

# NOTES FOR THE METRICOFE

## DO NOT LOSE!

Name:

### Area of Focus: Lab Safety

- Handle everything as if it's pathogenic.
  - Pathogenic means that what your handling could be an infective agent that could cause disease.
  - Clean work station periodically with proper disinfectant.
- Do not breathe vapors or put anything close to your nose to smell unless instructed.
  - When smelling, do not hold smell below nose, make a pass from one side to the other.
- Avoid blood and other bodily fluids.
  - If you are bleeding then please contact teacher immediately to get wound cleaned and covered.
- Please check glassware for cracks or chips prior to use.
  - If glassware is broken please contact teacher.
  - Please be safe with glassware to avoid dropping and breaking. Clean immediately.
- Clean spills from the outside in.
  - Apply paper towels over the spill, then, carefully starting from the outside, wipe in.
- Please do not eat food or drink in the classroom.
  - No gum
  - Cough drops
  - Or putting strange things in your mouth.

Keep flammable solutions away from flame.

- If you have long hair then please arrange it so that it will not hang down and catch on fire.

- Know where the fire extinguisher is and how to use it.
  - We have a Carbon Dioxide all purpose fire extinguisher.
    - Find key.
    - Pull it out. (Stand back)
    - Pull handle / trigger.
    - Point at the fire until extinguished.
- Keep electrical equipment away from water and vice versa.
- Use proper safety protection.
  - Goggles covering eyes.
  - Gloves (Non-latex) for allergy reasons.
- Know where the eyewash station is and how to use it. Where is the station?
  - If you get something in your eye
    - Get it out now!
    - Hold eyelid open.
    - Gently run water over your eyes
    - Go to school nurse immediately.
- Clean glassware before and after use to avoid harmful residue.
- Avoid cutting yourself if we are using sharp objects.
  - Never cut toward yourself or others.
  - A pencil and other pointed objects can be very dangerous.
- Use common sense at all times.
  - No horseplay.
  - No pushing.
  - No running.
  - No squirting with droppers.

Area of Focus: Magnification

Magnification: The act of expanding something in apparent size.

- The objects doesn't change in size.

De-magnification: To make something smaller in appearance.

This is stereoscopic microscope. It looks at things in which light cannot pass like a bumble bee. Lets you see the image in 3D.



This is a light microscope. It lets you magnify images that light can pass through. Uses glass slide and cover slip.



This is an electron microscope. It can magnify specimens much smaller than a light, or stereoscope, but doesn't usually view live cells or specimens



Parts of a microscope.

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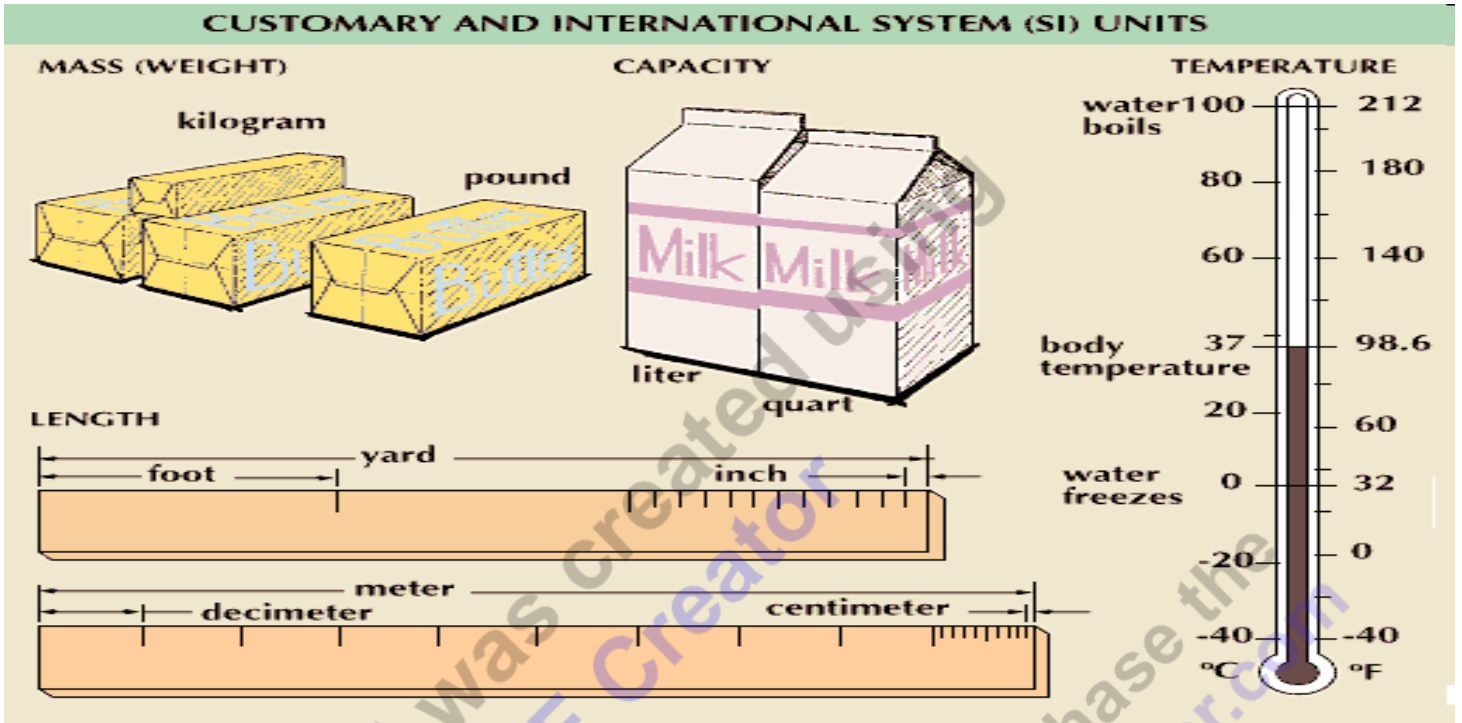


