

Metric System Basics

Units of Length

Length and distance in the metric system are based on the standard unit called the *meter*. All other metric units for length and distance are multiples or submultiples of the meter. Some of the other metric units of length are shown below.

| Name | Abbreviation | Value |
|------------|--------------|--------------|
| kilometer | km | 1,000 meters |
| hectometer | hm | 100 meters |
| dekameter | dam | 10 meters |
| meter | m | 1 meter |
| decimeter | dm | .1 meter |
| centimeter | cm | .01 meter |
| millimeter | mm | .001 meter |

The metric system is based on the decimal system (base ten). When one unit of measure is compared to the next unit of measure in the metric system, it is 10 times more or 10 times less than the next unit. From this you can see that a meter is 10 times the length of a decimeter, 100 times the length of a centimeter, and 1,000 times the length of a millimeter (10 x 10 x 10).

$$1 \text{ kilometer (km)} = 10 \text{ hectometers (hm)}$$

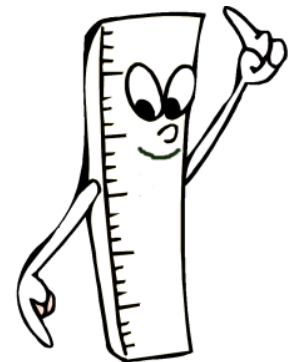
$$1 \text{ hectometer (hm)} = 10 \text{ dekameters (dam)}$$

$$1 \text{ dekameter (dam)} = 10 \text{ meters (m)}$$

$$1 \text{ meter (m)} = 10 \text{ decimeters (dm)}$$

$$1 \text{ decimeter (dm)} = 10 \text{ centimeters (cm)}$$

$$1 \text{ centimeter (cm)} = 10 \text{ millimeters (mm)}$$



Compared to a mile, how long is a kilometer (km)? Below are some of the U.S. units of length converted to metric units of length. This will give you an idea of how the metric units of length compare to the U.S. units of length.

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ foot} = 30.48 \text{ cm}$$

$$1 \text{ yard} = 0.9144 \text{ m}$$

$$1 \text{ mile} = 1.61 \text{ km}$$

Metric System Basics

Units of Length

Review page 1 and answer the questions below.

1. What is the base unit of measure for length in the metric system? _____
2. How many meters are there in one kilometer? _____
3. What number system is the metric system based on? _____
4. How many decimeters are there in one meter? _____
5. A decimeter is how many more times the length of a centimeter? _____
6. How many centimeters are in one meter? _____

Draw a line to match the abbreviation to the correct unit of measure.

| | |
|------------|-----|
| kilometer | mm |
| hectometer | cm |
| dekameter | dm |
| meter | m |
| decimeter | dam |
| centimeter | km |
| millimeter | hm |

Draw a line to match each value to the correct unit of measure.

| | |
|--------------|------------|
| 1,000 meters | centimeter |
| 100 meters | kilometer |
| 10 meters | decimeter |
| 1 meter | millimeter |
| .1 meter | dekameter |
| .01 meter | meter |
| .001 meter | hectometer |

Metric System Basics

Units of Volume

Volume in the metric system is based on the standard unit called the *liter*. All other metric units of volume are multiples or submultiples of the liter. Some of the other metric units of volume are shown below.

| Name | Abbreviation | Value |
|------------|--------------|--------------|
| kiloliter | kl or kL | 1,000 liters |
| hectoliter | hl or hL | 100 liters |
| dekaliter | dal or daL | 10 liters |
| liter | l or L | 1 liter |
| deciliter | dl or dL | .1 liter |
| centiliter | cl or cL | .01 liter |
| milliliter | ml or mL | .001 liter |

The metric system is based on the decimal system (base ten). When one unit of measure is compared to the next unit of measure in the metric system, it is 10 times more or 10 times less than the next unit. From this you can see that a liter is 10 times more than a deciliter, 100 times more than a centiliter, and 1,000 times the volume of a milliliter (10 x 10 x 10).

1 kiloliter (kl) = 10 hectoliters (hl)

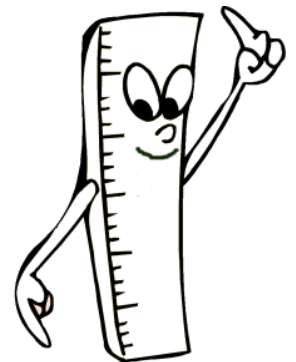
1 hectoliter (hl) = 10 dekaliters (dal)

1 dekaliter (dal) = 10 liter (l)

1 liter (l) = 10 deciliters (dl)

1 deciliter (dl) = 10 centiliters (cl)

1 centiliter (cl) = 10 milliliters (ml)



Compared to a gallon, how much is a liter (l)? Below are some of the U.S. units of volume converted to metric volumes. This will give you an idea of how the metric units compare to the U.S. units.

