

Warmup: $5,184,000$
 $86,400$

How many seconds are in
 a day?

$$\begin{array}{l}
 60 \text{ sec in minute} \\
 60 \text{ min in hour} \\
 24 \text{ hrs in day.} \\
 60 \times 60 = 3600 \text{ sec/hr} \\
 \quad \times 24 \\
 \hline
 \quad 86,400
 \end{array}$$

METRIC CONVERSION

**How to
convert
within
the
metric
system**



Do you remember...

**King
Henry?**



Learn the mnemonic:

**King Henry Died Unexpectedly
Drinking Chocolate Milk**



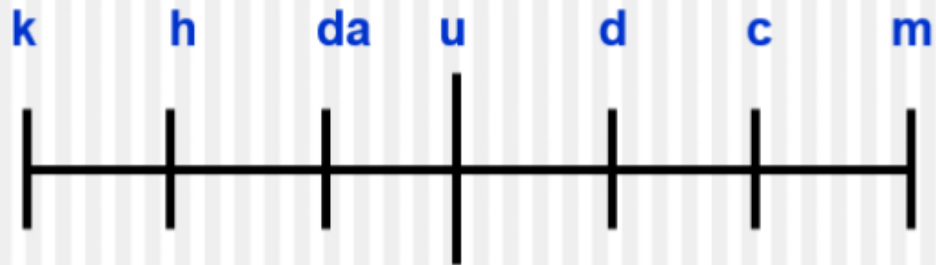
**Memorize
this!**

Metric Prefixes

Prefix	Symbol	Factor Number	Factor Word
kilo-	k	1000	Thousand
hecto	h	100	Hundred
deca	da or dk	10	Ten
unit	m, L, or g	1	One
deci	d	.1	Tenth
centi	c	.01	Hundredth
milli	m	.001	thousandth

Use the mnemonic:

Above the tick marks write the **first letter** for the words in the King Henry mnemonic:



RECALL: Metric Base Units

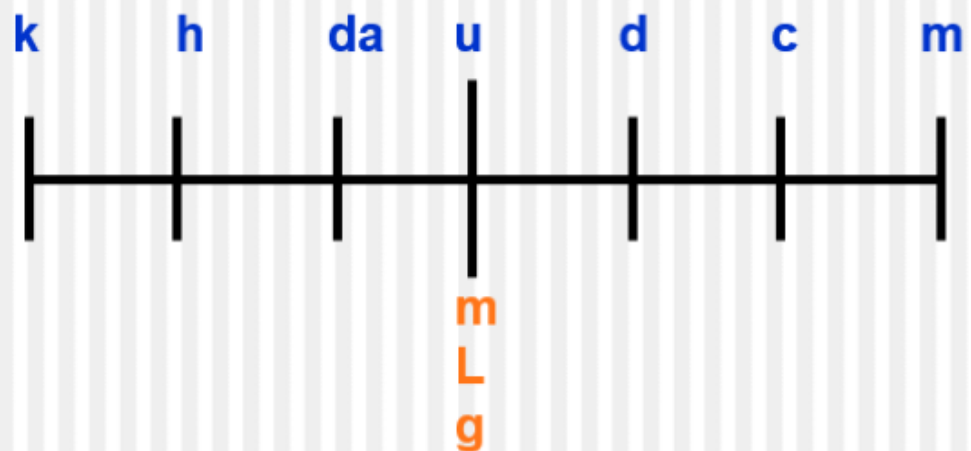
Meters are used to measure **length** and **distance**.

Liters are used to measure **volume** or the **capacity** of an object.

