Certified Metrication Specialist Program.

(Part 2 – South Carolina)

USMA CMS Chair

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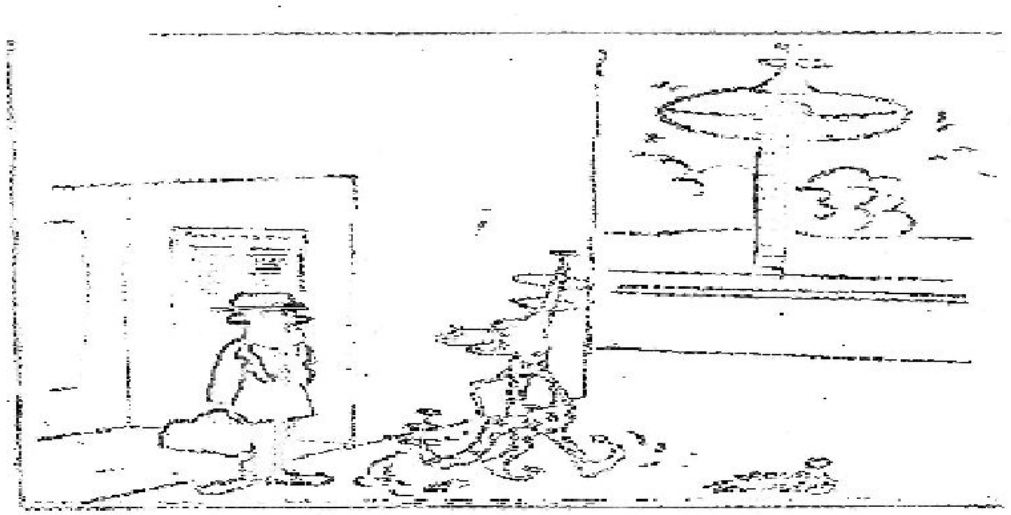

"Never mind taking me to your leader!
If your country hasn't gone metric yet,
we won't be able to do business anyway."

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The Dog

What is the name of this dog?

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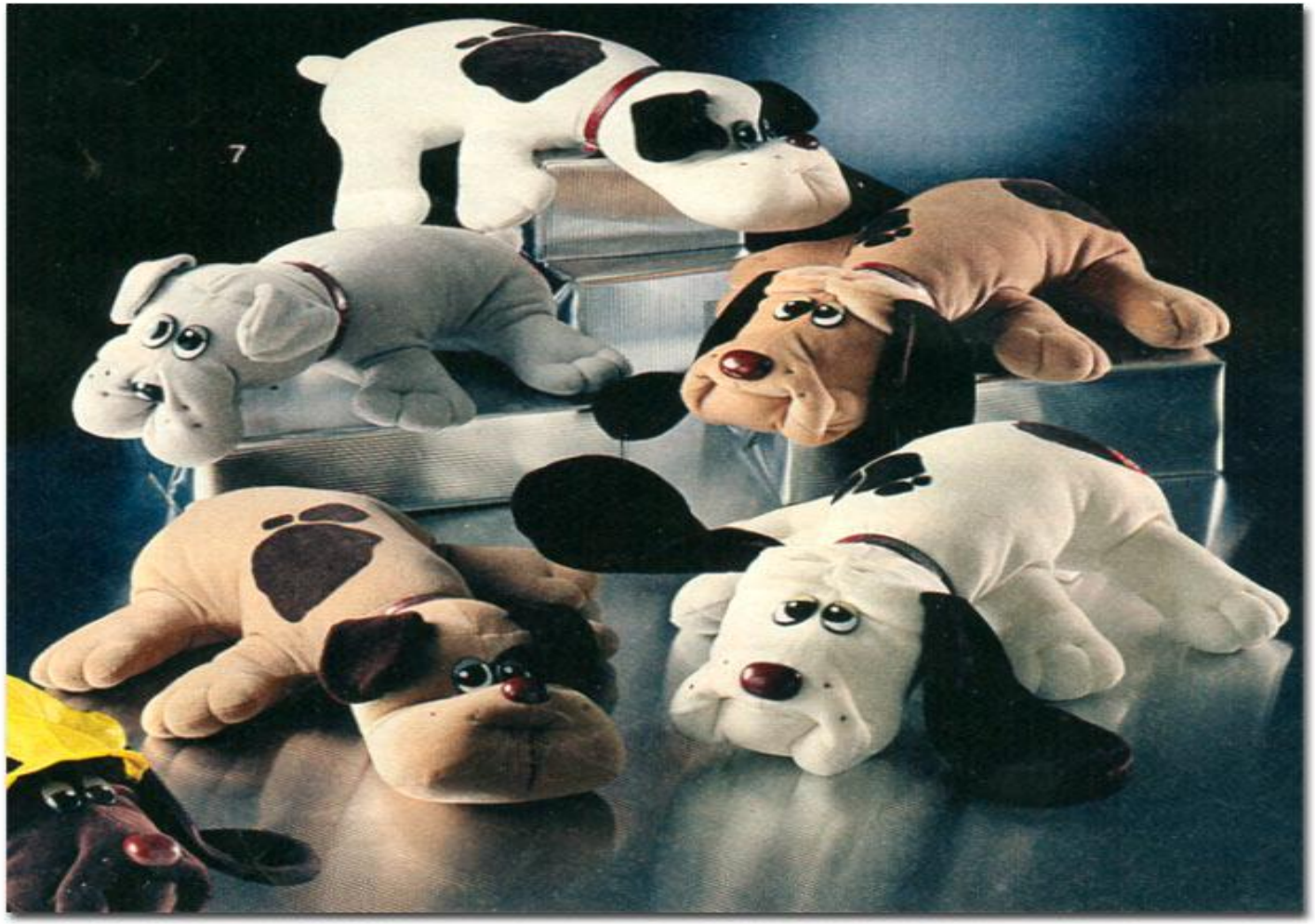
Answer! Pound Puppy



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What will be the name of this dog after the United States completely adopts the Metric System?

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Answer:

Kilogram Puppy

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What good will this do the dog?

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Hurray! No More Pound

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What good will this do the dog?

Answer:
As soon as we adopt the metric system there will be no more pound and this dog will not be homeless anymore

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The Metric System

Advantages of Teaching the Metric System

Graduations on a Metric ruler:

Conceptually much simpler

It is used in nanotechology

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The American Association for the Advancement of Science mentioned an additional intangible benefit…

Children learn Metric more readily

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It has been found that slower children **learn metric more readily** than they do the customary system—a factor that could not possibly be expressed in monetary terms

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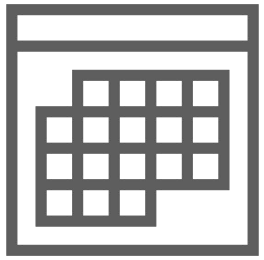
Time Could be Saved:



6 months to 2 years

of elementary arithmetic could be eliminated with the adoption of Metric

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Key Teaching Point

"Never convert between the customary system and the metric system"

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The most common used metric units are:

Length	Area	Mass	Volume	Capacity
mm	cm^2	mg	mm^3	mL
cm	m^2	g	cm^3	L
dm	dm^2	kg	dm^3	
km	hm^2	t	m^3	

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Other prefixes that are now in common use are:

mega (M) 10^{6}; (one million)

giga (G) 10^{9}; (one billion)

tera (T) 10^{12}; (one trillion) and

micro (μ) 10^{-6}; (one millionth);

nano (n) 10^{-9}; (one billionth);

pico (p) 10^{-12}; (one trillionth) pronounced “Peek-oh”

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The Interrelationship between Mass, Length, & Volume in the Metric System

