HOW LONG IS IT?

GEOMETRY • NUMBER • MEASUREMENT • LOGIC

- Estimation
- Non-standard measurement
- Counting
- Subtraction

Getting Ready

What You'll Need

Snap Cubes, about 40 per pai r

How Long Is It? recording sheet, 1 per pair, page 92

Overview

Children estimate the length of various classroom objects in terms of Snap Cubes. Then they measure the objects with Snap Cube trains and compare their estimates to the actual measurements. In this activity, children have the opportunity to:

- work with non-standard measurement
- refine their ability to estimate length
- develop number sense

The Activity

Tell children that, in measuring length, they should ignore any posts that may stick out from the ends of the Snap Cube train.

Introducing

- Hold up one Snap Cube and a crayon. Ask children to think about how many cubes they would need to snap together to make a train equal in length to the crayon.
- Write these column headings on the board. Write the word *crayon* in the first column.

Object	Estimated Length	Actual Length
crayon		

- Call for some estimates of the length of the crayon. Write them in the second column.
- Invite a volunteer to snap some cubes together to make a train, placing it next to the crayon to show the actual length of the crayon in terms of Snap Cubes.
- Repeat the activity using another object.

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On Their Own

How well can you estimate the length of an object?

- With a partner, choose an object in the classroom. Write the name of your object on part of a recording sheet that looks like this:

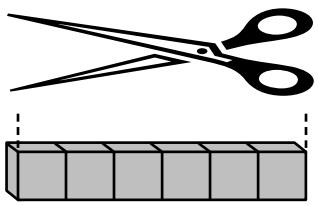
Object: _____

Estimate of length (in Snap Cubes): _____

Actual length (in Snap Cubes): _____

Our estimate was:
- ❑ too long
- ❑ too short
- ❑ just right

- Estimate how many Snap Cubes you would need to make a train the same length as your object. Record your estimate.
- Now measure your object with Snap Cubes. Do this by making a train and lining it up with your object. The number of Snap Cubes in the train is the actual length of your object. Record the actual length.



- Compare your estimate to the actual length. Check whether your estimate was *too long, too short, or just right.*
- Repeat the process of estimating, measuring, and comparing for several other objects. Each time, try to make a good estimate.
- Be ready to talk about your estimates.

The Bigger Picture

Thinking and Sharing

Ask volunteers to share one of the objects they measured. Invite the class to estimate its length in Snap Cubes and to explain how they made their estimates. Write the estimates on the board. Then have the volunteers reveal the actual length. Record this on the board as well. Repeat this process until all partners have had a chance to share one of their objects.

Use prompts such as these to promote class discussion:

- What makes a good estimate? What makes a bad estimate?
- Which estimates seemed reasonable? Why or why not?
- Which of the estimates were close to the actual measurement?
- How much longer (shorter) than the estimate was the actual measurement?
- Was it harder to estimate the length of an object that was very short or an object that was very long? Why do you think so?
- Did finding the actual length of your first object help you make an estimate for your next object? Explain.
- (Hold up an object.) Which object that we have already seen is probably closest in length to this object?

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Drawing

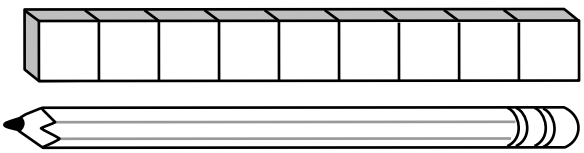
Have children draw a picture of one of the objects they measured next to a Snap Cube train of the same length.

Teacher Talk

Where's the Mathematics?

This activity gives children an opportunity to practice estimation and measurement in an open-ended setting. The *Thinking and Sharing* gives children an opportunity to apply their newly practiced skills to a variety of objects that they have not yet measured. Listening to their peers explain why they chose a particular estimate can expose children to a number of different estimation techniques. It can also help children see that an estimate is based on reason and is not just a wild guess.

The measurements of many objects that children will choose will not be equal to an exact number of Snap Cubes. This can provide opportunities to discuss rounding the measurement to the length of the nearest Snap Cube or using a fraction to indicate measurement. Encourage children to use the method that makes the most sense to them. Answers such as "It is a little more than 8 Snap Cubes long" help set the stage for the need to introduce a new set of numbers, fractions, that will enable children to communicate about what "a little more than" means.



The pencil is a little longer than 9 cubes.

Children may give some of their estimates as a range of numbers. For example, an estimate such as, "The pen looks like it is about 7 to 9 Snap

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Extending the Activity

Have children make a train of 20 Snap Cubes and then, without moving from their seats, identify two objects in the room each of which is about the length of their train. After they have identified the objects, have them measure them with their train to see if they were correct.

Cubes long" can take pressure off children who feel that if they estimate the pen to be 9 Snap Cubes long and the actual measurement is 8 Snap Cubes, then they have given a "wrong" estimate. Asking the question, "Which of the estimates were close to the actual measurement?" also encourages children to accept the idea that estimates only need to be "in the ballpark" to be good estimates.

When asked to compare their actual measurement to their estimate, children use subtraction. Some may subtract the numbers mentally. Others may build one train of Snap Cubes as long as their estimate and then another train of Snap Cubes as long as the actual measurement, finally lining up these two trains and "counting on" to find the difference in length.

Children also get chances to practice using the comparisons "longer" and "shorter" in context. If, after one child has shown that a calculator measures almost 6 Snap Cubes long and then a book is held up, observations might be made that the book is longer than the calculator and it looks as if two calculators laid end-to-end might be almost as long as the book. Hence, the book is probably "6 + 6 + one or two more," or 13 to 14 Snap Cubes long. Reasoning such as this helps children to develop a good number sense because they are fitting numbers together in meaningful contexts that may be verified concretely.

Children can also practice ordering numbers when they look at the list of objects and measurements on the board and put the items in order from shortest to longest. As the actual objects are placed in a line, children have verification that they are ordering the numbers correctly.

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