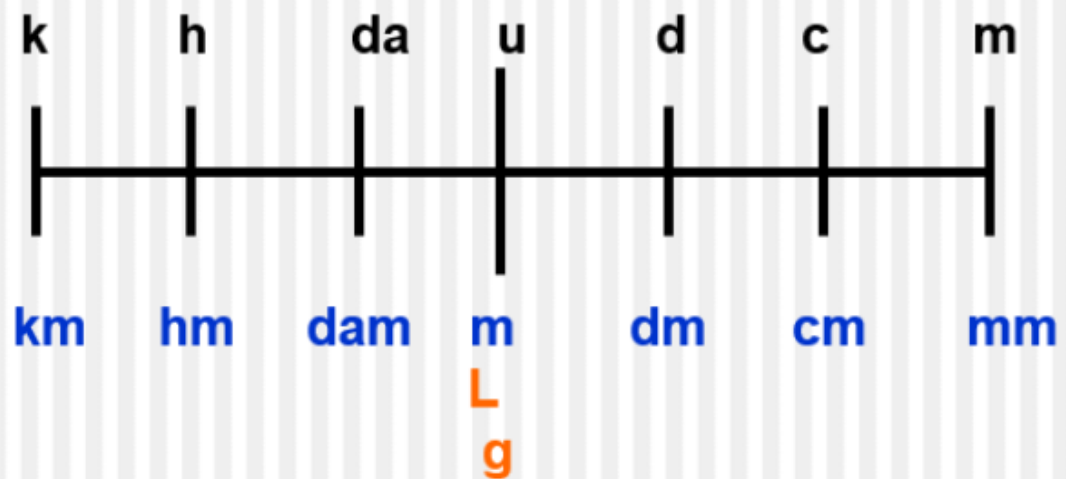
Grams are used to measure **mass** or the **weight** of an object.

Use the mnemonic:

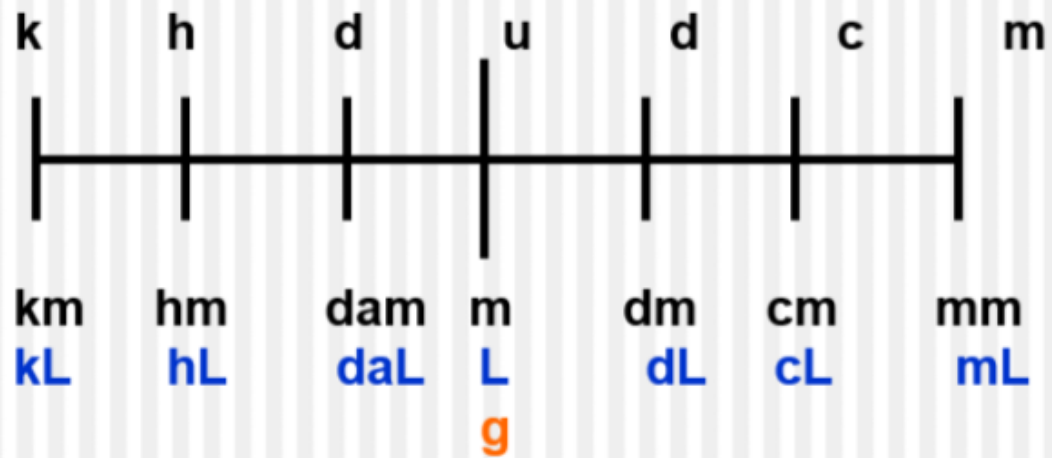
Write the units in the middle **under** the “U”.



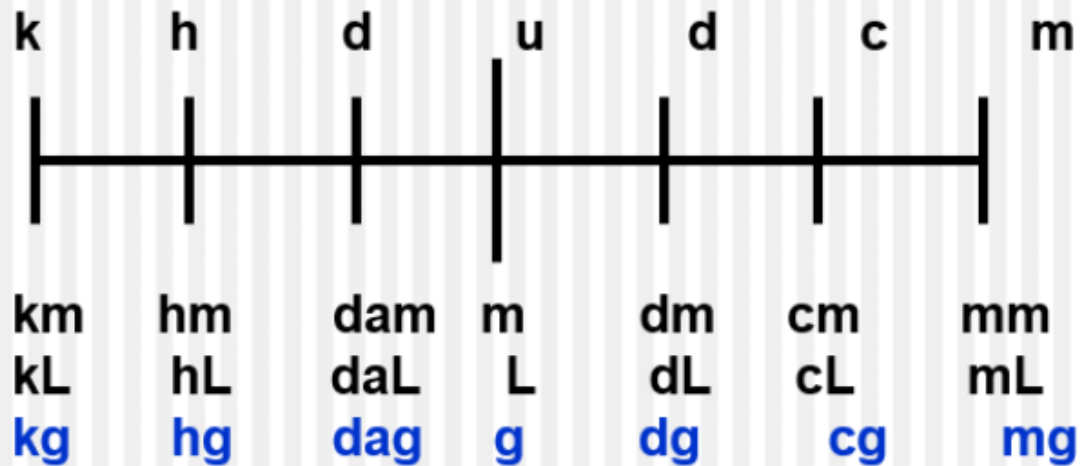
Let's add the meter line:



Let's add the **Liter** line:



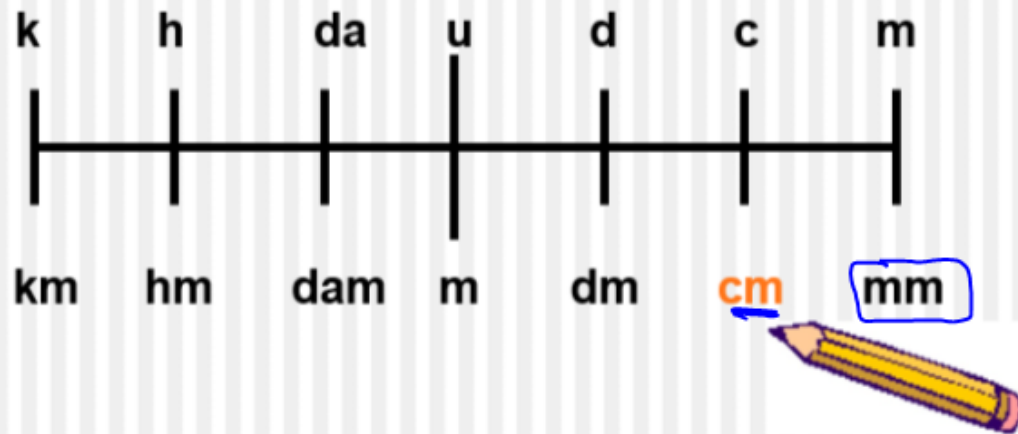
Let's add the gram line:



Example #1:

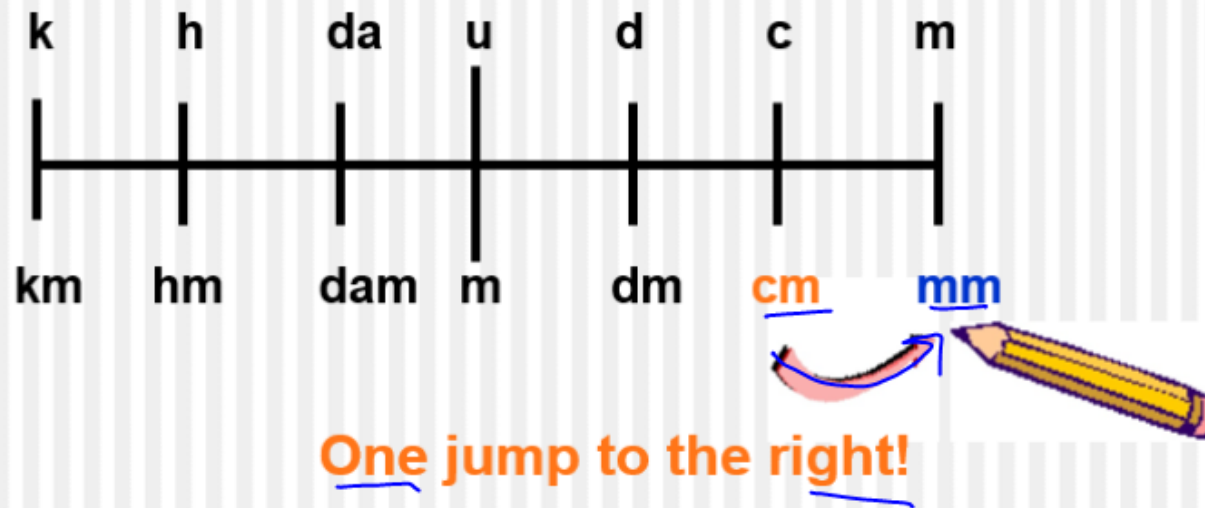
$$56 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$$

Look at the unit given in the problem. **56 cm**
Put your pencil on **that unit**.



Example #1: $56\text{ cm} = \underline{\hspace{2cm}}\text{ mm}$

Move to new unit, counting **jumps** and noticing the **direction** of the jump!



Example #1: 56 cm = _____ mm

Move **decimal** in original number the same # of **spaces** and in the same **direction**.