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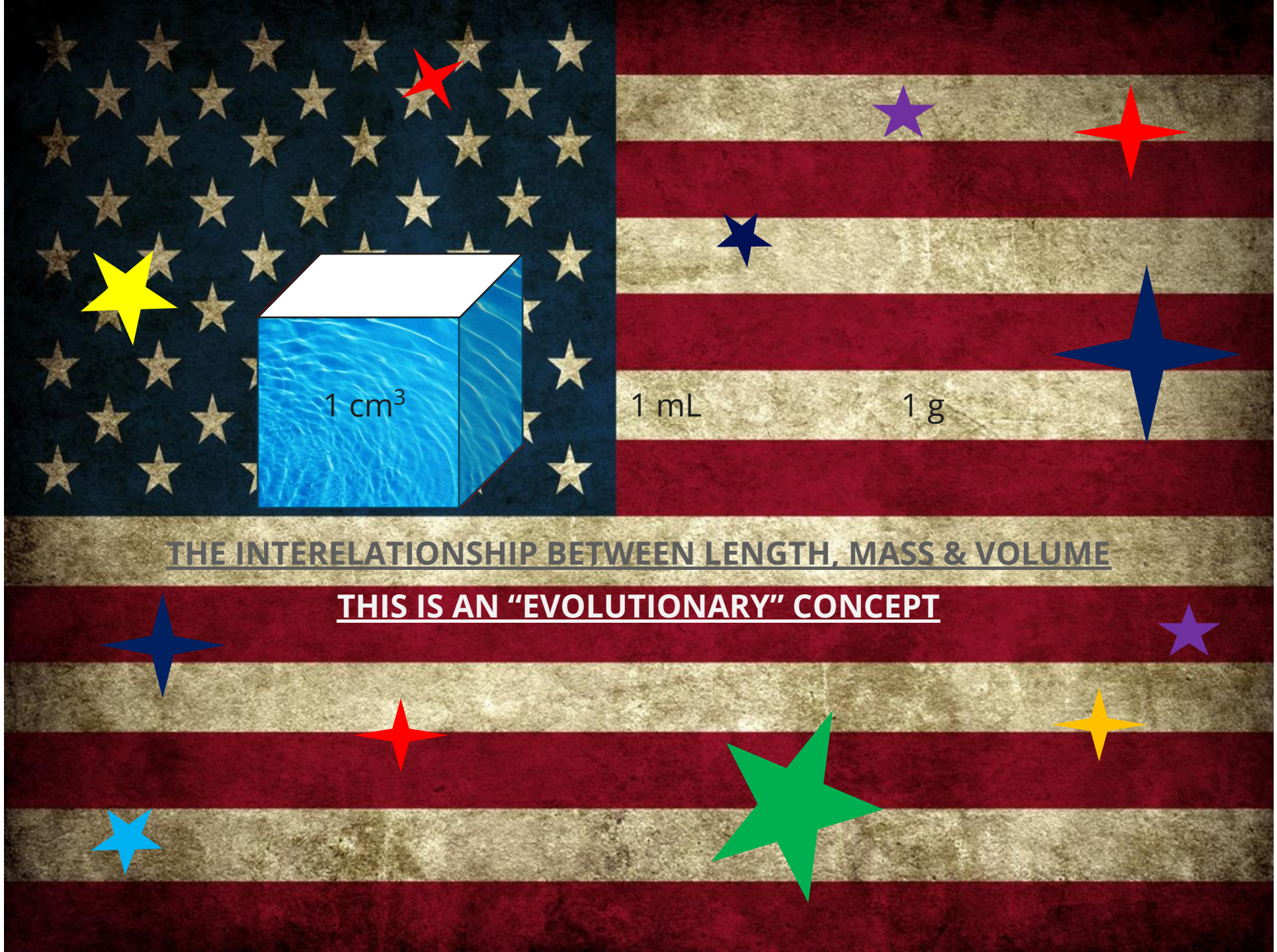

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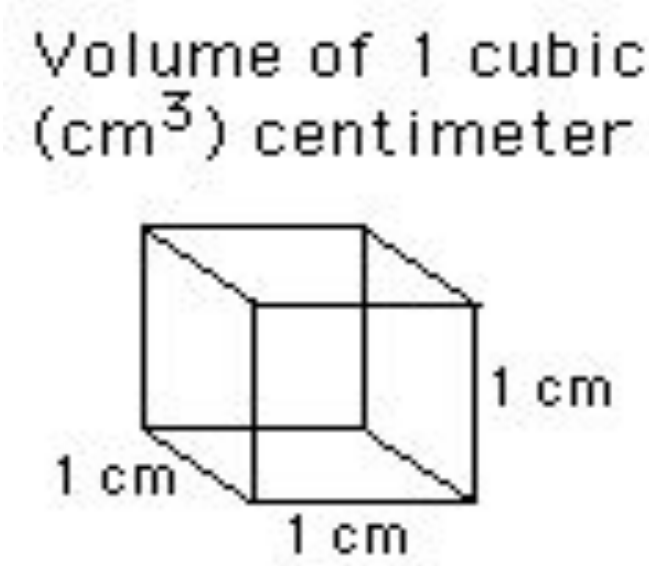
one gram is the mass of H_20 in a cm^3



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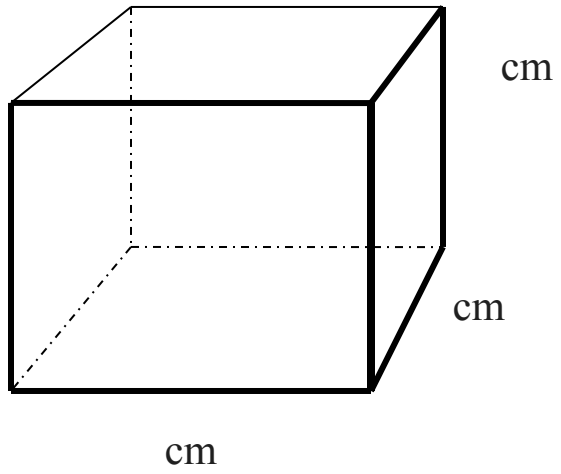
One cm^3 of Water = One milliliter mL



So each mL of water has a mass of 1 g

One Liter (1 L = 1000 mL)

So 1 liter full of water has a mass of 1000 g or 1 kg

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The Seven Basic Units in the Metric System

The Magnificent Seven

1. Length **Meter m**
2. Time **Second s**
3. Electric Current **Ampere A**
4. Luminous Intensity **Candela cd**
5. Temperature Kelvin K or **Celsius °C**
6. Mass **Kilogram kg**
7. Amount of Substance **Mole mol**

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All other units are derived from the Magnificent Seven

Examples:

Speed is meter per second (m/s)

Acceleration is the meter per second per second (m/s^2)

Area is square meter (m^2)

Volume is the cubic meter (m^3)

Newton (N) 1 N = 1kg(m/s^2)

Total Bioavailability of a drug = $\mu g/cm^3$ hours

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The Magnificent Seven Drawing

Draw a Picture of seven cowboys/or cowgirls

(You can substitute other ideas “Seven Super Heroes” etc.) where each represents one of the seven basic units in the metric system

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Drawing / Art

Identify each character with one of the seven basic units:

1. Meter (m), 2. Second (s), 3. Ampere (A),
4. Candela (cd), 5. Celsius (C), 6. Kilogram (kg) and 7. Mole (mol)

- Use *landscape* and put this on one office size page (216 mm x 279 mm)
- Use color
- Please sign the back of your art
- We will grade this based on the following information: I will show you an example in class and discuss the Seven Basic Units in the Metric System

