

**Bell ringer- Take out your
POE/Doing Science
worksheet from
yesterday.**

Take a min or two to look over/ finish either
side.

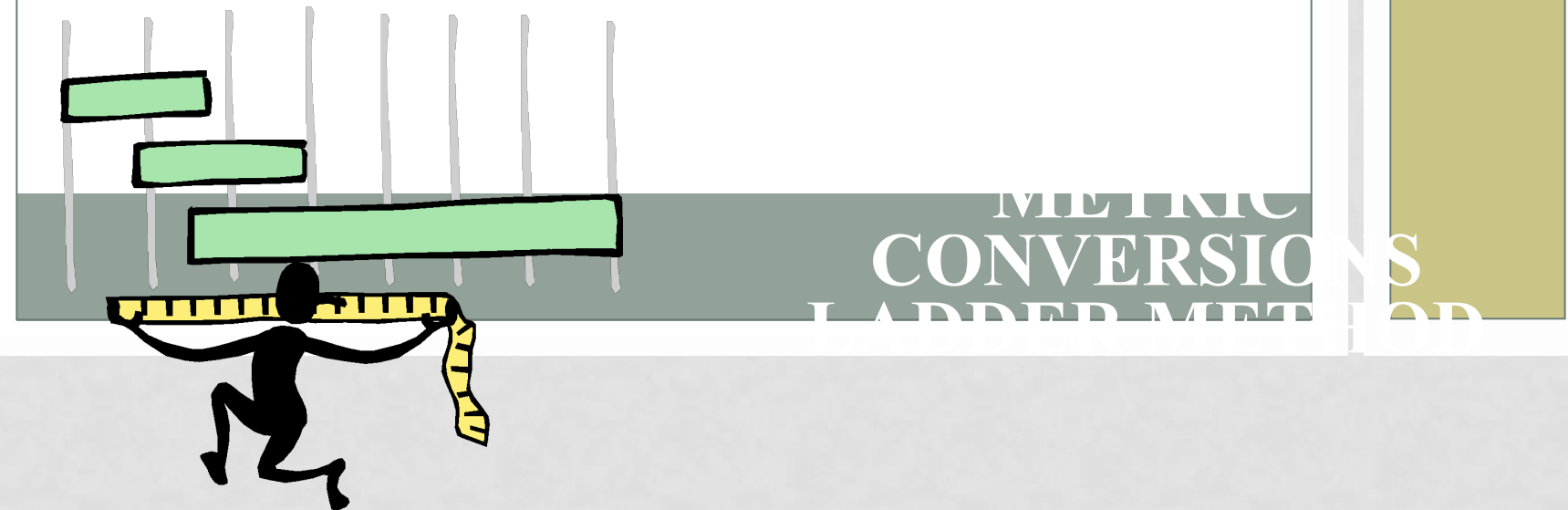
Explain

The pressure of the air is pushing the egg inside. Before the burning paper was put into the bottle, the pressure of the air inside the bottle was the same as outside the bottle. The burning paper, however, heats the air inside the bottle. This causes the air inside to expand. When the egg is placed on top of the bottle, it seals the bottle, and the fire eventually goes out. When the fire goes out, the air inside the bottle cools. As it cools, the air contracts, and the pressure of the air inside the bottle becomes less than the pressure outside. Then, the higher outside pressure pushes the egg into the bottle!

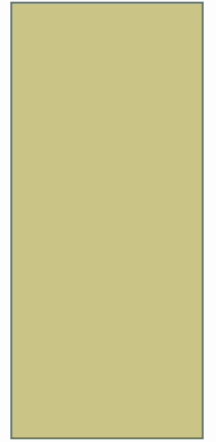
TODAY'S OBJECTIVES

- Review metric conversions using the shortcut or ladder method
- Memorize an acronym to help with metric conversions
- Practice metric conversions

Metric Mania



1. Why do we measure?
2. What do we measure?
3. What tools do we use/ have we used to measure?



TWO MAIN SYSTEMS OF MEASUREMENT IN THE US

Metric System

- Based on the number 10
 - **Length: meter**
 - **Volume: liter**
 - **Mass: gram**