Move **decimal** one jump to the right.
Add a **zero** as a placeholder.

Example #1:

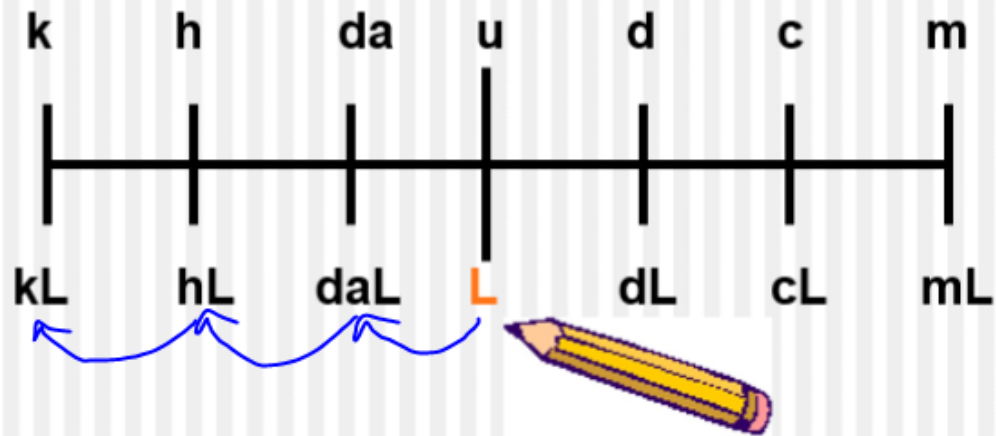
$$56 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$$

$$56 \text{ cm} = 560 \text{ mm}$$

Example #2:

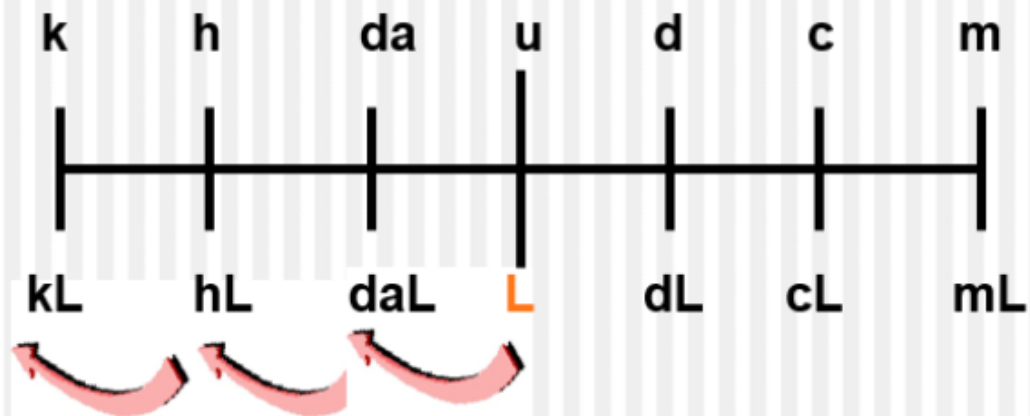
$$7.25 \text{ L} = \underline{\quad} \text{ kL}$$

Look at the unit that has a number. **7.25 L**
Put your pencil on **that unit**.



Example #2: $7.25 \text{ L} = \underline{\hspace{2cm}} \text{ kL}$

Move to new unit, counting **jumps** and noticing the **direction** of the jump!



Three jumps to the left!

Example #2: $7.25 \text{ L} = \underline{\hspace{2cm}} \text{ kL}$

Move **decimal** in original number the same # of **spaces** and in the same **direction**.

$$7.25 \text{ L} = \underline{\hspace{2cm}} \text{ kL}$$



.007.25

Three jumps
to the left!



Move **decimal** to the left three jumps.
Add two **zeros** as placeholders.

