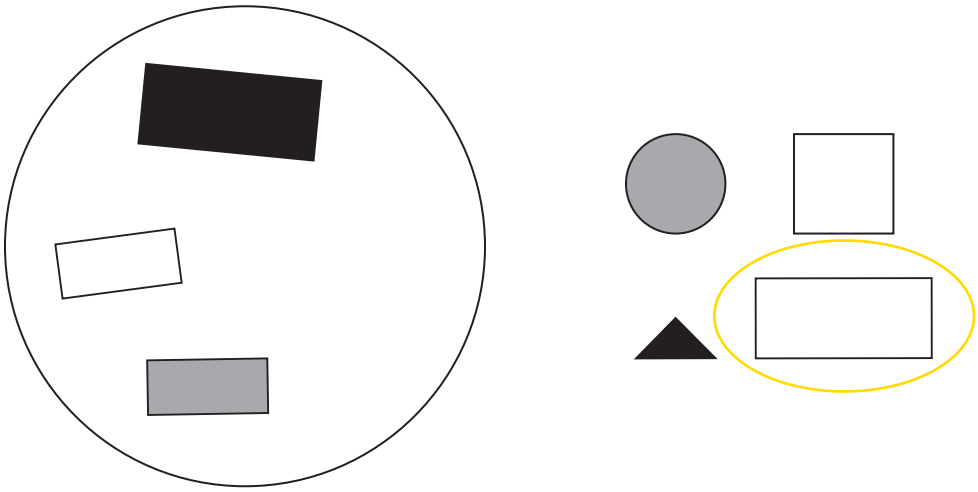
⚠ Look Out!

Watch out for children who incorrectly determine the sorting rule. Have these children practice sorting a group of blocks by shape, color, or size. Then try the activity again by giving children a presorted group and having them determine the rule.

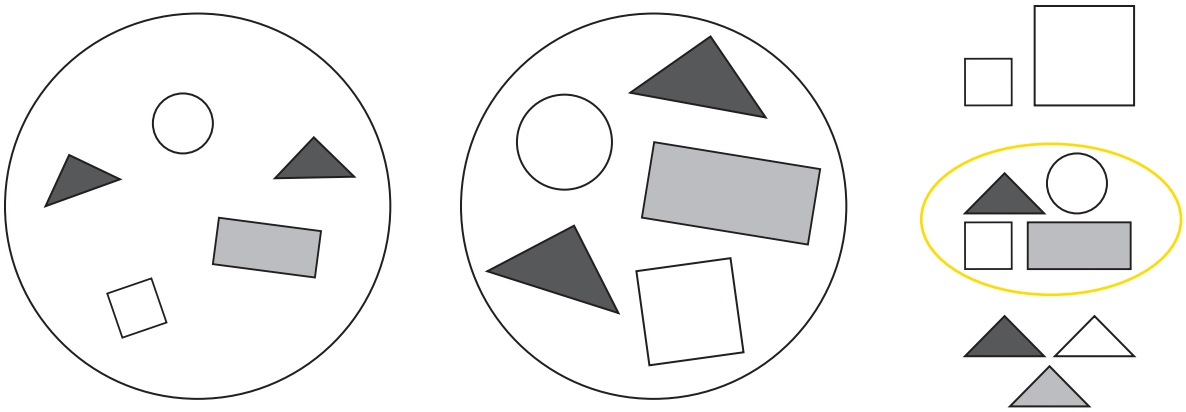
Answer Key

Check children's work.

1.



2.



Directions

1. Circle the shape that belongs inside the Sorting Circle. **2.** Circle the attribute that completes the rule: The blocks have been sorted by size, shape, or color.

Answer Key

Check children's work.

Challenge

Use Attribute Blocks. Sort the blocks into two groups using the rule you choose. Draw two large circles on your paper. Draw and color the blocks you sorted. Write or draw your sorting rule.