U.S. Customary System (old English System)

- Based on halving or doubling units
 - **Length: foot**
 - **Volume: gallon**
 - **Weight: pound**

BACKGROUND – UNITED STATES

- The U. S. **has** switched to Metric for
 - Sporting Events - Olympics
 - Military
 - Medicine
 - The scientific community has already long used the metric system

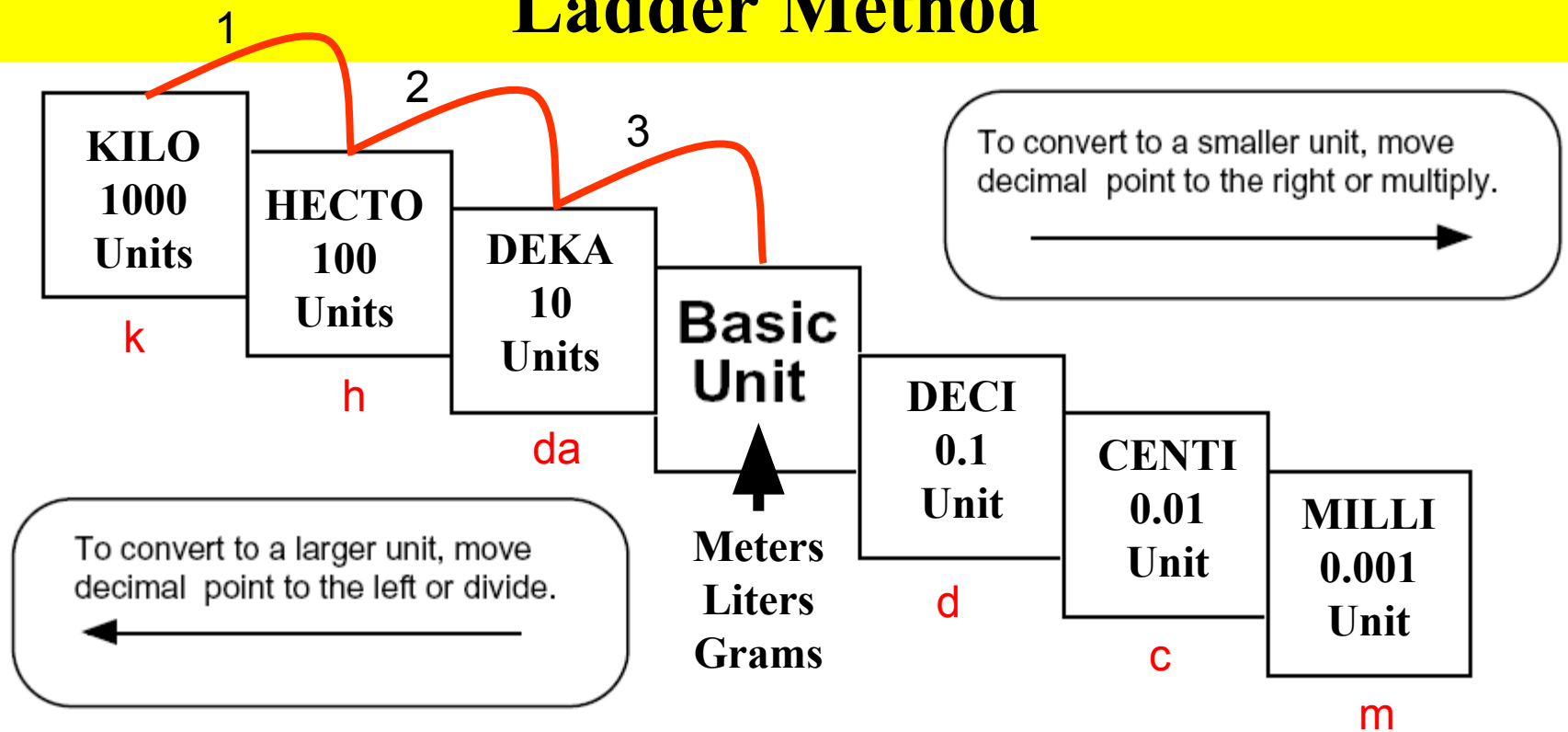
CONVERTING BETWEEN METRIC UNITS

Bigger units			BASIC UNITS			Smaller units					
Tera	giga	kilo	hecto	deka	m	deci	centi	milli	micro	nano	pico
T	G	k	h	da	L	d	c	m	u	n	p
10^{12}	10^9	10^3	10^2	10^1	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}	10^{-12}	
		1000	100	10		0.1	0.01	0.001			
					g						