Example #2:

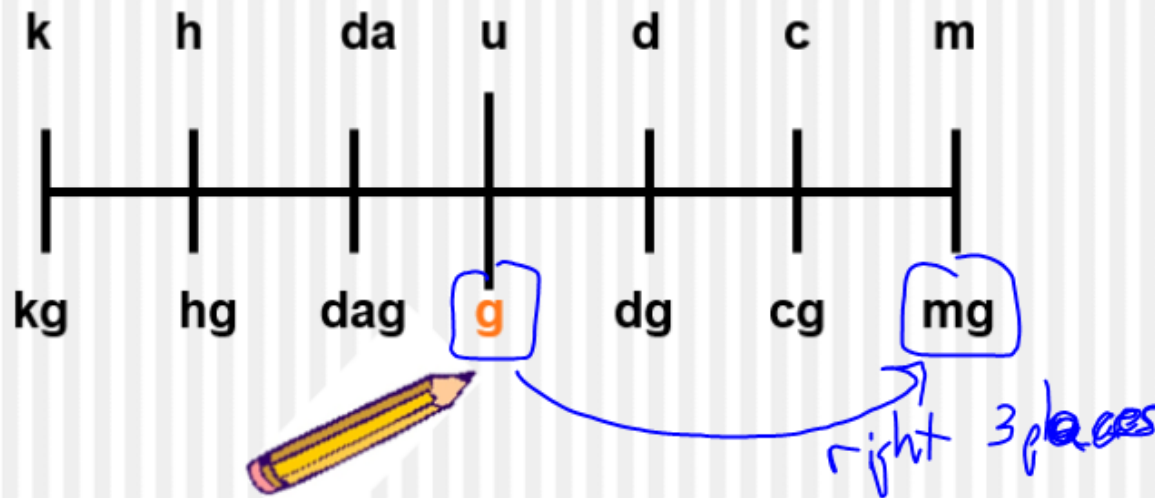
$$7.25 \text{ L} = \underline{\quad} \text{ kL}$$

$$7.25 \text{ L} = 0.00725 \text{ kL}$$

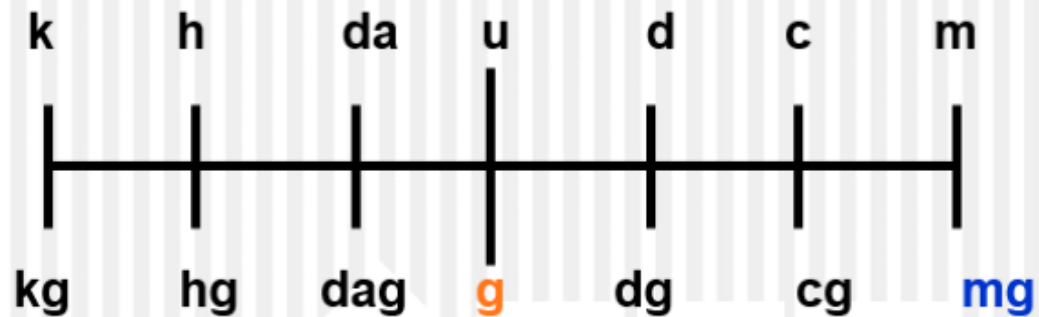
Example #3:

Try this problem on your own:

$$45,000 \text{ g} = \underline{\hspace{2cm}} \text{ mg}$$



Example #3: 45,000 g = _____ mg



Three jumps to the right!

45,000.000.

Three red curved arrows pointing from the decimal point to the right, indicating the movement of the decimal point three places to the right.

Example #3:

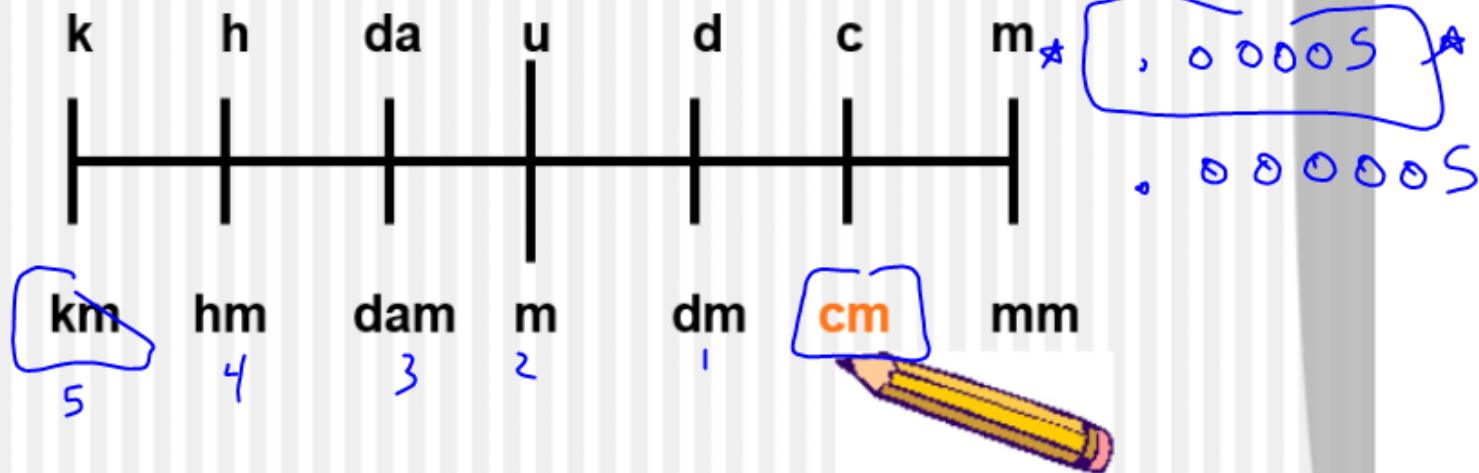
$$45,000 \text{ g} = \underline{45,000,000} \text{ mg}$$

