

## Intro to the Metric System

**1** Answer these questions.

Which metric unit is 10 times bigger than a meter? \_\_\_\_\_

Which metric unit is 100 times smaller than a meter? \_\_\_\_\_

**2** Answer these questions.

Which metric unit is 1,000 times bigger than a gram? \_\_\_\_\_

Which metric unit is 1,000 times smaller than a gram? \_\_\_\_\_

**3** List the abbreviations for each metric unit.

| Unit       | Abbreviation |
|------------|--------------|
| kilogram   | _____        |
| meter      | _____        |
| centimeter | _____        |
| milligram  | _____        |
| millimeter | _____        |

**4** How many meters are in each of the following units?

|            |       |
|------------|-------|
| kilometer  | _____ |
| hectometer | _____ |
| centimeter | _____ |
| millimeter | _____ |

**5** Convert this metric unit.

**2,500 meters**

= \_\_\_\_\_ dekameters

= \_\_\_\_\_ hectometers

= \_\_\_\_\_ kilometers

**6** Convert this metric unit.

**36.2 kilograms**

= \_\_\_\_\_ hectograms

= \_\_\_\_\_ dekagrams

= \_\_\_\_\_ grams

**7** Convert this metric unit.

**0.71 meters**

= \_\_\_\_\_ decimeters

= \_\_\_\_\_ centimeters

= \_\_\_\_\_ millimeters

**8** Convert this metric unit.

**128 milligrams**

= \_\_\_\_\_ centigrams

= \_\_\_\_\_ decigrams

= \_\_\_\_\_ grams

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**1** Answer these questions.

Which metric unit is 10 times bigger than a meter? a dekameter

Which metric unit is 100 times smaller than a meter? a centimeter

**2** Answer these questions.

Which metric unit is 1,000 times bigger than a gram? a kilogram

Which metric unit is 1,000 times smaller than a gram? a milligram

**3** List the abbreviations for each metric unit.

| Unit       | Abbreviation |
|------------|--------------|
| kilogram   | <u>kg</u>    |
| meter      | <u>m</u>     |
| centimeter | <u>cm</u>    |
| milligram  | <u>mg</u>    |
| millimeter | <u>mm</u>    |

**4** How many meters are in each of the following units?

|            |                  |
|------------|------------------|
| kilometer  | <u>1,000 m</u>   |
| hectometer | <u>100 m</u>     |
| centimeter | <u>1/100 m</u>   |
| millimeter | <u>1/1,000 m</u> |

**5** Convert this metric unit.

$$\begin{aligned}
 &2,500 \text{ meters} \\
 = &\underline{250} \text{ dekameters} \\
 = &\underline{25} \text{ hectometers} \\
 = &\underline{2.5} \text{ kilometers}
 \end{aligned}$$

**6** Convert this metric unit.

$$\begin{aligned}
 &36.2 \text{ kilograms} \\
 = &\underline{362} \text{ hectograms} \\
 = &\underline{3,620} \text{ dekagrams} \\
 = &\underline{36,200} \text{ grams}
 \end{aligned}$$

**7** Convert this metric unit.

$$\begin{aligned}
 &0.71 \text{ meters} \\
 = &\underline{7.1} \text{ decimeters} \\
 = &\underline{71} \text{ centimeters} \\
 = &\underline{710} \text{ millimeters}
 \end{aligned}$$

**8** Convert this metric unit.

$$\begin{aligned}
 &128 \text{ milligrams} \\
 = &\underline{12.8} \text{ centigrams} \\
 = &\underline{1.28} \text{ decigrams} \\
 = &\underline{0.128} \text{ grams}
 \end{aligned}$$

## Basic Metric Prefixes

G-MS 1

This diagram lists the six metric prefixes that we learned about in the video and shows which power of 10 they correspond to. (There are other prefixes for bigger and smaller amounts, but you don't need to know about them for this lesson.\*)

|                  |               |
|------------------|---------------|
| <b>kilo</b>      | $\times 1000$ |
| <b>hecto</b>     | $\times 100$  |
| <b>deka</b>      | $\times 10$   |
| <b>base unit</b> |               |
| <b>deci</b>      | $\div 10$     |
| <b>centi</b>     | $\div 100$    |
| <b>milli</b>     | $\div 1000$   |

Because these six metric prefixes represent amounts that are bigger or smaller than their immediate neighbors by a factor of 10, they map to the base-10 number places shown below. This diagram can help you understand the relationship between these basic metric units.



