

Objective

Estimate and measure in customary and metric units.

Common Core State Standards

- **2.MD.3** Estimate lengths using units of inches, feet, centimeters, and meters.

Measurement and Data

Estimating and Measuring

Measurement encompasses several areas of math. By this age, children will have experienced measuring objects with standard units. This exposure has formed a foundation of reference points that children can draw upon to make logical estimates and pick the best tools for measuring.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** How many inches long did you estimate that the pencil would be? How many inches was it when you measured with Color Tiles?
- **Ask:** What was your estimate of the length of the pencil in centimeters? How many centimeters was it when you measured it with the unit cubes?
- **Ask:** How did you use the measurement of the pencil to help you estimate the length of the piece of paper? Did you use the measurements of the paper or pencil to help you estimate the length of the eraser? Why or why not?
- Discuss with children the similarities and differences between inches and centimeters. Emphasize that inches and centimeters are both accurate ways to measure because they are both standard units.

Solve It

With children, reread the problem. Have children write a letter to Clyde explaining how he can measure in inches the same way he would measure using centimeters. They should tell Clyde how inches and centimeters are similar and different.

More Ideas

For other ways to teach about measuring in customary and metric units—

- Have children work in groups to trace outlines of their bodies on large sheets of paper and then measure from their feet to the top of their heads using both Color Tiles and Base Ten units.
- Have one child look around the room and select an object, estimating how long it is in inches or centimeters. Then have the child tell the class the estimate, using only the number and not the unit. The class then guesses the unit. Children then measure the object using Color Tiles and Base Ten units to find how close the estimate was.

Formative Assessment

Have children try the following problem.

Which is a good estimate of the length of your thumb?

- A. 1 cm B. 4 cm C. 6 inches

Try It! 35 Minutes | Pairs

Here is a problem about measuring in customary and metric units.

Mr. Rossi asked his students to measure objects in inches. Clyde is a new student in Mr. Rossi's class. He is from England. He told Mr. Rossi that people use centimeters to measure in England. Mr. Rossi told Clyde to measure the objects with Centimeter Cubes while his partner measured with 1-inch Color Tiles. Who used more units to measure?

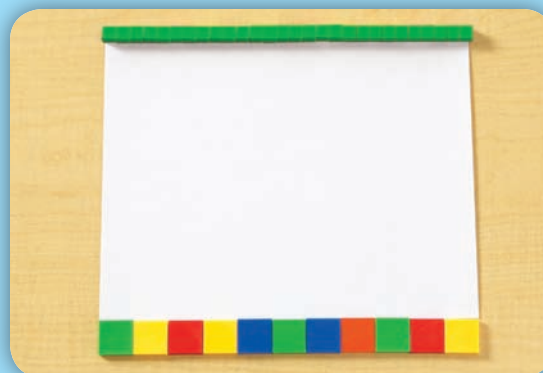
Introduce the problem. Then have children do the activity to solve the problem. Distribute Base Ten units, Color Tiles, recording sheets, pencils, and paper to children. Tell children that a tile is 1 inch long and a unit cube is 1 centimeter long. Explain that in the United States, we usually measure with customary units, such as inches and feet, but most other countries in the world use metric units, such as centimeters and meters.

Materials

- Base Ten Blocks (30 units per pair)
- Color Tiles (15 per pair)
- Measurement Recording Sheet 2 (BLM 10; 1 per pair)
- unsharpened pencil (1 per pair)
- $8\frac{1}{2}$ " \times 11" sheet of paper (1 per pair)



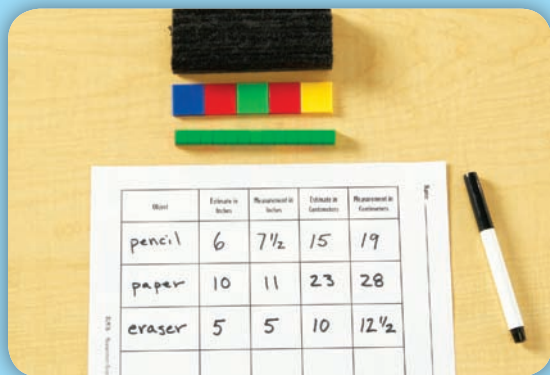
1. Have children estimate the length of the unsharpened pencil in tiles, then measure. Children should record the estimate and measurement on the recording sheet. They should then repeat the process with cubes.



2. Have children use their measurement of the pencil to estimate the length of a sheet of paper in inches. Children should measure with tiles and record the numbers. Have children repeat the activity for centimeters.

Look Out!

Some children may have trouble measuring accurately using cubes and tiles. Make sure children are lining up manipulatives correctly with the objects being measured. They should be careful not to leave gaps between the units of measure. Demonstrate for children that they will get a more accurate answer if the tiles and cubes are lined up correctly.

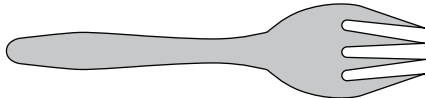


3. Have children repeat the steps of the activity to estimate and measure the length of a classroom eraser, and record their measurements.



Use Unit Cubes and Color Tiles to model the length of each item. Tell the length.

(Check students' work.)



6 inches
15 centimeters



3 inches
8 centimeters

Using Unit Cubes and Color Tiles, model the length of each line. Tell the length.

3. _____

4 inches 10 centimeters

4. _____

6 inches 15 centimeters

5. _____

3 inches 7 or 8 centimeters

Find each item. Estimate its length.

For 6–8, answers will vary. Sample answers are given.

6. pencil

6 inches

15 centimeters

7. eraser

1 inch(es)

3 centimeters

8. paper clip

2 inches

5 centimeters

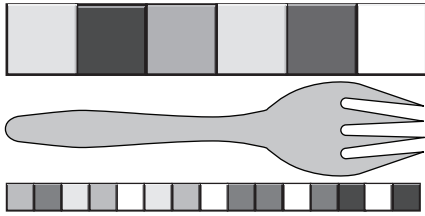
Answer Key

Challenge! When you measure the same object in inches and then centimeters, why is the number of centimeters always greater than the number of inches? Draw models of the units to help.

Challenge: (Sample) One inch equals about 2.5 centimeters. Because an inch is a longer distance, when a length is measured in both inches and centimeters, the number of inches will be a lesser number.

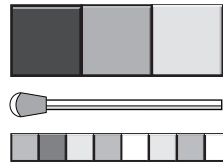
Use Unit Cubes and Color Tiles to model the length of each item. Tell the length.

1.



_____ inches
_____ centimeters

2.



_____ inches
_____ centimeters

Using Unit Cubes and Color Tiles, model the length of each line. Tell the length.

3.



_____ inches _____ centimeters

4.



_____ inches _____ centimeters

5.



_____ inches _____ centimeters

Find each item. Estimate its length.

6. pencil

_____ inches

_____ centimeters

7. eraser

_____ inch(es)

_____ centimeters

8. paper clip

_____ inches

_____ centimeters

Name _____

Challenge! When you measure the same object in inches and then centimeters, why is the number of centimeters always greater than the number of inches? Draw models of the units to help.

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Name _____

Object	Estimate in Inches	Measurement in Inches	Estimate in Centimeters	Measurement in Centimeters