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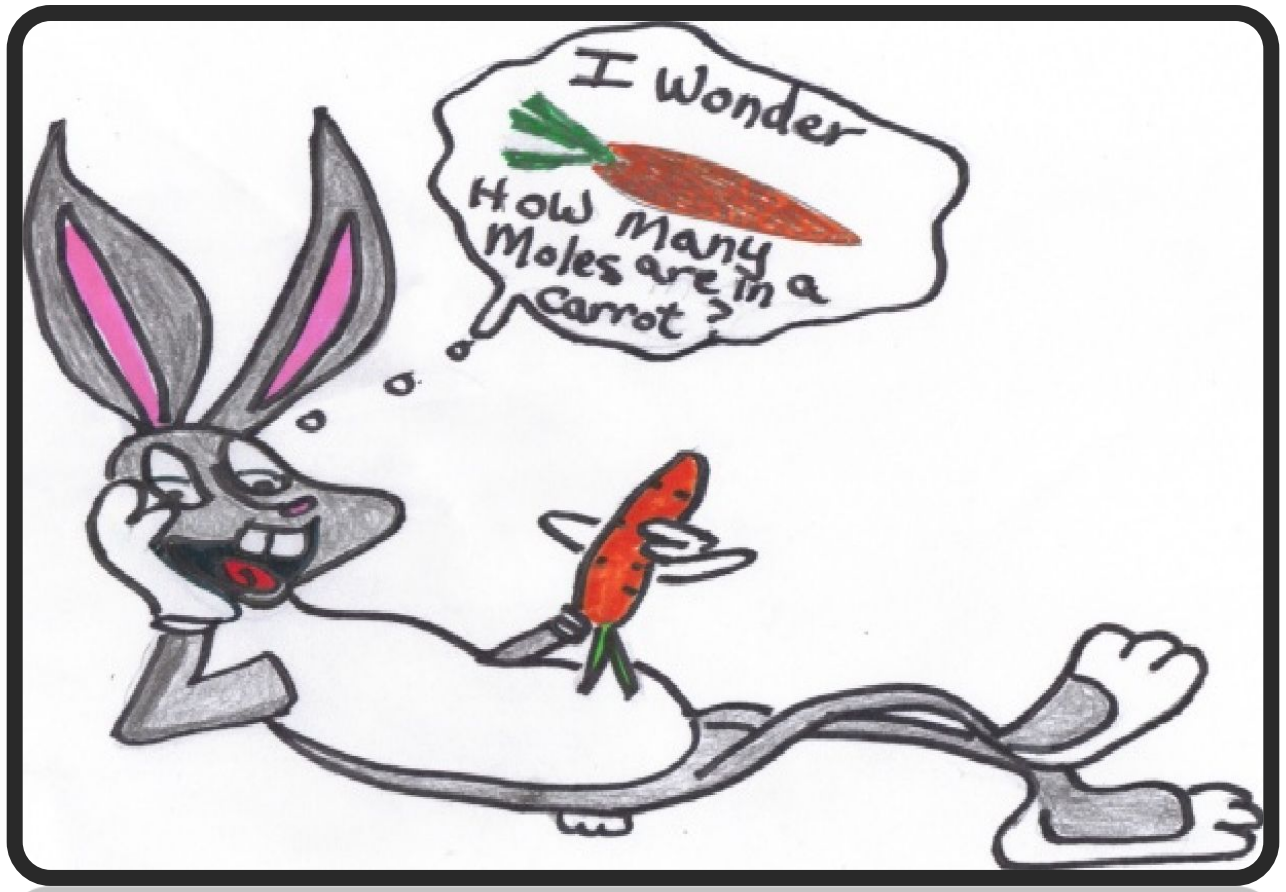
Amount of Substance - Mole mol



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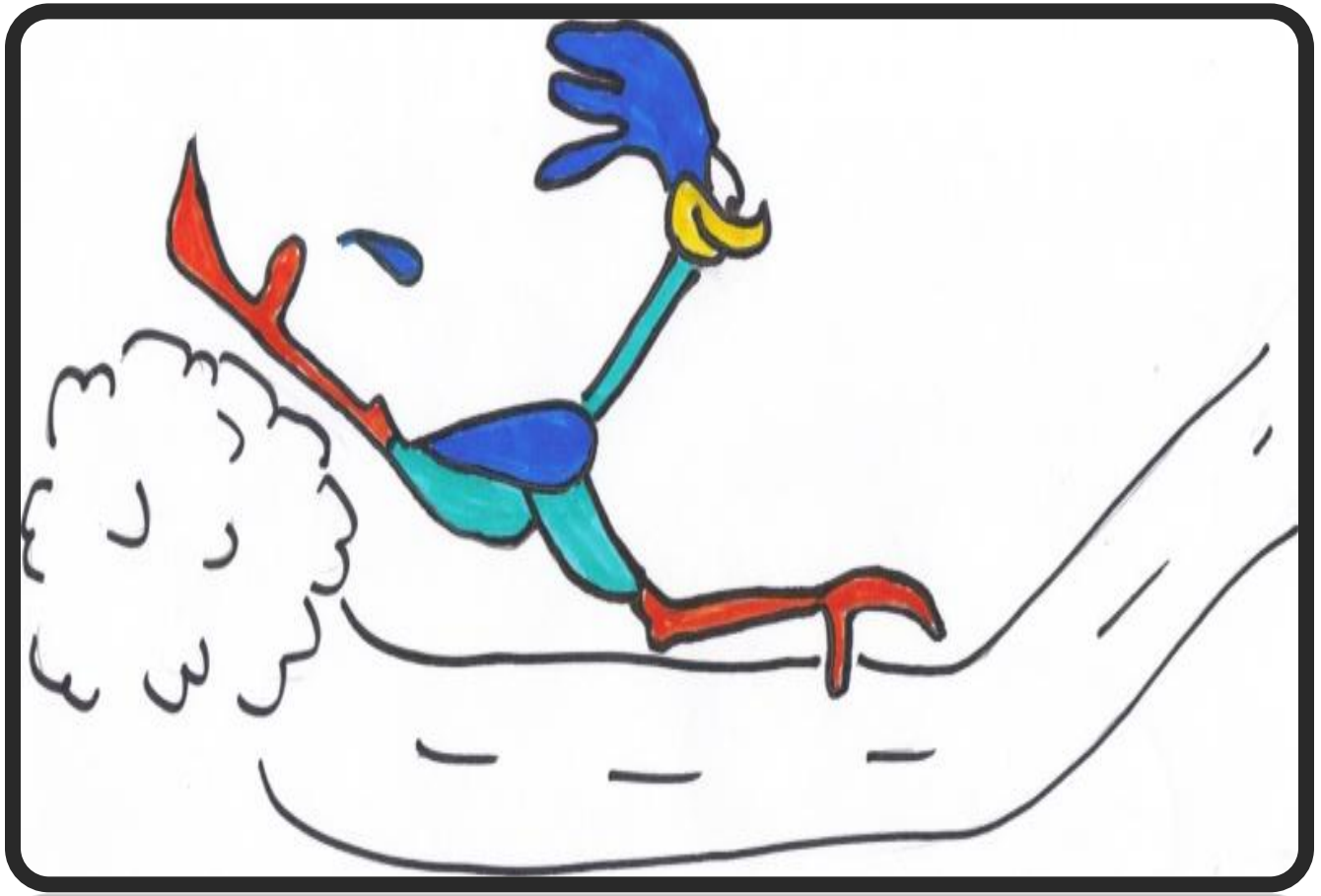
Length - Meter m



