# Lesson 11-4

MB657

Name _____

**Lesson 11-4**
**Convert Metric Units of Length**

**Solve & Share**
Measure the length of your book in centimeters. Then measure it in millimeters. What do you notice about the two measurements?

**I can ...**
convert metric units of length.

Content Standards 5.MD.A.1, 5.NBT.A.2
Mathematical Practices MP.2, MP.3, MP.5, MP.7

1 cm = ____ mm 10
length of book: ____ cm 27.3
length of book: ____ mm 273

27.3 cm x 10 mm = 273 mm

Use Appropriate Tools
You can select appropriate units and tools to measure the length of objects!

Centimeters are converted by multiplying millimeters by 10.

**Look Back!** MP.7 Use Structure How many meters long is your textbook? How do you know?

27.3 cm ÷ 100 cm = 0.273 m

There are 100 cm in a meter so you must divide by 100.

## Essential Question: How Do You Convert Metric Units of Length?

A

*The most commonly used metric units of length are the kilometer (km), meter (m), centimeter (cm), and millimeter (mm).*

$1 \text{ km} = 10^3 \text{ m} = 1{,}000 \text{ m}$
$1 \text{ m} = 10^2 \text{ cm} = 100 \text{ cm}$
$1 \text{ m} = 10^3 \text{ mm} = 1{,}000 \text{ mm}$
$1 \text{ cm} = 10 \text{ mm}$

DATA

| 1 kilometer | 1 hectometer | 1 decameter | 1 meter | 1 decimeter | 1 centimeter | 1 millimeter |
|---|---|---|---|---|---|---|
| $10^3$ m | $10^2$ m | 10 m | 1 m | 0.1 m | 0.01 m | 0.001 m |


B The distance between two towns is 3 kilometers. How many meters apart are they?

3 km = ☐ m

**To change from larger units to smaller units, multiply.**


Find $3 \times 10^3$.
3 km = 3,000 m

So, the towns are 3,000 meters apart.

C The distance between a kitchen and living room is 1,200 centimeters. How many meters apart are they?

1,200 cm = ☐ m

**To change from smaller units to larger units, divide.**

Find $1{,}200 \div 10^2$.
1,200 cm = 12 m

So, the kitchen and the living room are 12 meters apart.

**Convince Me!** MP.3 Critique Reasoning Elena says that 25 cm is equal to 250 mm. Do you agree? Why or why not?

25cm × 10mm = 250mm

Yes 1cm = 10mm so 25cm = 250mm

Name _____

## Guided Practice*

### Do You Understand?

1. To find the number of meters in six kilometers, why do you multiply $6 \times 10^3$?

Because Km are larger you need to multiply by 100 m to convert.

2. Convert 12.5 centimeters to millimeters. Explain.

1cm = 10mm

12.5cm x 10mm = 125mm

Larger to smaller: Multiply

### Do You Know How?

In **3–6**, convert each unit of length.

3. $10^3$ cm = ____ m

4. 8 m = ____ mm

5. 1,000 mm = ____ cm

6. 3 km = ____ m

In **7** and **8**, compare lengths. Write >, <, or = for each ◯.

7. 20,000 m ◯ 20 km

8. 400 cm ◯ 4 m

58m x 1,000 mm

1,000m ÷ 100cm = 100

1,000m ÷ 10cm = 100

20km x 1,000 = 20,000

4m x 100cm = 400cm

## Independent Practice

In **9–14**, convert each unit of length.

9. 7.5 cm = ____ mm

10. 6 m = ____ cm

11. 0.8 km = ____ cm

12. 17,000 m = ____ km

13. 48,000 mm = ____ m

14. 4 km = ____ m

6m x 100cm = 600cm

In **15–20**, compare lengths. Write >, <, or = for each ◯.

15. 25,365 cm ◯ 30 m

16. 3.6 km ◯ 3,600 m

17. 1,200 mm ◯ 12 m

18. 52,800 cm ◯ 1 km

19. 7,500,000 m ◯ 750 km

20. 800 m ◯ 799,999 mm

7,500,000 ÷ 1,000 = 7,500 km

In **21** and **22**, complete each table.

21.

| km | 1 | | 0.1 |
|---|---|---|---|
| m | | 500 | |

22.

| m | | 50 | 0.5 |
|---|---|---|---|
| cm | 5,000 | | 50 |

5,000 ÷ 100 = 50

5 x 100 = 500

0.5 x 100 = 50

*For another example, see Set D on page 689.



Complete # 10, 19, 22, 24, & 28

## Math Practices and Problem Solving

**23. Number Sense** Let $x$ = the length of an object in meters and $y$ = the length of the same object in millimeters. Which is a smaller number, $x$ or $y$?

**24. Higher Order Thinking** How many millimeters are equal to one kilometer? Show your work.

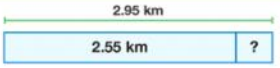
1,000 mm = 1 m
1 m = 1,000 KM
1,000 x 1,000 = 1,000,000 MM

**25. MP.2 Reasoning** Which fraction is greater: $\frac{7}{8}$ or $\frac{9}{12}$? Explain how you know.


**26.** A week ago, Trudy bought the pencil shown. Now the pencil measures 12.7 centimeters.

How many centimeters of the pencil have been used?


**27. Math and Science** Mount St. Helens, located in Washington, erupted on May 18, 1980. Before the eruption, the volcano was 2.95 kilometers high. After the eruption, the volcano was 2.55 kilometers high. Use the bar diagram to find the difference in height of Mount St. Helens before and after the eruption, in meters.




### Common Core Assessment

**28.** Eileen plants a tree that is 2 meters tall in her yard. Which of the following is equivalent to 2 meters?

Ⓐ 200 mm
Ⓑ 20 cm
Ⓒ 200 km
Ⓓ 2,000 mm

2m x 1,000 mm = 2000
2m x 100 cm = 200 cm
2m = 1,000 Km = 0.002 KM

**29.** Which of these number sentences is **NOT** true?

Ⓐ 600 cm = 6 m
Ⓑ 1 m < 9,000 mm
Ⓒ 900 mm = 9 cm
Ⓓ 10 km > 5,000 m