Three jumps to the right!

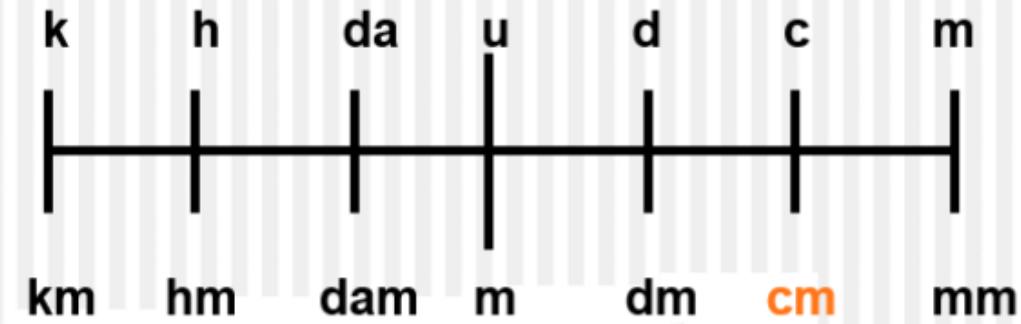
Example #4:

Try this problem on your own

$$5 \text{ cm} = \text{--- km}$$



Example #4: $5 \text{ cm} = \underline{\hspace{2cm}} \text{ km}$



Five jumps to the left!

.00005.

Example #4:

$$5 \text{ cm} = 0.00005 \text{ km}$$

Five jumps to the left!

One last caution:

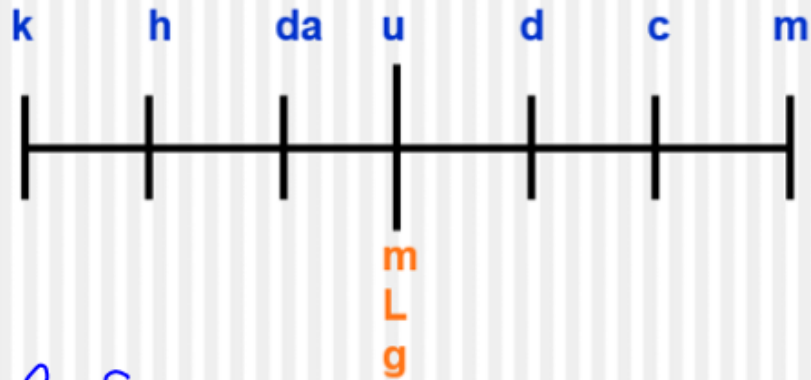
Be careful **NOT** to count the spot you start from, where you put your pencil point.

Only count the jumps!



Examples #5-9:

Try these on your own.