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Time - Second s

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Temperature - Celsius ^{0}C

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Mass - Kilogram kg

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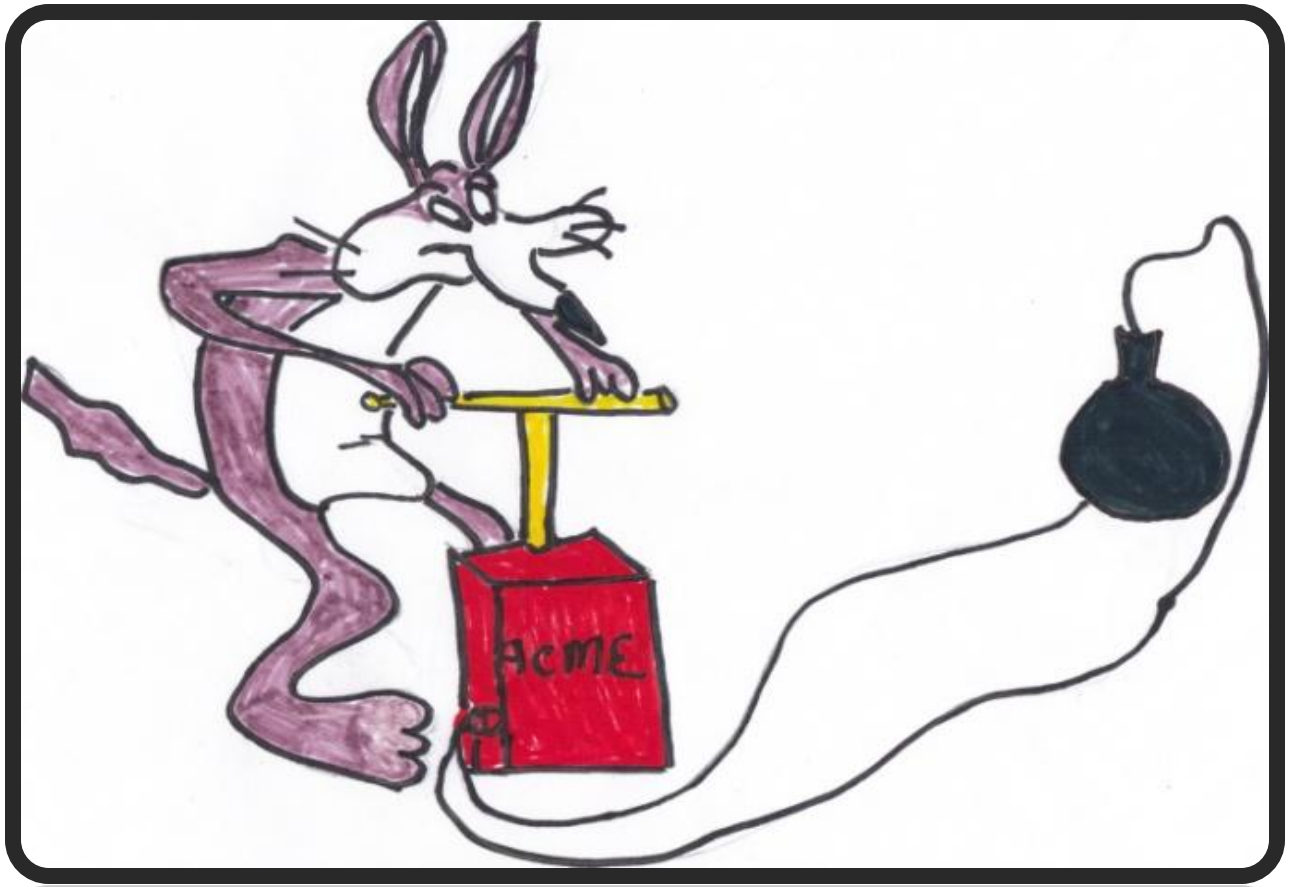
Luminous Intensity - Candela cd

Electric Current - Ampere A



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Example of Student Art

Snow White's 7

Meter (Doc- Tallest Dwarf)

Second (Sneezy-Can sneeze any second)

Ampere (Grumpy- Electricity is quick to react like Grumpy)

Candela (Dopey- Lights up just like Dopey's personality)

Kelvin/Celsius (Sleepy- Cold temperatures slow molecules down)

Kilogram (Happy- The biggest of the dwarves, only seems appropriate)

Mole (Bashful- though bashful lacks social skills, he might have a lot of potential.

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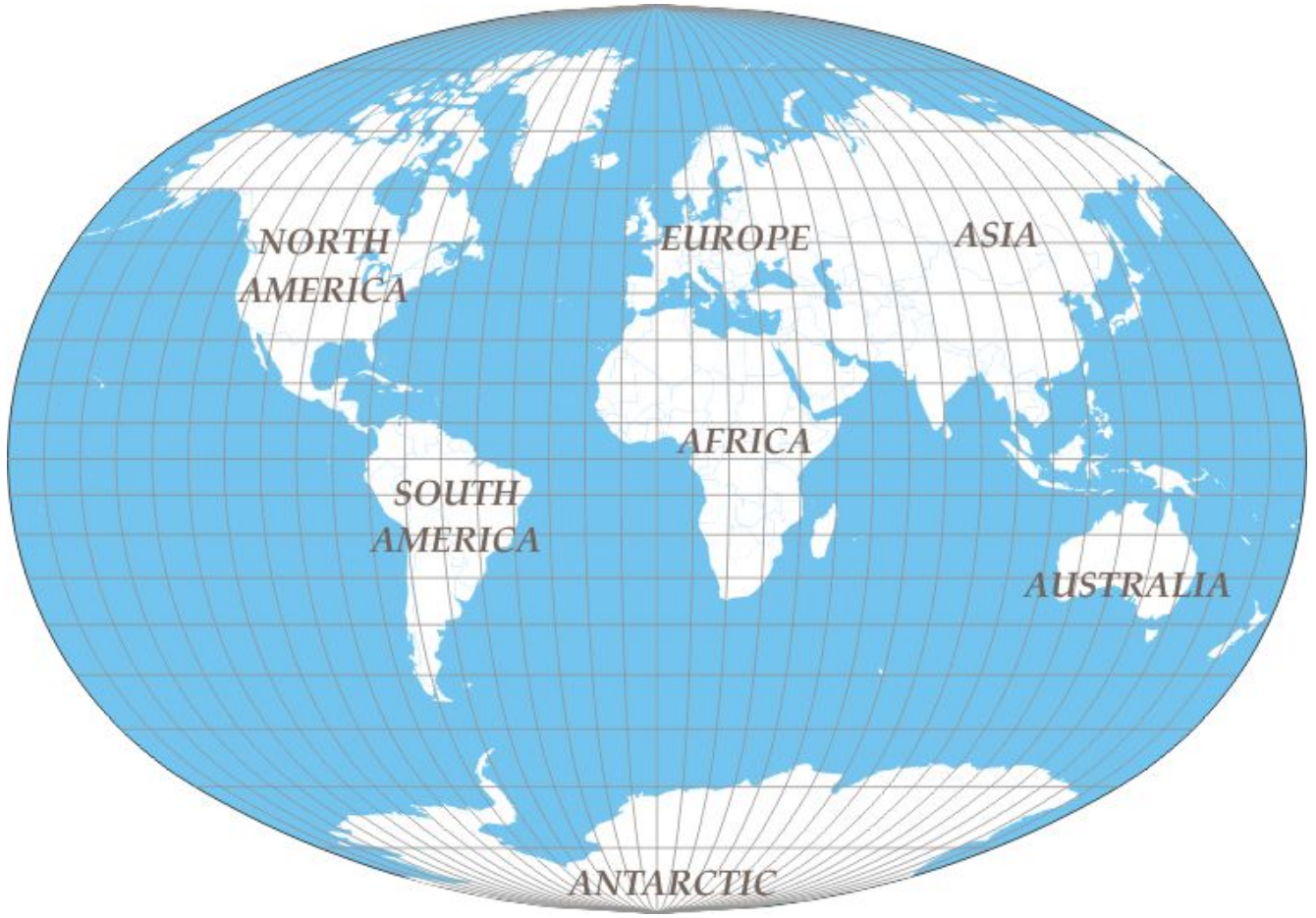
Our World - The Seven Continents



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The Four Main Reasons Why the US Should Go METRIC

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1. The SI Metric System was scientifically developed

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1. Scientifically Developed

Roman mile was

5 000 ft

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1 fur-long = 660 ft

or 220 yds

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Why then

5 280 ft today

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$$5{,}280 \div 660 = 8$$

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So the addition of 280 feet to the Roman mile means

1 mi = 8 fur-longs

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2. Ease of Computation

Which is easier?

29 mi = _____ in (inches)

29 km = _____ cm

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Here is the problem!

mi → fL → rods → yds → ft → in

km → hm → dam → m → dm → cm

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I will do km to cm

Answer ⁂

29 km = 290 hm = 2 900 dam = 29 000 m

= 290 000 dm = 2 900 000 cm

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Ok you do mi to in!!!!

Good Luck!

29 mi → _____ fL → _____ rods

rods → _____yds → _____ft

ft → _____in

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Fact!

