



**Hands-On
Standards®**

TEACHING MATH WITH MANIPULATIVES

MATH INTERVENTION

Geometry, Measurement & Data



Objective

Express the length of an object as a whole number of units.

Materials

- Color Tiles (1 set per pair)
- Measuring Objects Recording Sheet (Lesson 4, page 62, 1 per pair)
- pencil (1 per pair)

EL Support

- Review vocabulary: longest, shortest, longer, shorter.
- Draw three relatively short lines on the board, aligned left, in size order from shortest on top to longest on bottom. Discuss the terms *short*, *shorter*, and *shortest* in relationship to the lines.
- Draw three longer lines on the board, again left aligned and arranged from shortest to longest from top to bottom. Have students describe these lines using the terms *long*, *longer*, and *longest*.

Students have had hands-on experience in comparing objects using both direct and indirect comparisons. Students will now use Color Tiles to measure an object to find its length. Using a nonstandard unit, such as Color Tiles, provides a simple way to introduce to students how to measure an object. Measuring with nonstandard units first will provide a solid building block for later on when they will be introduced to standard units.



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



Talk About It

Discuss the **Try It!** activity.

- Tell students that they will use Color Tiles to measure the objects. Point out that all the tiles are the same size. **Say:** *The number of tiles used is how long the object is.*
- **Say:** *When you place the tiles, they must be touching each other side by side.* Explain the importance of placing the tiles side by side by demonstrating how leaving gaps or overlapping will not give an accurate measurement.
- **Ask:** *How do you know when to stop adding tiles?* Elicit that they should stop when the end of the tile is exactly above the end of the object they are measuring.



Solve It

With students, reread the problem. **Ask:** *How many Color Tiles long is each item he found?* Have students use their tiles to explain.



More Ideas

For other ways to teach determining the length of objects—

- Have students measure objects using white Cuisenaire® Rods. Choose objects ahead of time that are whole numbers of white rods long. You may also wish to draw objects of whole unit lengths for students to measure, such as a ribbon exactly 9 rods long. Remind students to place the rods side by side with no overlapping or gaps.
- Have students work in pairs. Each partner draws an object. Then have them switch papers and measure how long the drawing is using white Cuisenaire® Rods or Color Tiles. If needed, tell them to choose the number of rods or tiles it is closer to the end of the object.
- For more practice, use Lesson 4 student page 63.



Activity



30 minutes



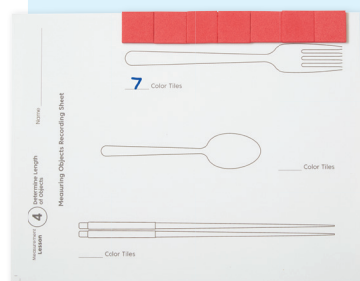
Pairs

Here is a problem about determining the length of objects.

Alex wants to measure some objects he found in his kitchen. How many Color Tiles long is each item he found?

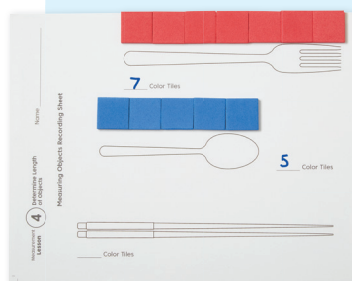
Introduce the problem. Then have students do the activity to solve the problem. Distribute Color Tiles, recording sheets, and pencils to student pairs.

1



Say: Let's measure the fork. Place one color tile above the left edge of the fork. Place another so that its edge touches the edge of the first tile. Have students continue placing tiles. **Ask:** How many tiles long is the fork? Have students write the number of tiles on the recording sheet.

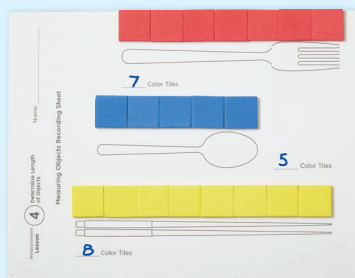
2



Say: Now measure the spoon. **Ask:** What should you do first? Guide students to start measuring by placing a tile above the left edge of the spoon. **Say:** Continue placing tiles to measure the spoon. **Ask:** How many tiles long is the spoon? Have students write the number of tiles on the recording sheet.

3

Say: Now measure the chopsticks. Have students place tiles to measure the length. **Ask:** How many tiles long are the chopsticks? Have students write the number of tiles on the recording sheet.



Look Out!

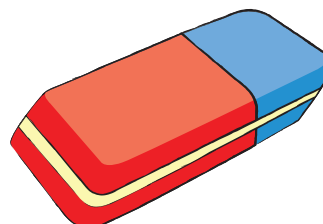
Watch for students who line up the tiles correctly but miscount. Demonstrate how to start at one end and suggest they touch or point to each tile as they count across until they get to the last tile.