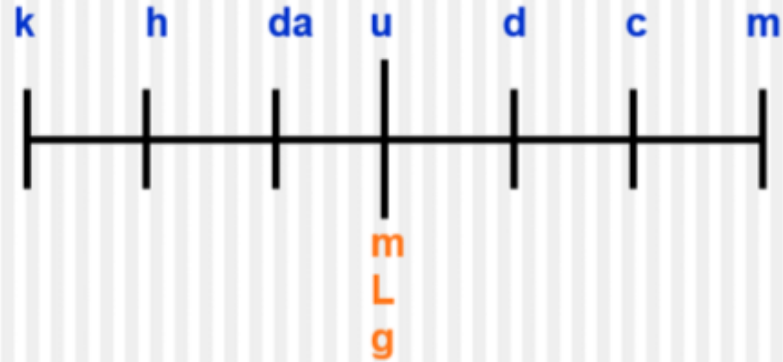


(5) 35 mm = 3.5 cm

(6) 14,443 L = 14.443 kL

(7) 0.00056 kg = .56 g

Examples #5-9: Try these on your own.



(8) 35,400 mL = 35.4 L

(9) .000016 km = 16 mm

English Unit Conversions

- **Common Length Conversion Factors**
 - **5280 ft = 1 mile**
 - **12 in = 1 ft**
 - **3 ft = 1 yard**

Example 10: Convert 2 miles to ft

- 5280 ft = 1 mile
- 12 in = 1 ft
- 3 ft = 1 yard

$$\begin{array}{c}
 \begin{array}{|c|} \hline 2 \text{ (mi)} \\ \hline \end{array} \xrightarrow{\times} \begin{array}{|c|} \hline 5280 \text{ (ft)} \\ \hline \end{array} \\
 \hline
 \begin{array}{|c|} \hline 1 \\ \hline \end{array} \xrightarrow{\quad} \begin{array}{|c|} \hline 1 \text{ (mi)} \\ \hline \end{array}
 \end{array}
 = \frac{10,560}{1} \text{ ft} = 10,560 \text{ ft}$$

$$\frac{2}{1} \times \frac{3}{4} = \frac{6}{4} \quad \left(\frac{3}{2} \right)$$

$$\frac{\overset{1}{\cancel{2}} \cdot 3}{1 \cdot \cancel{4} 2} = \frac{\overset{1}{\cancel{2}} 3}{1 \cdot \cancel{2} 2}$$

Example 11: Convert 7.5 yd to in

- **5280 ft = 1 mile**
- **12 in = 1 ft**
- **3 ft = 1 yard**

$$\begin{array}{|c|c|c|}
 \hline
 7.5 \cancel{\text{yd}} & 3 \cancel{\text{ft}} & 12 \text{ in} \\
 \hline
 1 & 1 \cancel{\text{yd}} & 1 \cancel{\text{ft}} \\
 \hline
 \end{array}
 = \frac{270}{1} \text{ in} = 270 \text{ in}$$

English Unit Conversions

- **Common Weight Conversion Factors**
 - 16 oz = 1 pound
 - 2000 lb = 1 ton

Example 12: Convert 9000 lb to tons

- Common Weight Conversion Factors

- 16 oz = 1 pound

- 2000 lb = 1 ton

$$\begin{array}{c|c}
 9000 \text{ lb} & 1 \text{ ton} \\
 \hline
 1 & 2000 \text{ lb}
 \end{array}
 = \frac{9000}{2000} \text{ tons} = 4.5 \text{ tons}$$

The diagram shows a conversion factor table with a blue arrow pointing from the top-left cell to the top-right cell. The result 4.5 tons is circled in blue.

English Unit Conversions

- **Common Volume Conversion Factors**

- 8 oz = 1 cup
- 2 cups = 1 pint
- 2 pints = 1 quart
- 4 quarts = 1 gallon

Example 13: Convert 3 quarts to pints

- Common Volume Conversion Factors

- 8 oz = 1 cup

- 2 cups = 1 pint

- 2 pints = 1 quart

- 4 quarts = 1 gallon

3 qt	2 pints	=	6 pints
1	1 qt		

English Unit Conversions

- **Common Time Conversion Factors**

- 60 sec = 1 minute
- 60 min = 1 hour
- 24 hr = 1 day
- 7 days = 1 week
- 52 weeks = 1 year
- 12 months = 1 year

Example 14: Convert 3 days to minutes

• Common Time Conversion Factors

- 60 sec = 1 minute
- 60 min = 1 hour
- 24 hr = 1 day
- 7 days = 1 week
- 52 weeks = 1 year
- 12 months = 1 year

$$\begin{array}{c|c|c|c}
 \cancel{3 \text{ days}} & \cancel{24 \text{ hrs}} & \cancel{60 \text{ min}} & \\
 \hline
 1 & \cancel{1 \text{ day}} & \cancel{1 \text{ hr}} & = 11,320 \text{ min}
 \end{array}$$

Examples #15-20:

Try these on your own.