1 quart = .94 liter

1 gallon = 3.78 liter

1 ounce = 29.57 milliliter

1 pint = .47 liter

Metric System Basics

Units of Volume

Review page 3 and answer the questions below.

1. What is the base unit of measure for volume in the metric system? _____
2. How many milliliters are there in one liter? _____
3. What number system is the metric system based on? _____
4. How many deciliters are there in one liter? _____
5. A deciliter is how many more times the volume of a milliliter? _____
6. How many centiliters are in one liter? _____

Draw a line to match the abbreviation to the correct unit of measure.

| | |
|------------|-----|
| kiloliter | ml |
| hectoliter | cl |
| dekaliter | dl |
| liter | l |
| deciliter | dal |
| centiliter | kl |
| milliliter | hl |

Draw a line to match each value to the correct unit of measure.

| | |
|--------------|------------|
| 1,000 liters | centiliter |
| 100 liters | kiloliter |
| 10 liters | deciliter |
| 1 liter | milliliter |
| .1 liter | dekaliter |
| .01 liter | liter |
| .001 liter | hectoliter |

Metric System Basics

Units of Weight

Weight in the metric system is based on the standard unit called the *gram*. All other metric units of weight are multiples or submultiples of the gram. Some of the other metric units of weight are shown below.

| Name | Abbreviation | Value |
|-----------|--------------|-------------|
| kilogram | kg | 1,000 grams |
| hectogram | hg | 100 grams |
| dekagram | dag | 10 grams |
| gram | g | 1 gram |
| decigram | dg | .1 gram |
| centigram | cg | .01 gram |
| milligram | mg | .001 gram |

The metric system is based on the decimal system (base ten). When one unit of measure is compared to the next unit of measure in the metric system, it is 10 times more or 10 times less than the next unit. From this you can see that a gram is 10 times more than a decigram, 100 times more than a centigram, and 1,000 times more than a milligram (10 x 10 x 10).

$$1 \text{ kilogram (kg)} = 10 \text{ hectograms (hg)}$$

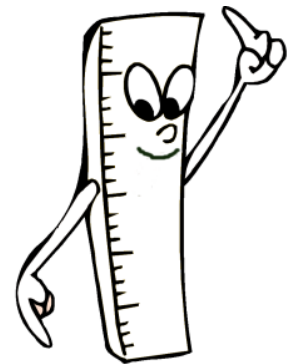
$$1 \text{ hectogram (hg)} = 10 \text{ dekagrams (dag)}$$

$$1 \text{ dekagram (dag)} = 10 \text{ grams (g)}$$

$$1 \text{ gram (g)} = 10 \text{ decigrams (dg)}$$

$$1 \text{ decigram (dg)} = 10 \text{ centigrams (cg)}$$

$$1 \text{ centigram (cg)} = 10 \text{ milligrams (mg)}$$



Compared to an ounce, how much is a gram (g)? Below are some of the U.S. units of weight converted to metric units of weight. This will give you an idea of how the metric units compare to the U.S. units.

$$1 \text{ ounce} = 28.349 \text{ grams} \quad 1 \text{ pound} = 453.592 \text{ grams} \quad 1 \text{ ton} = 907.184 \text{ kilograms (kg)}$$

Metric System Basics

Units of Weight

Review page 5 and answer the questions below.

1. What is the base unit of measure for weight in the metric system? _____
2. How many milligrams are there in one gram? _____
3. What number system is the metric system based on? _____
4. How many decigrams are there in one gram? _____
5. A decigram is how many more times the weight of a milligram? _____
6. How many centigrams are in one gram? _____

Draw a line to match the abbreviation to the correct unit of measure.

| | |
|-----------|-----|
| kilogram | mg |
| hectogram | cg |
| dekagram | dg |
| gram | g |
| decigram | dag |
| centigram | kg |
| milligram | hg |

Draw a line to match each value to the correct unit of measure.

| | |
|-------------|-----------|
| 1,000 grams | centigram |
| 100 grams | kilogram |
| 10 grams | decigram |
| 1 gram | milligram |
| .1 gram | dekagram |
| .01 gram | gram |
| .001 gram | hectogram |