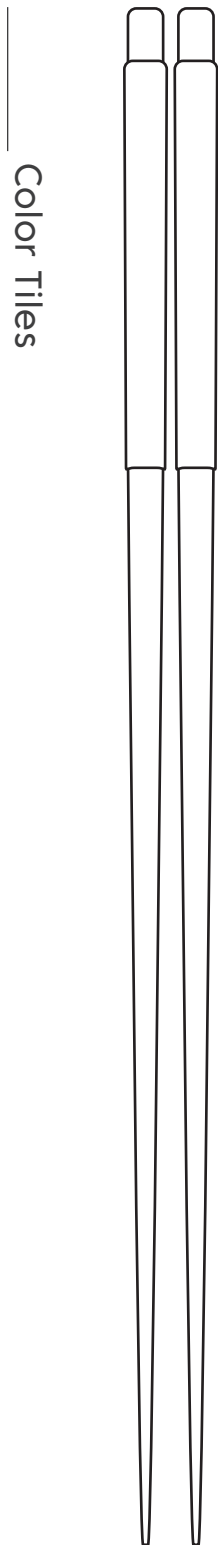
Formative Assessment

Display an eraser. Have students try the following problem.

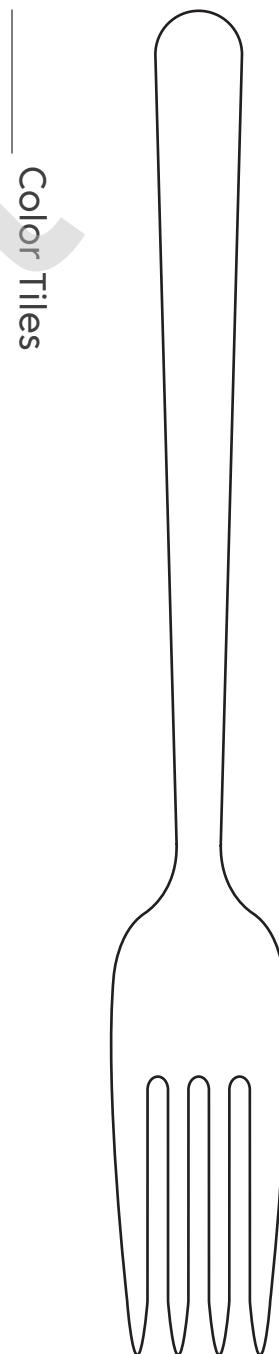
How many Color Tiles long is the eraser? Write your answer.



Measuring Objects Recording Sheet

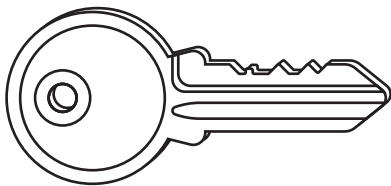


_____ Color Tiles



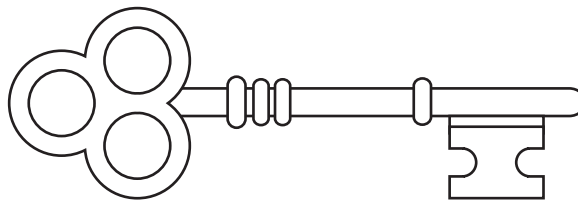
Use Color Tiles to measure the length of each key.

1.



_____ Color Tiles

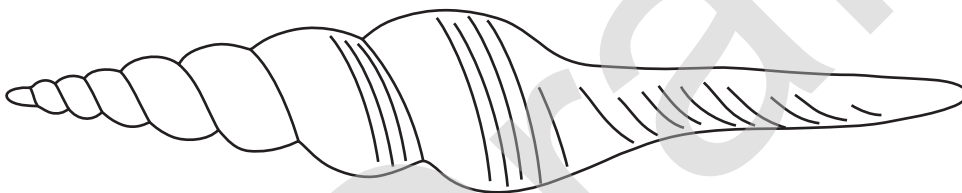
2.



_____ Color Tiles

Use Color Tiles to measure the length of each shell.

3.



_____ Color Tiles

4.



_____ Color Tiles

Challenge! Lynn measured the length of a bracelet and said it was 5 Color Tiles long. It was actually 8 Color Tiles long. What could she have done wrong?

Use this sheet to record assessment results for each student.

Unit 1: Geometry					
Item No.	Lesson No.	Concept	Meets? Y/N		
			___ / ___ / ___	___ / ___ / ___	___ / ___ / ___
1.	1	Two-dimensional shapes and attributes.			
2.	1	Three-dimensional shapes and attributes.			
3.	4	Compose 3-D shapes using cubes.			
4.	6	Partition rectangles into fourths.			
5.	2	Create shapes based on attributes.			
6.	3	Compose 2-D shapes to build a composite shape.			
7.	5	Identify fourths and halves.			
8.	4	Compose 3-D shapes using cubes.			
9.	6	Understand that more equal shares means smaller pieces of a whole.			
10.	2	Create shapes based on attributes.			