**\*Note:** There are metric units that are larger and smaller than these units, and they are separated by factors of 1,000. But in this lesson, we're only focusing on the six prefixes shown.

## Basic Metric Unit Relationships

G-MS 2

**Instructions:** Fill in the blanks. (You can use the chart on page 1 to help you)

- 1 A kilometer is equal to 1,000 meters.
- 2 A dekameter is equal to \_\_\_\_\_ meters.
- 3 A meter is equal to \_\_\_\_\_ centimeters.
- 4 A centimeter is equal to \_\_\_\_\_ millimeters.
- 5 A meter is equal to \_\_\_\_\_ millimeters.
- 6 A hectometer is equal to \_\_\_\_\_ meters.
- 7 A meter is equal to \_\_\_\_\_ decimeters.
- 8 A kilometer is equal to \_\_\_\_\_ hectometers.

**Instructions:** Fill in the blanks. (You can use the chart on page 1 to help you)

- 1 A millimeter is equal to  $\frac{1}{1,000}$  of a meter. or one-thousandth
- 2 A decimeter is equal to \_\_\_\_\_ of a meter.
- 3 A centimeter is equal to \_\_\_\_\_ of a meter.
- 4 A meter is equal to \_\_\_\_\_ of a kilometer.
- 5 A meter is equal to \_\_\_\_\_ of a hectometer.
- 6 A meter is equal to \_\_\_\_\_ of a dekameter.
- 7 A millimeter is equal to \_\_\_\_\_ of a centimeter.
- 8 A centimeter is equal to \_\_\_\_\_ of a decimeter.

## Basic Metric Unit Conversions

G-MS 3

**Instructions:** Multiply or divide by powers of 10 to convert these measurements to the units shown. Use the chart on page 1 to remind yourself of the relationships between metric units. (Note: Because multiplying or dividing by powers of 10 can be thought of as shifting the decimal point, the decimal shift corresponding to the math operation is also shown.)

- |    |                                      | math                    | decimal shift |
|----|--------------------------------------|-------------------------|---------------|
| 1  | 35 meters = <u>3,500</u> centimeters | $35 \times 100 = 3,500$ | 2, right      |
| 2  | 120 milligrams = <u>0.12</u> grams   | $120 \div 1,000 = 0.12$ | 3, left       |
| 3  | 15 centimeters = _____ meters        |                         |               |
| 4  | 3.4 grams = _____ milligrams         |                         |               |
| 5  | 0.5 kilograms = _____ grams          |                         |               |
| 6  | 21 centimeter = _____ decimeters     |                         |               |
| 7  | 6,800 grams = _____ kilograms        |                         |               |
| 8  | 10.4 centimeters = _____ meters      |                         |               |
| 9  | 0.03 grams = _____ centigrams        |                         |               |
| 10 | 1,375 meters = _____ kilometers      |                         |               |
| 11 | 7 meters = _____ kilometers          |                         |               |
| 12 | 8.5 milligrams = _____ grams         |                         |               |

## Basic Metric Prefixes

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|                  |               |
|------------------|---------------|
| <b>kilo</b>      | $\times 1000$ |
| <b>hecto</b>     | $\times 100$  |
| <b>deka</b>      | $\times 10$   |
| <b>base unit</b> |               |
| <b>deci</b>      | $\div 10$     |
| <b>centi</b>     | $\div 100$    |
| <b>milli</b>     | $\div 1000$   |

Because these six metric prefixes represent amounts that are bigger or smaller than their immediate neighbors by a factor of 10, they map to the base-10 number places shown below. This diagram can help you understand the relationship between these basic metric units.



