Metric Units of Length

Essential Question How can you use models to compare metric units of length?

Investigate

Hands On

Materials ■ ruler (meter) ■ scissors ■ tape

Meters (m), **decimeters** (dm), centimeters (cm), and **millimeters** (mm) are all metric units of length.

Build a meterstick to show how these units are related.

A. Cut out the meterstick strips.

B. Place the strips end-to-end to build 1 meter. Tape the strips together.

C. Look at your meter strip. What patterns do you notice about the sizes of the units?

1 meter is _____ times as long as 1 decimeter.

1 decimeter is _____ times as long as 1 centimeter.

1 centimeter is _____ times as long as 1 millimeter.

Describe the pattern you see.

_____

_____

Math Idea
If you lined up 1,000 metersticks end-to-end, the length of the metersticks would be 1 kilometer.

Draw Conclusions

1. Compare the size of 1 meter to the size of 1 centimeter. Use your meterstick to help.

_____

2. Compare the size of 1 meter to the size of 1 millimeter. Use your meterstick to help.

_____

_____

3. **THINK SMARTER** What operation could you use to find how many centimeters are in 3 meters? Explain.

_____

_____

_____

_____

Make Connections

You can use different metric units to describe the same length. For example, you can measure the length of a book as 3 decimeters or as 30 centimeters. Since the metric system is based on the number 10, decimals or fractions can be used to describe metric lengths as equivalent units.

Think of 1 meter as one whole. Use your meter strip to write equivalent units as fractions and decimals.

1 meter = 10 decimeters

Each decimeter is

_____ or _____ of a meter.

1 meter = 100 centimeters

Each centimeter is

_____ or _____ of a meter.

Complete the sentence.

• A length of 51 centimeters is _____ or _____ of a meter.

• A length of 8 decimeters is _____ or _____ of a meter.

• A length of 82 centimeters is _____ or _____ of a meter.

Math Talk

MATHEMATICAL PRACTICES ⑦

Look for Structure Explain how you are able to locate and write decimeters and centimeters as parts of a meter on the meterstick.

Name _____

Share and Show MATH BOARD

Complete.

✓ **1.** 2 meters = _____ centimeters

2. 3 centimeters = _____ millimeters

3. 5 decimeters = _____ centimeters

MATHEMATICAL PRACTICE ④ **Use Symbols** **Algebra** **Compare using** $<$, $>$, **or** $=$.

4. 4 meters ◯ 40 decimeters

5. 5 centimeters ◯ 5 millimeters

6. 6 decimeters ◯ 65 centimeters

7. 7 meters ◯ 700 millimeters

Describe the length in meters. Write your answer as a fraction and as a decimal.

✓ **8.** 65 centimeters = _____ or _____ meter

9. 47 centimeters = _____ or _____ meter

10. 9 decimeters = _____ or _____ meter

11. 2 decimeters = _____ or _____ meter

Problem Solving • Applications Real World

12. A new building is 25 meters tall. How many decimeters tall is the building?

_____

13. **GO DEEPER** Alexis is knitting a blanket 2 meters long. Every 2 decimeters, she changes the color of the yarn to make stripes. How many stripes will the blanket have? Explain.

_____

_____

_____

14. **THINK SMARTER** Julianne's desk is 75 centimeters long. She says her desk is 7.5 meters long. Describe her error.

_____

_____

15. **THINK SMARTER** Write the equivalent measurements in each column.

5,000 millimeters   500 centimeters   50 centimeters

$\frac{55}{100}$ meter   0.500 meter   0.55 meter

$\frac{500}{1,000}$ meter   550 millimeters   50 decimeters

5 meters	55 centimeters	500 millimeters

16. **THINK SMARTER** Aruna was writing a report on pecan trees. She made the table of information to the right.

Write a problem that can be solved by using the data.

Pecan Tree	
Average Measurements	
Length of nuts	3 cm to 5 cm
Height	21 m to 30 m
Width of trunk	18 dm
Width of leaf	10 cm to 20 cm

Pose a problem.

_____

_____

_____

_____

_____

_____

Solve your problem.

- **MATHEMATICAL PRACTICE ①** **Describe** how you could change the problem by changing a unit in the problem. Then solve the problem.

_____

_____

Metric Units of Length

Common Core

COMMON CORE STANDARD—4.MD.A.1
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Complete.

1. 4 meters = ____400____ centimeters

Think: 1 meter = 100 centimeters,
so 4 meters = 4 × 100 centimeters,
or 400 centimeters

2. 8 centimeters = _____ millimeters

3. 5 meters = _____ decimeters

4. 9 meters = _____ millimeters

5. 7 meters = _____ centimeters

Compare using <, >, or =.

6. 8 meters ◯ 80 centimeters

7. 3 decimeters ◯ 30 centimeters

8. 4 meters ◯ 450 centimeters

9. 90 centimeters ◯ 9 millimeters

Describe the length in meters. Write your answer as a fraction and as a decimal.

10. 43 centimeters = _____ or

_____ meter

11. 6 decimeters = _____ **or**

_____ meter

Problem Solving Real World

12. A flagpole is 4 meters tall. How many centimeters tall is the flagpole?

_____

13. Lucille runs the 50-meter dash in her track meet. How many decimeters long is the race?

_____

14. **WRITE** *Math* Find a measurement, in centimeters, of an object. Look through books, magazines, or the Internet. Then write the measurement as parts of a meter.

_____

_____
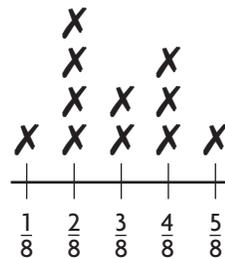
Lesson Check (4.MD.A.1)

1. A pencil is 15 centimeters long. How many millimeters long is that pencil?

_____

2. John's father is 2 meters tall. How many centimeters tall is John's father?

_____

Spiral Review (4.NF.B.4b, 4.NF.C.7, 4.MD.B.4)

3. Bruce reads for $\frac{3}{4}$ hour each night. How long will he read in 4 nights?

_____

_____

4. Mark jogged 0.6 mile. Caroline jogged 0.49 mile. Write an inequality to compare the distances they jogged.

_____

_____

Use the line plot for 5 and 6.

5. How many lawns were mowed?

_____

6. What is the difference between the greatest amount and least amount of gasoline used to mow lawns?

_____

_____

**Gasoline Used to Mow
Lawns in May (in Gallons)**

FOR MORE PRACTICE
GO TO THE
Personal Math Trainer