Investigate

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.

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**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.
Metric Units of Length

<table>
<thead>
<tr>
<th>1 centimeter (cm)</th>
<th>=</th>
<th>10 millimeters (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 decimeter (dm)</td>
<td>=</td>
<td>10 centimeters</td>
</tr>
<tr>
<td>1 meter (m)</td>
<td>=</td>
<td>10 decimeters</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td>100 centimeters</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td>1,000 millimeters</td>
</tr>
</tbody>
</table>

1. 2 meters = _____ centimeters

2. 3 centimeters = _____ millimeters

3. 5 decimeters = _____ centimeters

4. 4 meters $\square$ 40 decimeters

5. 5 centimeters $\square$ 5 millimeters

6. 6 decimeters $\square$ 65 centimeters

7. 7 meters $\square$ 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

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

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.

<table>
<thead>
<tr>
<th>5,000 millimeters</th>
<th>500 centimeters</th>
<th>50 centimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 meters</td>
<td>0.500 meter</td>
<td>0.55 meter</td>
</tr>
<tr>
<td>550 millimeters</td>
<td>550 millimeters</td>
<td>50 decimeters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5 meters</th>
<th>55 centimeters</th>
<th>500 millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

**Pose a problem.**

**Solve your problem.**

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

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?