

# LESSON 2

## Objective

Estimate and measure length using nonstandard units.

## Common Core State Standards

- **1.MD.2** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

## Measurement and Data

# Nonstandard Units

Children make connections about measurement through hands-on experience. At an early age nonstandard units are used because they are simpler for children to manipulate. As they get older, children are able to transition to using rulers because they have had experience with linear measurement. Estimating lengths incorporates number sense and spatial sense while creating a beginning foundation of reference points for linear measurements.

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

## Talk About It

Discuss the Try It! activity.

- Have children share their estimates and then actual measurements of the length of a pencil in Pattern Blocks.
- **Ask:** *How close was your estimate to the actual length of your pencil? Was your second measurement different than your first one?*
- **Ask:** *What are some other things you could measure with blocks?* Invite volunteers to suggest objects in the classroom that could be measured with blocks. Have children estimate and measure the objects. **Ask:** *How could we be certain we all get the same measurements?*

## Solve It

With children, reread the problem. Have children draw a rectangle to represent a pencil box that would be long enough to fit their pencil. Have children use a block to help measure how long the rectangle should be.

## More Ideas

For other ways to teach about estimating and measuring lengths using nonstandard units—

- Have children work in groups to measure their pencil again, this time using Cuisenaire® Rods. First have children use a large rod, such as blue. Then have them use a smaller rod, such as light green. Point out that their measurements differ depending on the size of the rod they use.
- Have children work in pairs to measure classroom objects with 2-cm Color Cubes. Children should make an estimate, measure the object, and compare the estimate to the actual measurement.

## Formative Assessment

Have children try the following problem.

*How many tiles long is the pencil?*



- A. 2
- B. 3
- C. 4

**Try It!** 25 Minutes | Pairs

Here is a problem about estimating and measuring lengths using nonstandard units.

*Eli's class wants to make pencil boxes. Eli's teacher says that the children can help figure out how long the boxes should be by finding out how long their pencils are. What is one way Eli's class can find out how long their pencils are?*

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

Give each pair several Pattern Blocks of two shapes.

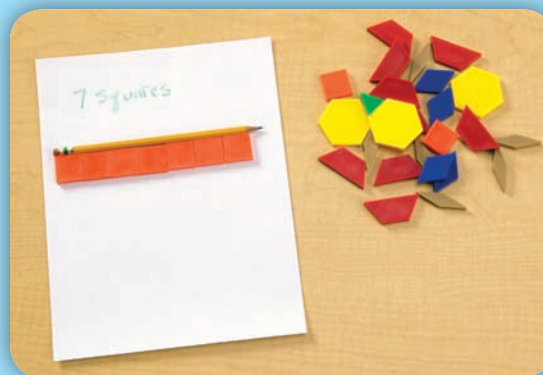
**Say:** *I want you to make measurements using the blocks that I gave you.*

**Materials**

- Pattern Blocks (several of 2 different shapes per pair)
- pencils (1 per pair, at least 6 inches long)
- paper (1 sheet per pair)
- crayons (1 per child)



**1.** Have children choose one block. **Ask:** *How many shapes long do you think your pencil is?* Have children hold the shape and the pencil for reference. Have children make an estimate.



**2.** Have one partner use the shape to measure the pencil. Caution children to line up the block against one end of the pencil and then make sure the others line up closely. **Say:** *Write the actual measurement on your paper.*



**3.** Have children measure the length of the pencil using another shape and write the actual measurement. Then ask each pair to tell the length of their pencil. Have children explain why the two measurements are different.

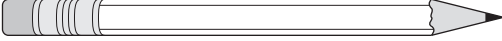
**! Look Out!**

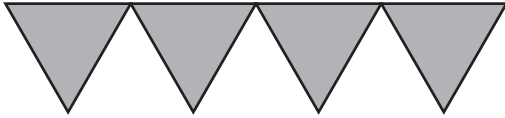
Some children may have trouble understanding that they must align one end of the manipulative and the end of their pencil in order to get an accurate measurement. If this is the case, suggest that children line up the two against the straight edge of a book to make sure they get the right measurement.




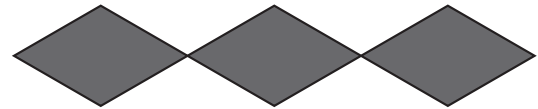
**Use Pattern Blocks. Use the blocks to measure each length.**

(Check students' work.)

1. 



2. 



**Use Pattern Blocks. Find each item.**

**Use the shape shown to measure the item.**

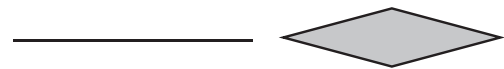
**Draw a picture like the ones above.**

3.–6. Answers will vary.

3. one side of a book



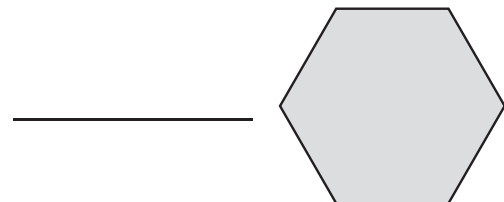
4. straw



5. crayon



6. dollar bill



## Answer Key

**Challenge!** Measure the length of your pencil using the square from the Pattern Blocks. Then measure your pencil using the longest side of the red trapezoid from the Pattern Blocks. Are the measurements the same?

Challenge: (Sample) The square is half as long as the longest side of the trapezoid, so the measurements are different.

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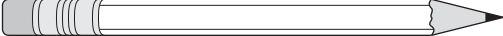
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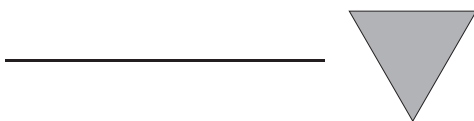
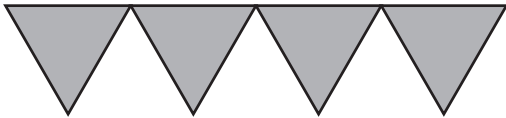
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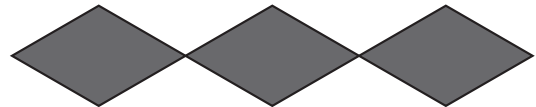
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**Use Pattern Blocks. Use the blocks to measure each length.**

1. 



2. 

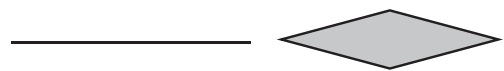


**Use Pattern Blocks. Find each item.  
Use the shape shown to measure the item.  
Draw a picture like the ones above.**

3. one side of a book



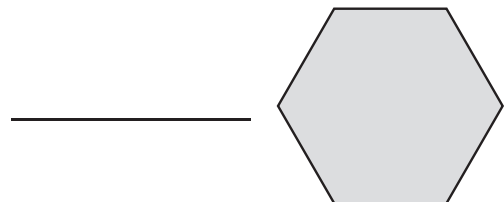
4. straw



5. crayon



6. dollar bill



Name \_\_\_\_\_

**Challenge!** Measure the length of your pencil using the square from the Pattern Blocks. Then measure your pencil using the longest side of the red trapezoid from the Pattern Blocks. Are the measurements the same?

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