The metric system is based on decimal arithmetic, just like dollars and cents

Once learned, it's simpler to use

and *less prone to error*

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Ok you are in Luck! I found some conversions “Have Fun”

1 mi = 8 FL

1 FL = 40 Rod

1 Rod = 5.5 yd

1 yd = 3 ft

1 ft = 12 in

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Ok here are the answers
How did you do?

29 mi → __232__ FL → _9,280_ rods

29 x (8) 232 x (40)

rods → _51,040 _yds → 152,120_ft

9,289 x(5.5) 51,040 x(3)

ft → 1,837,440 in

153,120 x (12)

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3. Economic Reasons

Industry is the driving force behind metrication

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Economic Reasons

Most major U. S. industries are primarily or completely metricated

- Automobile
- Construction equipment
- Electronics
- Soft drink
- Liquor
- Pharmaceutical

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Benefits from Transition to Metric Some Examples

- IBM during metric conversion reduced fastener part numbers from 38,000 to 4,000
- The Liquor Industry reduced its containers sizes from 53 to 7
- You weigh 82 kilograms instead of 180 pounds

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We only need to make the change once

The benefits are perpetual

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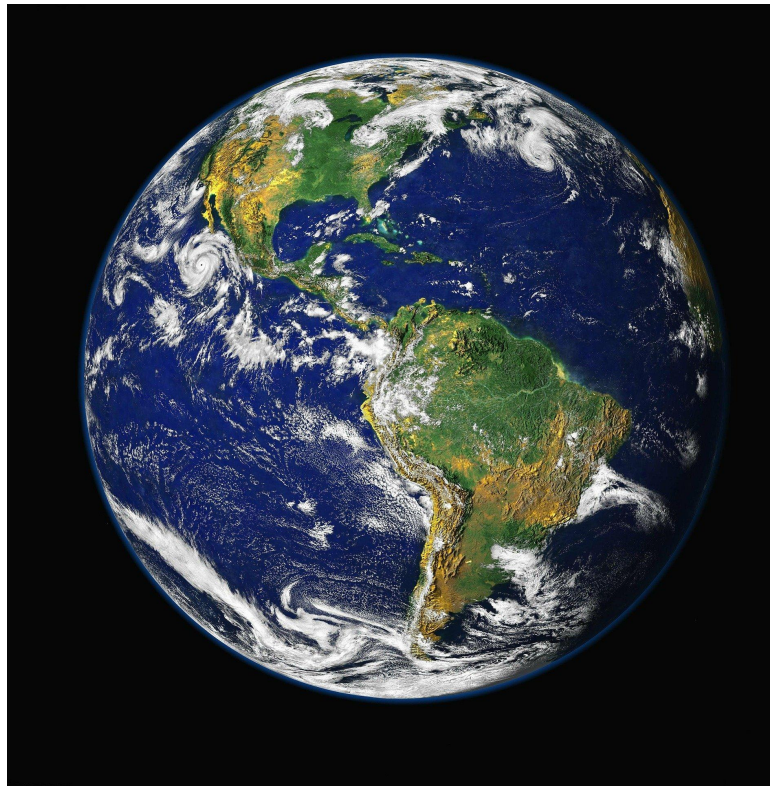
4. Universal Language



The metric system is the only measurement system ever to approach world-wide adoption

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Some 6,500 years after the dawn of Civilization we are finally going to have a Universal Language of Measurement

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The four Main Reasons "Why" the US Should Go Metric

1. ***The SI Metric System Was Scientifically Developed***
2. ***Ease of Computation***
3. ***Economic & Trade Reasons***
4. ***This is a METRIC WORLD (Universal Language)***

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Please Answer The Following Questions

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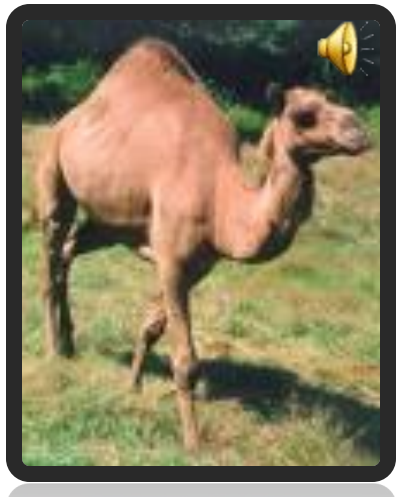

I’d walk a _____ for a camel

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I’d walk a Kilometer km for a camel

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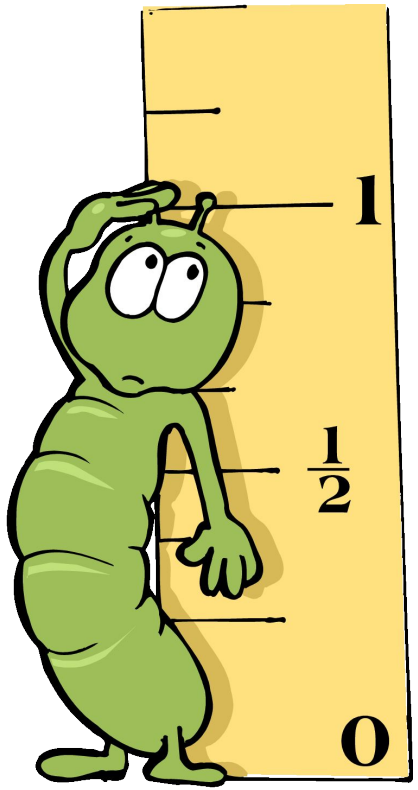

Good-bye inch worm

Hello _____ worm

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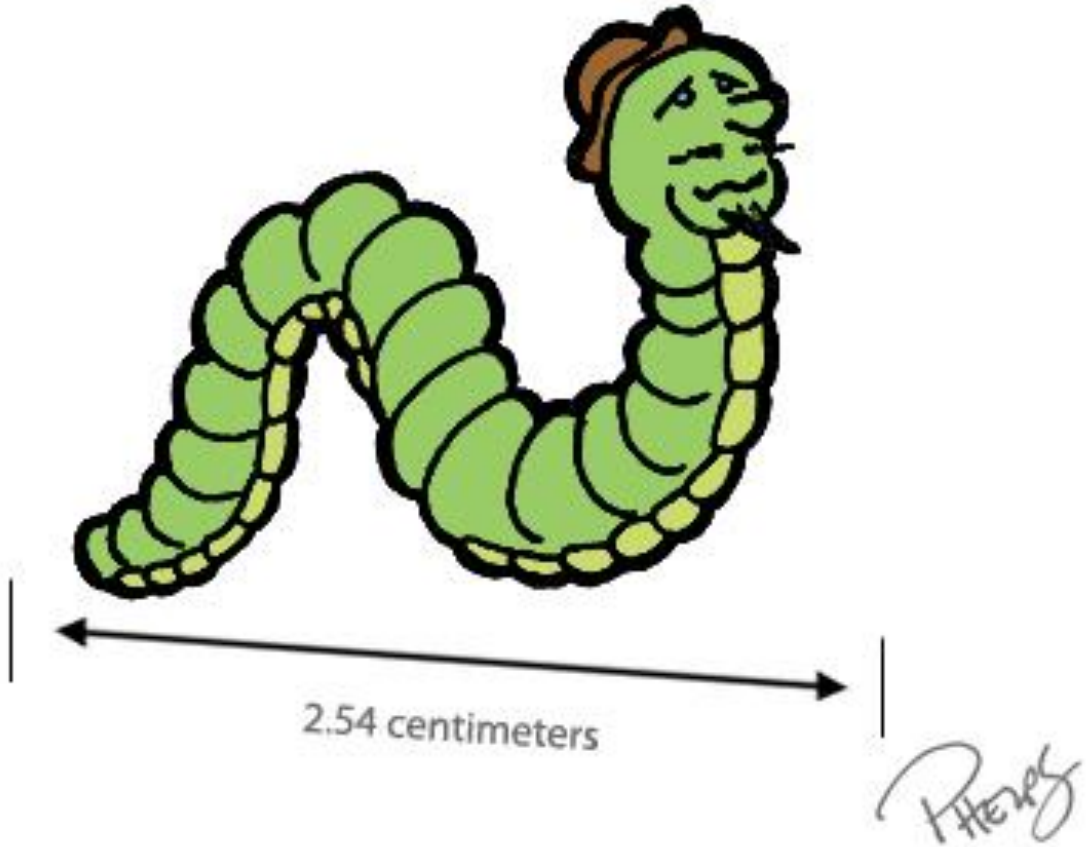