Design a pneumonic device to help you remember metric prefixes

<https://www.youtube.com/watch?v=XS-8FCqYo5M>

Ladder Method



How do you use the “ladder” method?

1st – Determine your starting point.

2nd – Count the “jumps” to your ending point.

3rd – Move the decimal the same number of jumps in the same direction.

$$4 \text{ km} = \underline{\hspace{2cm}} \text{ m}$$

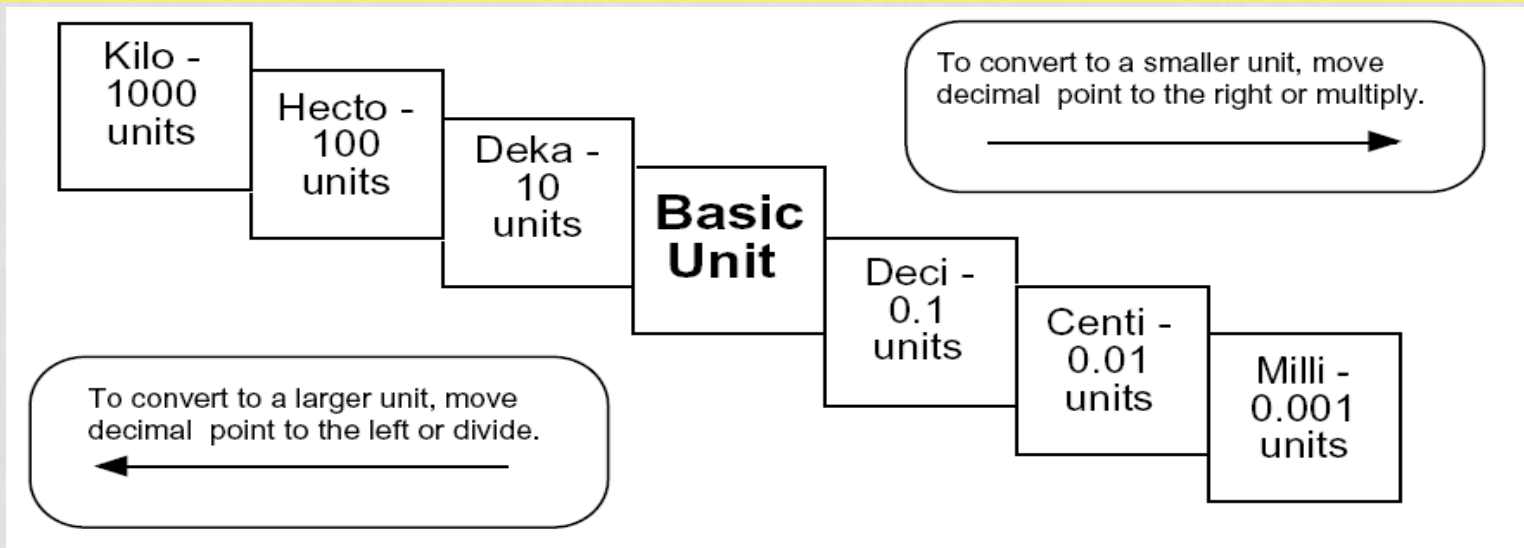
Starting Point Ending Point

How many jumps does it take?

$$4.\underline{\hspace{0.5cm}}\underline{\hspace{0.5cm}}\underline{\hspace{0.5cm}} = 4000 \text{ m}$$

1 2 3

Conversion Practice



Try these conversions using the ladder method.