**\*Note:** There are metric units that are larger and smaller than these units, and they are separated by factors of 1,000. But in this lesson, we're only focusing on the six prefixes shown.

## Basic Metric Unit Relationships

G-MS 2

**Instructions:** Fill in the blanks. (You can use the chart on page 1 to help you)

- 1 A kilometer is equal to 1,000 meters.
- 2 A dekameter is equal to 10 meters.
- 3 A meter is equal to 100 centimeters.
- 4 A centimeter is equal to 10 millimeters.
- 5 A meter is equal to 1,000 millimeters.
- 6 A hectometer is equal to 100 meters.
- 7 A meter is equal to 10 decimeters.
- 8 A kilometer is equal to 10 hectometers.

**Instructions:** Fill in the blanks. (You can use the chart on page 1 to help you)

- 1 A millimeter is equal to  $\frac{1}{1,000}$  of a meter. or  
one-thousandth
- 2 A decimeter is equal to  $\frac{1}{10}$  of a meter. or  
one-tenth
- 3 A centimeter is equal to  $\frac{1}{100}$  of a meter. or  
one-hundredth
- 4 A meter is equal to  $\frac{1}{1,000}$  of a kilometer. or  
one-thousandth
- 5 A meter is equal to  $\frac{1}{100}$  of a hectometer. or  
one-hundredth
- 6 A meter is equal to  $\frac{1}{10}$  of a dekameter. or  
one-tenth
- 7 A millimeter is equal to  $\frac{1}{10}$  of a centimeter. or  
one-tenth
- 8 A centimeter is equal to  $\frac{1}{10}$  of a decimeter. or  
one-tenth

## Basic Metric Unit Conversions

G-MS 3

**Instructions:** Multiply or divide by powers of 10 to convert these measurements to the units shown. Use the chart on page 1 to remind yourself of the relationships between metric units. (Note: Because multiplying or dividing by powers of 10 can be thought of as shifting the decimal point, the decimal shift corresponding to the math operation is also shown.)

|    |  | math                       | decimal shift |
|----|--|----------------------------|---------------|
| 1  | 35 meters = <u>3,500</u> centimeters   | $35 \times 100 = 3,500$    | 2, right      |
| 2  | 120 milligrams = <u>0.12</u> grams     | $120 \div 1,000 = 0.12$    | 3, left       |
| 3  | 15 centimeters = <u>0.15</u> meters    | $15 \div 100 = 0.15$       | 2, left       |
| 4  | 3.4 grams = <u>3,400</u> milligrams    | $3.4 \times 1,000 = 3,400$ | 3, right      |
| 5  | 0.5 kilograms = <u>500</u> grams       | $0.5 \times 1,000 = 500$   | 3, right      |
| 6  | 21 centimeter = <u>2.1</u> decimeters  | $2.1 \div 10 = 2.1$        | 1, left       |
| 7  | 6,800 grams = <u>6.8</u> kilograms     | $6,800 \div 1,000 = 6.8$   | 3, left       |
| 8  | 10.4 centimeters = <u>0.104</u> meters | $10.4 \div 100 = 0.104$    | 2, left       |
| 9  | 0.03 grams = <u>3</u> centigrams       | $0.03 \times 100 = 3$      | 2, right      |
| 10 | 1,375 meters = <u>1.375</u> kilometers | $1,375 \div 1,000 = 1.375$ | 3, left       |
| 11 | 7 meters = <u>0.007</u> kilometers     | $7 \div 1,000 = 0.007$     | 3, left       |
| 12 | 8.5 milligrams = <u>0.0085</u> grams   | $8.5 \div 1,000 = 0.0085$  | 3, left       |