Good-bye inch worm

Hello Centimeter cm worm

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Football is a game of

_____

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Football is a game of

_Centimeter _cm

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An _____ of

prevention is worth a

_____ of cure

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An gram g of

prevention is worth a

__Kilogram_kg of cure

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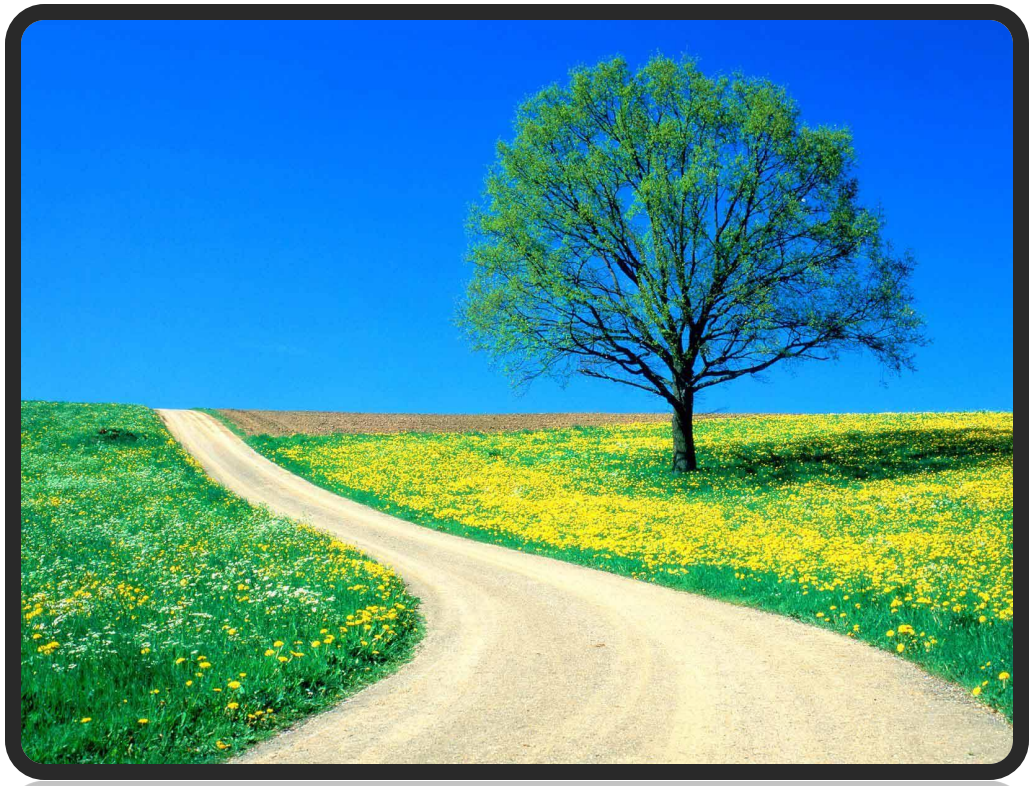

Give him a _____

and he will take a _____

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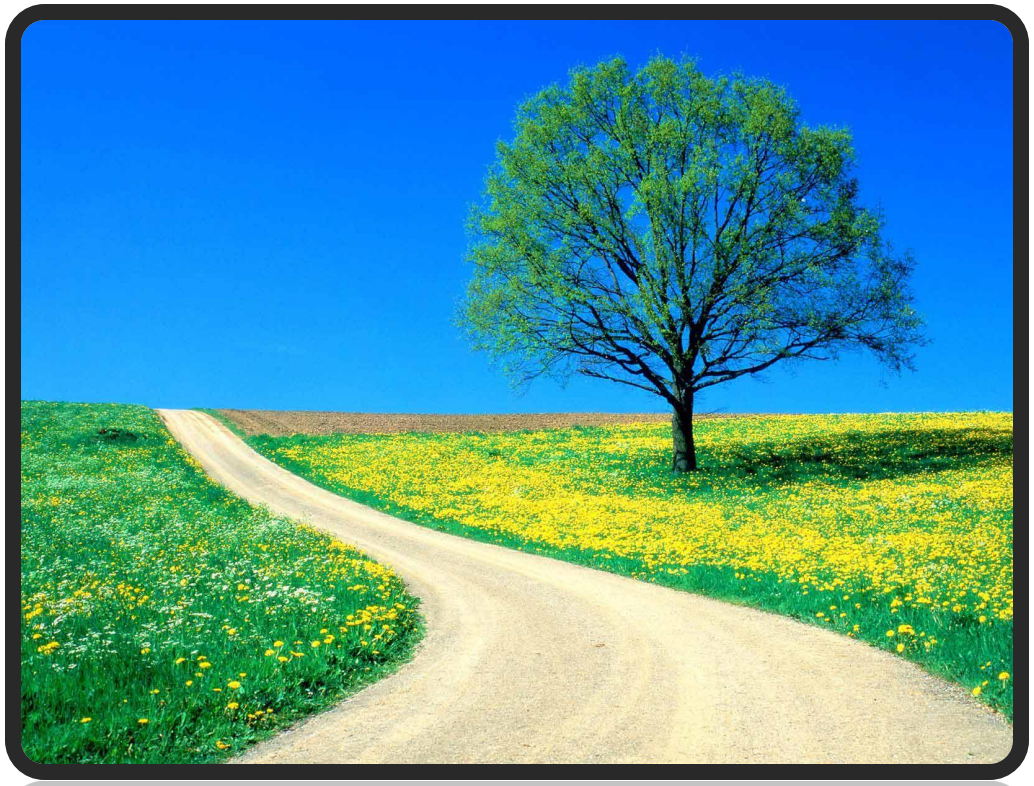

Give him a centimeter cm

and he will take a ___kilometer km__

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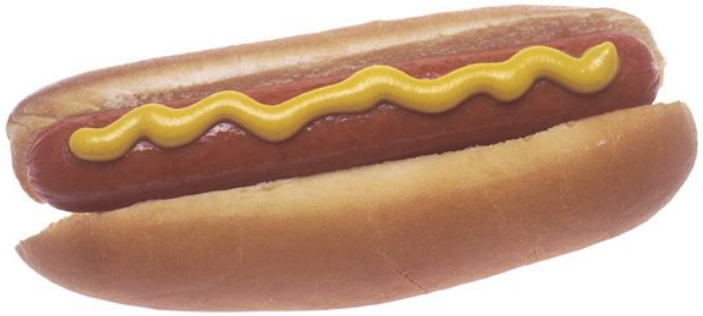

The foot-long hot dog will become the _____ dog

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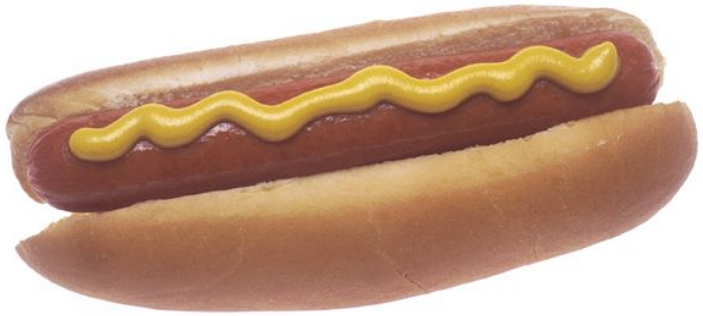