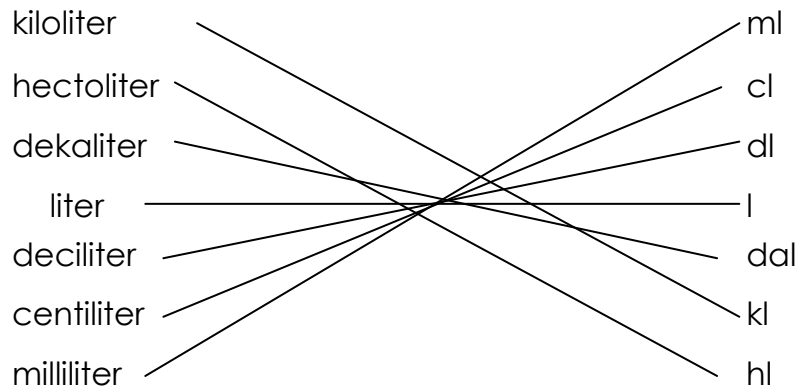
Metric System Basics

Units of Volume

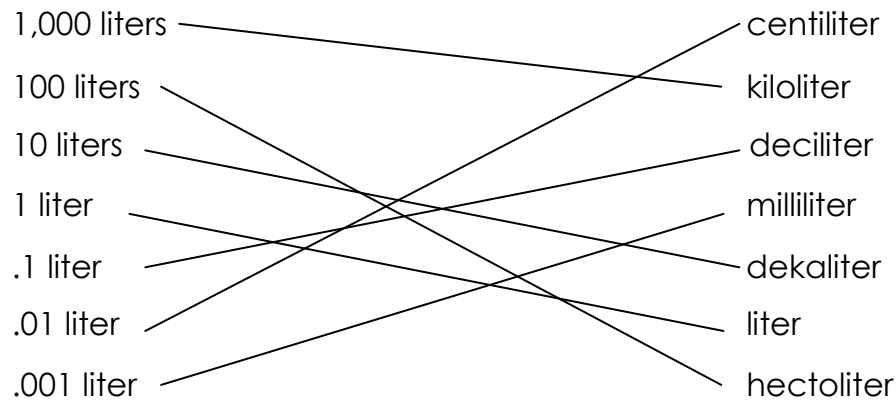
Review page 3 and answer the questions below.

1. What is the base unit of measure for volume in the metric system? **liter**
2. How many milliliters are there in one liter? **1,000**
3. What number system is the metric system based on? **decimal**
4. How many deciliters are there in one liter? **10**
5. A deciliter is how many more times the volume of a milliliter? **100**
6. How many centiliters are in one liter? **100**

Draw a line to match the abbreviation to the correct unit of measure.



Draw a line to match each value to the correct unit of measure.



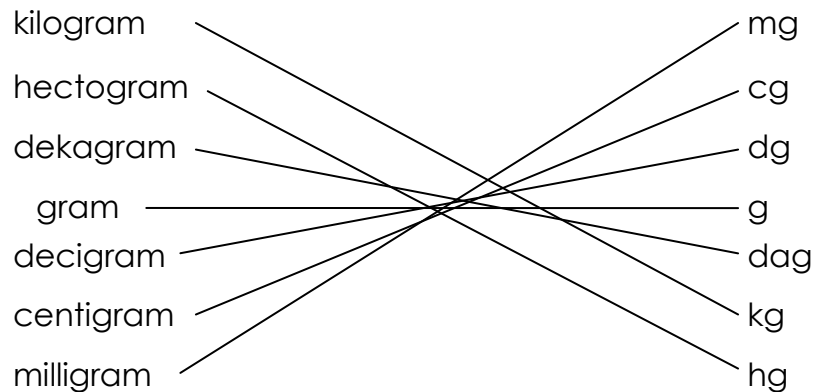
Metric System Basics

Units of Weight

Review page 5 and answer the questions below.

1. What is the base unit of measure for weight in the metric system? **gram**
2. How many milligrams are there in one gram? **1,000**
3. What number system is the metric system based on? **decimal**
4. How many decigrams are there in one gram? **10**
5. A decigram is how many more times the weight of a milligram? **100**
6. How many centigrams are in one gram? **100**

Draw a line to match the abbreviation to the correct unit of measure.



Draw a line to match each value to the correct unit of measure.