(15) 16 pts = 2 gal

(16) 24,000 lb = 12 T

(17) 4.5 days = 108 hr

▪ 16 oz = 1 pound

▪ 2000 lb = 1 ton

▪ 5280 ft = 1 mile

▪ 12 in = 1 ft

▪ 3 ft = 1 yard

▪ 8 oz = 1 cup

▪ 2 cups = 1 pint

▪ 2 pints = 1 quart

▪ 4 quarts = 1 gallon

▪ 60 sec = 1 minute

▪ 60 min = 1 hour

▪ 24 hr = 1 day

▪ 7 days = 1 week

▪ 52 weeks = 1 year

▪ 12 months = 1 year

Examples #15-20:

Try these on your own.

(18) 5 miles = 26,400 ft

(19) 504 hr = 3 weeks

(20) 17 cups = 8.5 pt

- 8 oz = 1 cup
- 2 cups = 1 pint
- 2 pints = 1 quart
- 4 quarts = 1 gallon

- 60 sec = 1 minute
- 60 min = 1 hour
- 24 hr = 1 day
- 7 days = 1 week
- 52 weeks = 1 year
- 12 months = 1 year

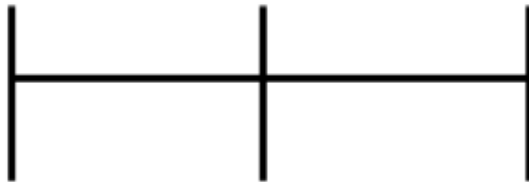
- 16 oz = 1 pound
- 2000 lb = 1 ton

- 5280 ft = 1 mile
- 12 in = 1 ft
- 3 ft = 1 yard

Length	Weight	Volume	Time
12 inches = 1 foot	16 ounces = 1 pound	2 cups = 1 pint	60 seconds = 1 minute
3 feet = 1 yard	2000 pounds = 1 ton	2 pints = 1 quart	60 minutes = 1 hour
5,280 feet = 1 mile		4 quarts = 1 gallon	24 hours = 1 day
1,760 yard = 1 mile			7 days = 1 week
			52 weeks = 1 year

21. I biked 8.5 miles and my friend biked 36,960 ft. Who biked the **longer** distance?

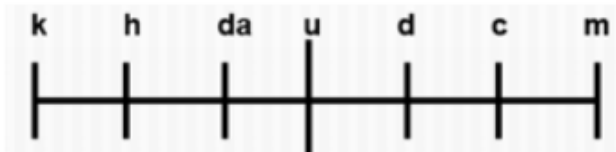
Prove your answer:



Length	Weight	Volume	Time
12 inches = 1 foot	16 ounces = 1 pound	2 cups = 1 pint	60 seconds = 1 minute
3 feet = 1 yard	2000 pounds = 1 ton	2 pints = 1 quart	60 minutes = 1 hour
5,280 feet = 1 mile		4 quarts = 1 gallon	24 hours = 1 day
1,760 yard = 1 mile			7 days = 1 week
			52 weeks = 1 year

22. I need 4 m of cloth to make a blue blanket and 360 cm to make a red blanket. Which blanket is **shorter**?

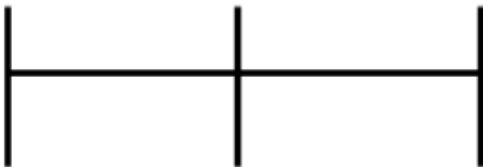
Prove your answer:



Length	Weight	Volume	Time
12 inches = 1 foot	16 ounces = 1 pound	2 cups = 1 pint	60 seconds = 1 minute
3 feet = 1 yard	2000 pounds = 1 ton	2 pints = 1 quart	60 minutes = 1 hour
5,280 feet = 1 mile		4 quarts = 1 gallon	24 hours = 1 day
1,760 yard = 1 mile			7 days = 1 week
			52 weeks = 1 year

23. In June my air conditioner ran for a total of 156 hours. In July my air conditioner ran for 6.5 days. Was my bill the **same** for each month?

Prove your answer:



HW #1: Dimensional Analysis