The foot-long hot dog
will become the
three decimeter 3 dm dog

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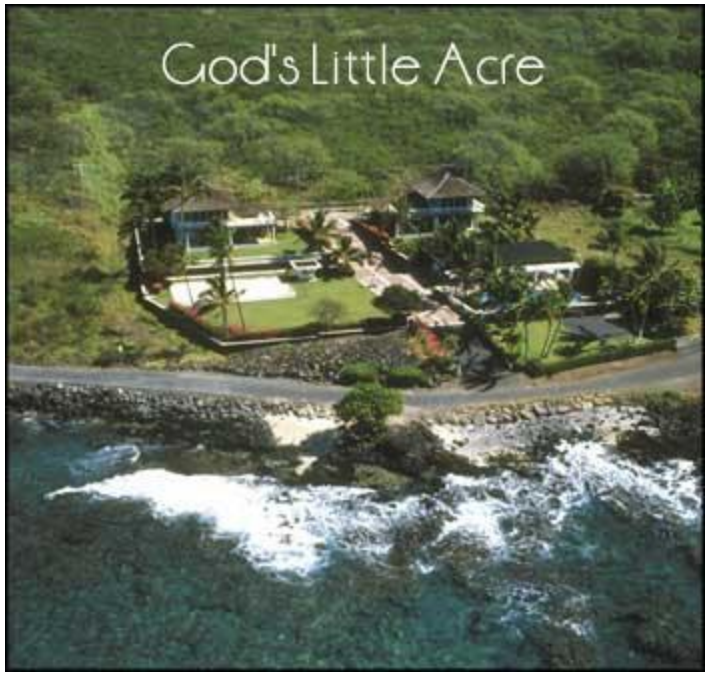
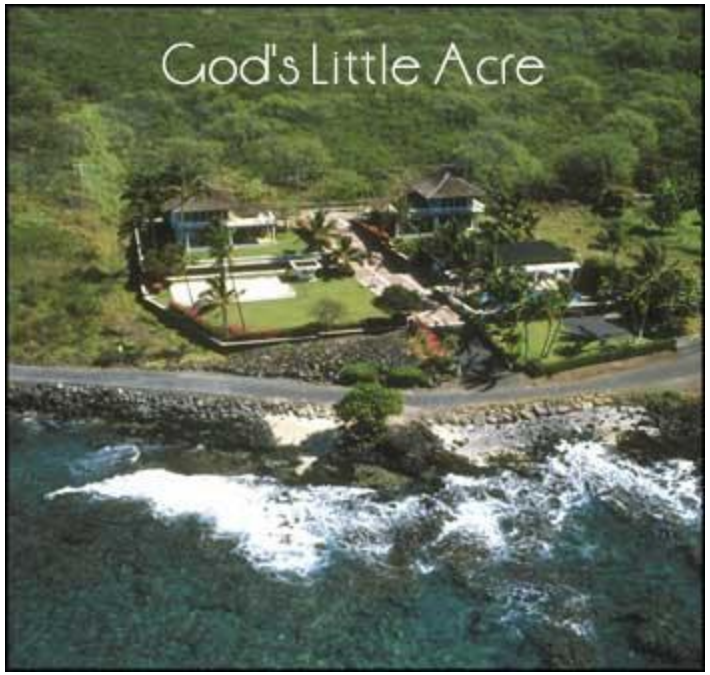


God’s little acre will become God’s little



God’s little acre will become God’s little hectare ha

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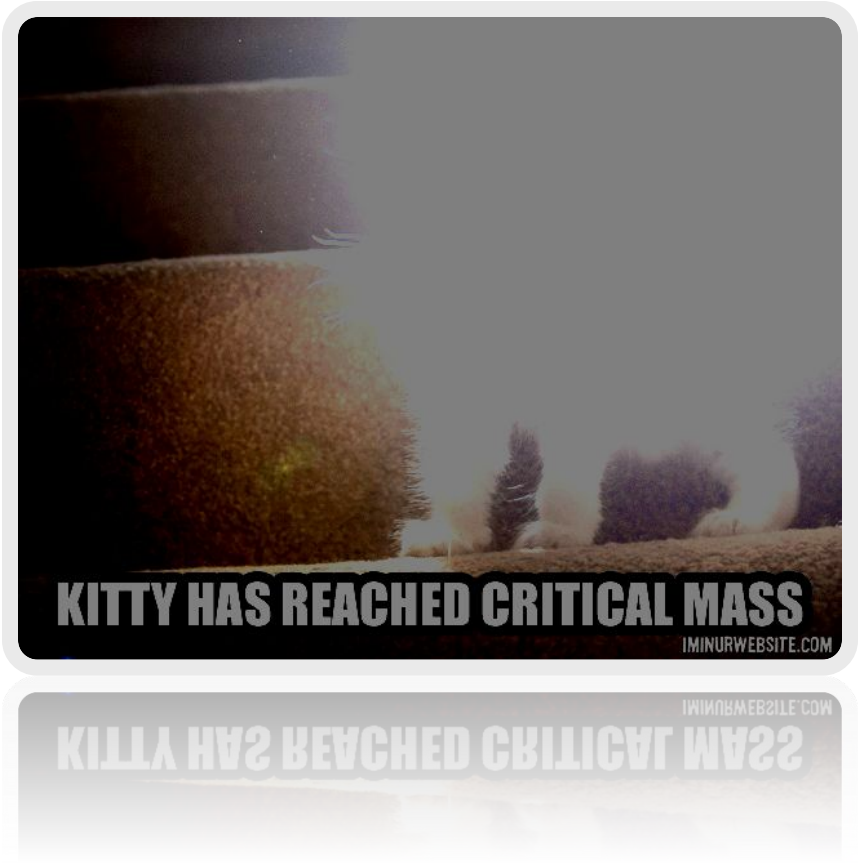

Go to the bathroom,
step on the scale, and
”_____ yourself!

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Go to the bathroom, step on the scale, and "mass yourself!

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Did you know that....

- Metric - minimizes the likelihood of error
- Metric - does not have the numerous conversion factors of the other systems
- Metric - has one unit for a quantity
- Metric - is Legal – Logical - & Preferred
- Since 1992 federal government contracts, grants and publications must be metric
- Six months to two years of elementary arithmetic might be eliminated with the adoption of SI-Metric

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Metric Websites

www.nist.gov/education

Metric System then Puzzles and Games:

- Measurement Word Search
- Measurement Crossword
- Vocabulary Challenge
- NIST Metric Pyramid
- Big Match Up
- My Name Card
- Metric Bookmark

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Metric Websites

www.metric.org

United States Metric Association

- Why teach the metric system (SI)
- Using the metric system (SI)
- Tips to educators for teaching the metric system
- Teaching metric to very young children

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Going Metric is easy and is seeping into the U.S. language

Metric is here to stay!

- It is perfectly acceptable to speak of the 100 meter racer in the Olympics or the local 5K run for cancer research
- People are happy to buy 35 mm film and talk about the 4.0 liter engine in their car
- Fat and fiber come in grams, sodium in milligrams, computer speeds in megahertz, and even wine and spirits come in metric sizes only
- Watts, volts, and amperes are metric units

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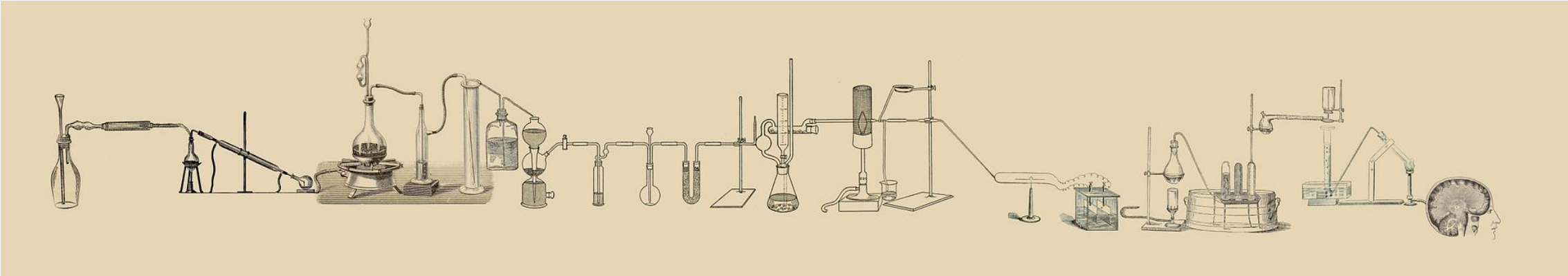
- The metric system is the language of science and medicine
- If you want to go to college, you better take chemistry in high school…Chemistry is 100% metric