Unit 2: Measurement					
Item No.	Lesson No.	Concept	Meets? Y/N		
			___ / ___ / ___	___ / ___ / ___	___ / ___ / ___
1.	1	Order three objects by length.			
2.	2	Use objects to show lengths between two objects.			
3.	3	Determine if a object is longer or shorter.			
4.	4	Measure the length of an object.			
5.	5	Use different size units to measure length.			
6.	6	Tell time to the hour.			
7.	7	Tell time to the half hour.			
8.	8	Tell and write time to the half hour using analog and digital clocks.			
9.	8	Tell and write time to the hour using analog and digital clocks.			
10.	5	Use different-size units to measure length.			

Kindergarten TOC Intervention Geometry, Measurement, and Data	
Geometry	
Find Relative Position	
Name Shapes	
Identify Irregular Shapes	
Identify Two- and Three- Dimensional Shapes	
Model Shapes	
Compose Two-Dimensional Shapes	
Measurement	
Determine Attributes	
Measure Length in Nonstandard Units	
Measure Height in Nonstandard Units	
Compare Lengths	
Compare Heights	
Compare Objects	
Data	
Classify by Categories	
Sort by One Attribute	
Sort by Two Attributes	
Determine the Sorting Rule	
Sort and Count	
Sort, Count, and Analyze	

1 st Grade TOC Intervention Geometry, Measurement, and Data	
Geometry	
Shape Attributes	
Create Shapes	
Compose Two-Dimensional Shapes	
Compose Three-Dimensional Shapes	
Equal Shares with Circles	
Equal Shares with Rectangles	
Measurement	
Order Objects by Lengths	
Find In-Between Lengths	
Compare Lengths	
Determine Length of Objects	
Use Different Size Units to Measure Length	
Tell Time to the Hour	
Tell Time to the Half Hour	
Write the Digital Time	
Data	
Create Tally Charts	
Create Picture Graphs	
Create Bar Graphs	
Interpret Data on Graphs	
Compare Data on Graphs	
Create Questions About Data	

2 nd Grade TOC Intervention Geometry, Measurement, and Data	
Geometry	
Identify Shapes	
Recognize and Draw Shapes	
Partition Rectangles	
Solve Problems by Partitioning Rectangles	
Partition Rectangles into Fair Shares	
Partition Circles	
Measurement	
Estimate Lengths	
Different Size Units	
Select and Use Measurement Tools	
Measure and Compare Lengths	
Whole Numbers as Lengths on a Number Line	
Tell Time to 5 Minutes	
Tell Time to the Minute	
Solve Coin Problems	
Data	
Line Plots Using Inches	
Line Plots Using Centimeters	
Solve Problems Using a Line Plot	
Picture Graphs	
Bar Graphs	
Solve Problems Using Graphs	



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MATH INTERVENTION

Number & Operations





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TEACHING MATH WITH MANIPULATIVES

Kindergarten TOC Intervention Number and Operations
Numbers to 5
Read and Write Numbers to 5
Count Objects to 5
Count Sets of Objects to 5
Make a Set with 1 or More (up to 5)
Numbers to 20 and Beyond
Read and Write Numbers 6 to 10
Count Objects to 10
Make a Set With 1 More (Up to 10)
Compose and Decompose Numbers to 10
Find Ways to Make 10
Read and Write Numbers to 20
Count Objects to 20
Compose and Decompose Numbers to 20
Count Objects to 100
Comparing Numbers
Make a Set of 1 or More and Compare
Compare Sets of Objects to 10
Compare Numbers to 10
Adding and Subtracting
Add and Subtract Using + and -
Add and Subtract with Number Sentences
Make 10 Using Number Sentences

1 st Grade TOC Intervention Number and Operations
Understanding Addition & Subtraction
Solve Add-To and Take-From Word Problems
Solve Put-Together and Take-Apart Word Problems
Solve Compare Word Problems
Solve Word Problems with Addends
Using Strategies to Add and Subtract Within 20
Related Facts
Group to Add
Think Addition
Count On and Count Back
Make 10 to Add or Subtract
Use Doubles to Add or Subtract
The Equal Sign
Creating, Comparing, and Place Value
Teen Numbers
Represent Two-Digit Numbers
Read, Write, and Represent Numbers to 120
Decompose Numbers
Compare Numbers
Adding and Subtracting Beyond 20
Add a Two-Digit or One-Digit Number
10 More or 10 Less
Add a Multiple of 10
Subtract a Multiple of 10

2 nd Grade TOC Intervention Number and Operations
Adding and Subtracting Within 1000
Use Strategies to Add and Subtract
Explain Addition and Subtraction Strategies
Solve One-Step Add to Problems
Solve One-Step Take-From Problems
Solve Two-Step Word Problems
Place Value, Counting, and Comparing
Three-Digit Numbers and Their Values
Explore Three-Digit Numbers
Writing Numbers in Different Forms
Greater Than, Less Than, or Equal To
Foundations of Multiplication
Odd or Even
Odd or Even and Doubles
Skip-Count by 5s, 10s, and 100s
Build Arrays
Adding and Subtracting Beyond 100
Use Mental Math to Add and Subtract
Use Place Value to Add Three or More Numbers
Use Properties to Add
Add Hundreds, Tens, and Ones
Subtract Hundreds, Tens, and Ones
Addition to 1000



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