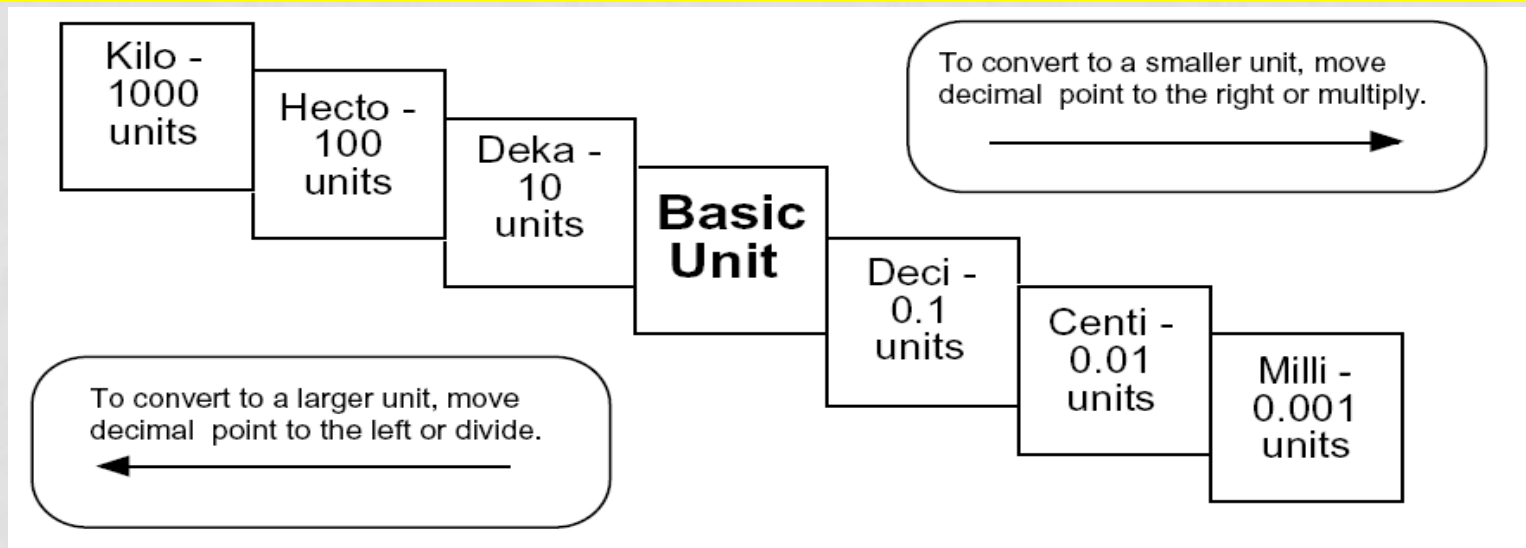
1000 mg = _____ g 1 L = _____ mL 160 cm = _____ mm

14 km = _____ m 109 g = _____ kg 250 m = _____ km

Compare using <, >, or =.

56 cm (6 m) 7 g 698 mg ()

Conversion Practice



Try these conversions using the ladder method.

$1000 \text{ mg} = \mathbf{1 \text{ g}}$

$1 \text{ L} = \mathbf{1000 \text{ mL}}$

$160 \text{ cm} = \mathbf{1600 \text{ mm}}$

$14 \text{ km} = \mathbf{14,000 \text{ m}}$

$109 \text{ g} = \mathbf{.109 \text{ kg}}$

$250 \text{ m} = \mathbf{.25 \text{ km}}$

Compare using $<$, $>$, or $=$.

$56 \text{ cm} \text{ (} < \text{)} 6 \text{ m}$

$7 \text{ g} \text{ (} > \text{)} 698 \text{ mg}$

Metric Conversion Challenge

Write the correct abbreviation for each metric unit.

- 1) Kilogram _____ 4) Milliliter _____ 7) Kilometer _____
2) Meter _____ 5) Millimeter _____ 8) Centimeter _____
3) Gram _____ 6) Liter _____ 9) Milligram _____

Try these conversions, using the ladder method.