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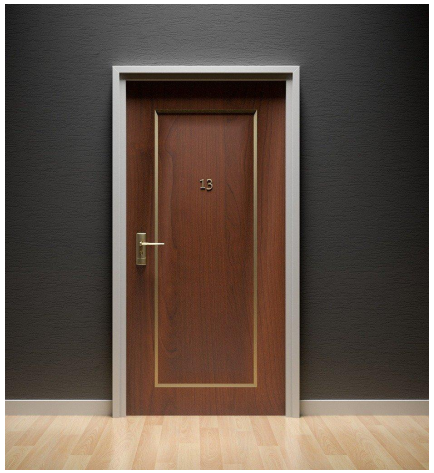
One can make a relationship between each everyday metric units and something physical

For example:

- Centimeter: the diameter of the colored part of your eye
- Meter: the height of a doorknob in your home, the length of a baseball bat
- Gram: a little more than the weight of a paper clip or three raisins
- Decimeter: The length of an ordinary wall receptacle
- Square Decimeter: the size of a slice of bread. And so on…



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Make no relationship

- Note: No relationship to the customary units is made
- You do not want to mix the units
- So I would never say a meter is about a yard

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We have to stop recycling the problem

As it stands in the US our Universities that offer teacher degrees, **DO NOT** have a strong curriculum on metric training

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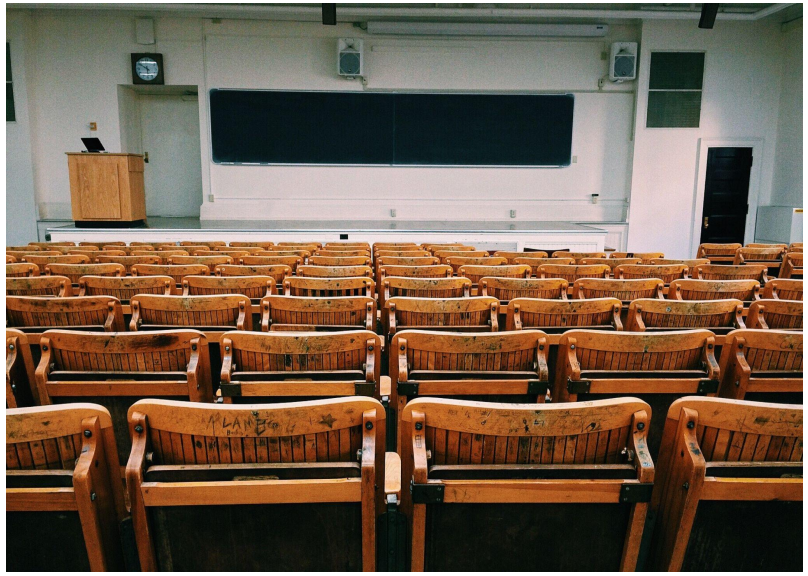
Without Knowledge or Confidence

Hence the new teachers leave the institution without the knowledge or confidence in themselves to teach metric



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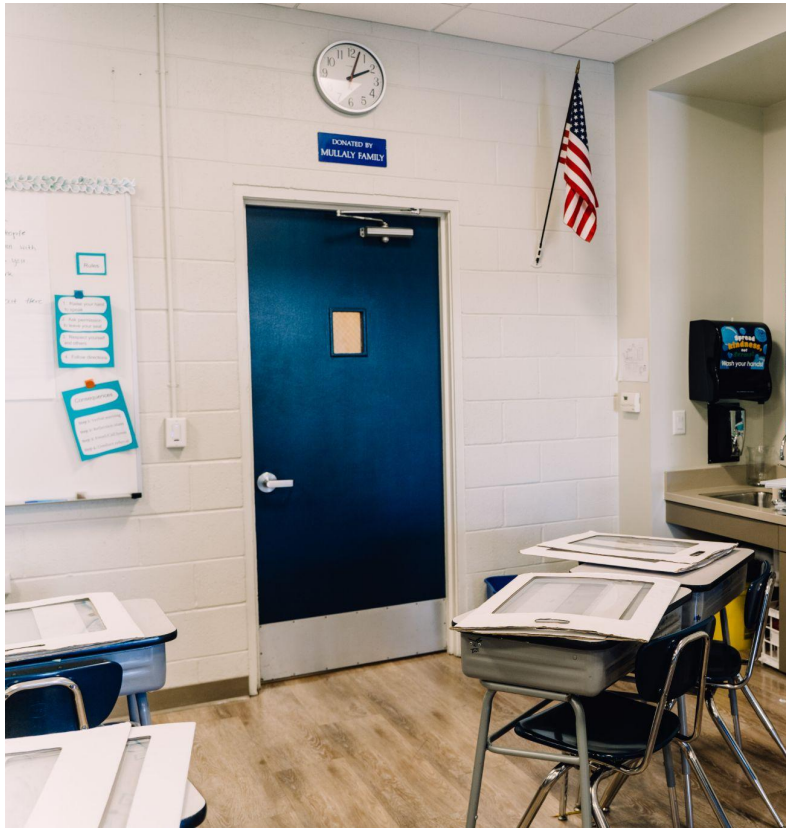
So What Happens?

So what happens when the classroom door is shut?

They teach what they know — the old customary system, which the child gets at home anyway



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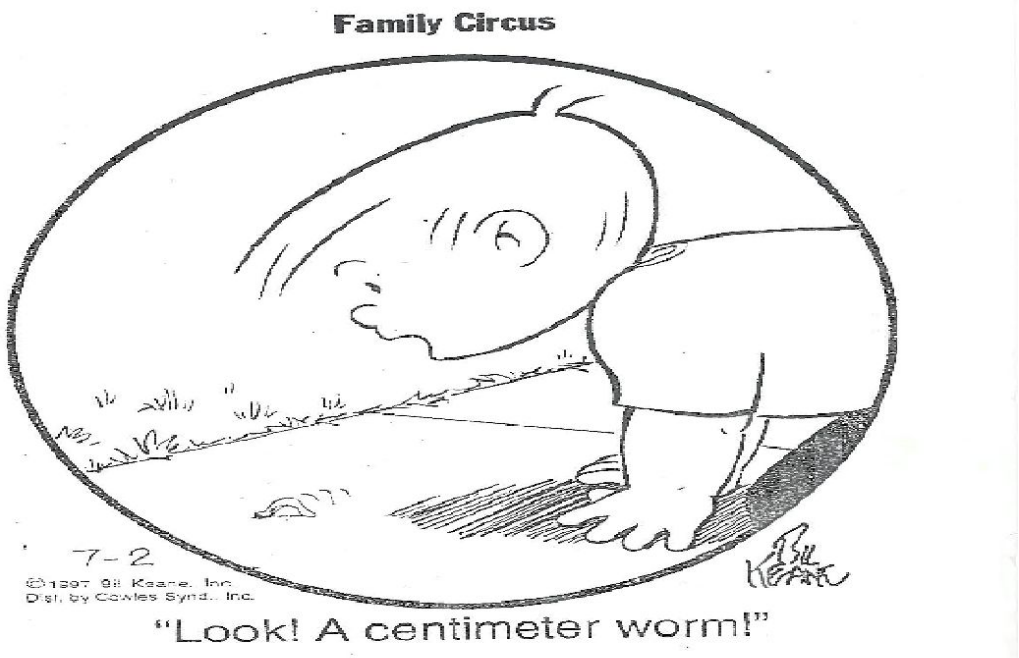

THANK YOU!

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