- 10) 2000 mg = _____ g 15) 5 L = _____ mL 20) 16 cm = _____ mm
11) 104 km = _____ m 16) 198 g = _____ kg 21) 2500 m = _____ km
12) 480 cm = _____ m 17) 75 mL = _____ L 22) 65 g = _____ mg
13) 5.6 kg = _____ g 18) 50 cm = _____ m 23) 6.3 cm = _____ mm
14) 8 mm = _____ cm 19) 5.6 m = _____ cm 24) 120 mg = _____ g

Metric Conversion Challenge

OPENER: Start checking your homework. Circle problems you have questions about

1) Kilogram **kg**

4) Milliliter **mL**

7) Kilometer **km**

2) Meter **m**

5) Millimeter **mm**

8) Centimeter **cm**

3) Gram **g**

6) Liter **L**

9) Milligram **mg**

Try these conversions, using the ladder method.

10) 2000 mg = **2 g**

15) 5 L = **5000 mL**

20) 16 cm = **160 mm**

11) 104 km = **104,000 m**

16) 198 g = **.198 kg**

21) 2500 m = **2.5 km**

12) 480 cm = **4.8 m**

17) 75 mL = **.075 L**

22) 65 g = **65,000 mg**

13) 5.6 kg = **5600 g**

18) 50 cm = **.5 m**

23) 6.3 cm = **63 mm**

14) 8 mm = **.8 cm**

19) 5.6 m = **560 cm**

24) 120 mg = **.12 g**

Compare using <, >, or =.

25) 63 cm 6 m 27) 5 g 508 mg 29) 1,500 mL 1.5 L

26) 536 cm 53.6 dm 28) 43 mg 5 g 30) 3.6 m 36 cm

Compare using <, >, or =.

25) 63 cm 6 m 27) 5 g 508 mg 29) 1,500 mL 1.5 L

26) 536 cm 53.6 dm 28) 43 mg 5 g 30) 3.6 m 36 cm

MEASURING WORKSHEET #3

- 1a. 10 km 1b. 6 km
- 2a. 8,000mL 2b. 900 cm
- 3a. 2,000g 3b. 6L
- 4a. 4000 m 4b. 7kg
- 5a. 5kg 5b. 9km
- 6a. 2cm 6b. 2L
- 7a. 8cm 7b. 2km
- 8a. 9000mL 8b. 10kg
- 9a. 6m 9b. 1km
- 10a. 1kg 10b. 4m

METRIC FILM 1975

- In the 1970's there was an effort to officially adopt the metric system in the US
- 70s metric film <https://www.youtube.com/watch?v=SYn5UJ76h1Y>

BACKGROUND – WORLD WIDE

- **What countries besides the U.S. have not adopted the metric system?**
 - For a country to switch to metric is a process that happens over time. Only 3 countries in the world, have not officially adopted metric as their primary system of measuring.

BACKGROUND – WORLD WIDE



Three countries have not officially adopted the International System of Units as their primary or sole system of measurement: Liberia, Myanmar, and the United States.

METRIC RAP

- <https://www.youtube.com/watch?v=lhtgKHYZti0>
- **Metric Review Tutorial**
- <https://www.youtube.com/watch?v=UyDMwnkeAwQ>

ENGLISH OR METRIC?

- Quart
- meter
- Ounce
- Inch
- kilometer
- Mile
- liter
- Foot
- kilogram

Bell ringer- What is the tallest building in the world? Where is it located?

Burj Khalifa in Dubai, United Arab Emirates (which rises 828 metres (2,717 ft))

How many cm?

How many Kilometers?

A new tower is going to be finish in 2019 that will be 105,000cm tall. Will it be taller or shorter than Burj Khalifa?

Tower challenge

- Build the tallest **freestanding** tower out of 8 straws and two marshmallows.
- To complete the challenge you must list the final measurement of your tower in all metric units.

Bill Nye metric

[https://www.youtube.com/watch?
v=MekxJse2vgs](https://www.youtube.com/watch?v=MekxJse2vgs)