When carrying a microscope, carry it by the arm, and have one hand under the base.

Always lower the stage after use so the gears are not strained.

- Remove any slide as well.
- The finely tuned gears are what make microscopes expensive.

Area of Focus: The Metric System.



The international System of Units (SI) also known as the metric system.

Quantity	Base Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric Current	ampere	A
Temperature	Kelvin	K
Light intensity	candela	cd
Amount of substance	mole	mol

The Metric System : A measurement system based on the powers of ten.

Scientific notation: A method for expressing, and working with, very large or very small numbers.

yotta	[Y]	1 000 000 000 000 000 000 000 000 000	= 10 <sup>24</sup>
zetta	[Z]	1 000 000 000 000 000 000 000 000	= 10 <sup>21</sup>
exa	[E]	1 000 000 000 000 000 000 000	= 10 <sup>18</sup>
peta	[P]	1 000 000 000 000 000 000	= 10 <sup>15</sup>
tera	[T]	1 000 000 000 000	= 10 <sup>12</sup>
giga	[G]	1 000 000 000	(a thousand millions = a billion)
mega	[M]	1 000 000	(a million)
kilo	[k]	1 000	(a thousand)
hecto	[h]	100	(a hundred)
deca	[da]	10	(ten)
deci	[d]	0.1	(a tenth)
centi	[c]	0.01	(a hundredth)
milli	[m]	0.001	(a thousandth)
micro	[μ]	0.000 001	(a millionth)
nano	[n]	0.000 000 001	(a thousand millionth)
pico	[p]	0.000 000 000 001	= 10 <sup>-12</sup>
femto	[f]	0.000 000 000 000 001	= 10 <sup>-15</sup>
atto	[a]	0.000 000 000 000 000 001	= 10 <sup>-18</sup>
zepto	[z]	0.000 000 000 000 000 000 001	= 10 <sup>-21</sup>
yocto	[y]	0.000 000 000 000 000 000 000 001	= 10 <sup>-24</sup>

- "I am 1828.80 mm tall."
- "I am 182.80 cm tall."
- "I am 1.8280 meters tall."
- "I am .001828 km tall."

● King -	Kilometer	1000m	103
● Henry -	Hectometer	100m	102
● Died -	Decameter	10m	101
● While -	Standard	1m	100
● Drinking -	Decimeter	.1m	10-1
● Chocolate -	Centimeter	.01m	10-2
● Milk -	Millimeter	.001m	10-3

<u>Quantity</u>	<u>Base Unit</u>	<u>Symbol</u>
● Length	Meter	M
● Mass	Gram	g
● Temperature	Kelvin	K
● Time	Second	s
● Amount	Mol	mol
● Force	Newton	N
● Electric Current	Ampere	a
● Luminous Intensity	Candela	cd
● Volume	Liter	l

### Area of Focus: Mass

Mass: The amount of matter in an object. Weight has to do with gravity. On earth, mass and weight are the same.

Metric Ton: A cubic meter filled with water or 1,000 kilograms.

The standard unit of mass in the metric system is the gram.

- 1 milligram = 0.001 gram
- 1 centigram = 0.01 gram
- 1 decigram = 0.1 gram
- 1 kilogram = 1000. grams

## Area of Focus: Volume, Liter, l

Volume: The three-dimensional space an object occupies.

The standard unit of volume in the metric system is the liter.

- 1 milliliter = 0.001 liter
- 1 centiliter = 0.01 liter
- 1 deciliter = 0.1 liter
- 1 kiloliter = 1000. liters

Volume is also the space that matter occupies.

- Matter is anything that has mass and takes up space.

How to find the volume of a cube?

- Length x Width x Height - \_\_\_\_\_cm<sup>3</sup>

Volume of a cylinder: Where Pi = 3.14

Density: How much mass is contained in a given volume. We use grams/cm<sup>3</sup>(grams per cubic centimeter)

- Density - mass divided volume

Mass

- $D = \frac{\text{Mass}}{\text{Volume}} = \text{grams/cm}^3$

An object will float in water.

- Density of less than one = float.
- Density of more than one = sink.

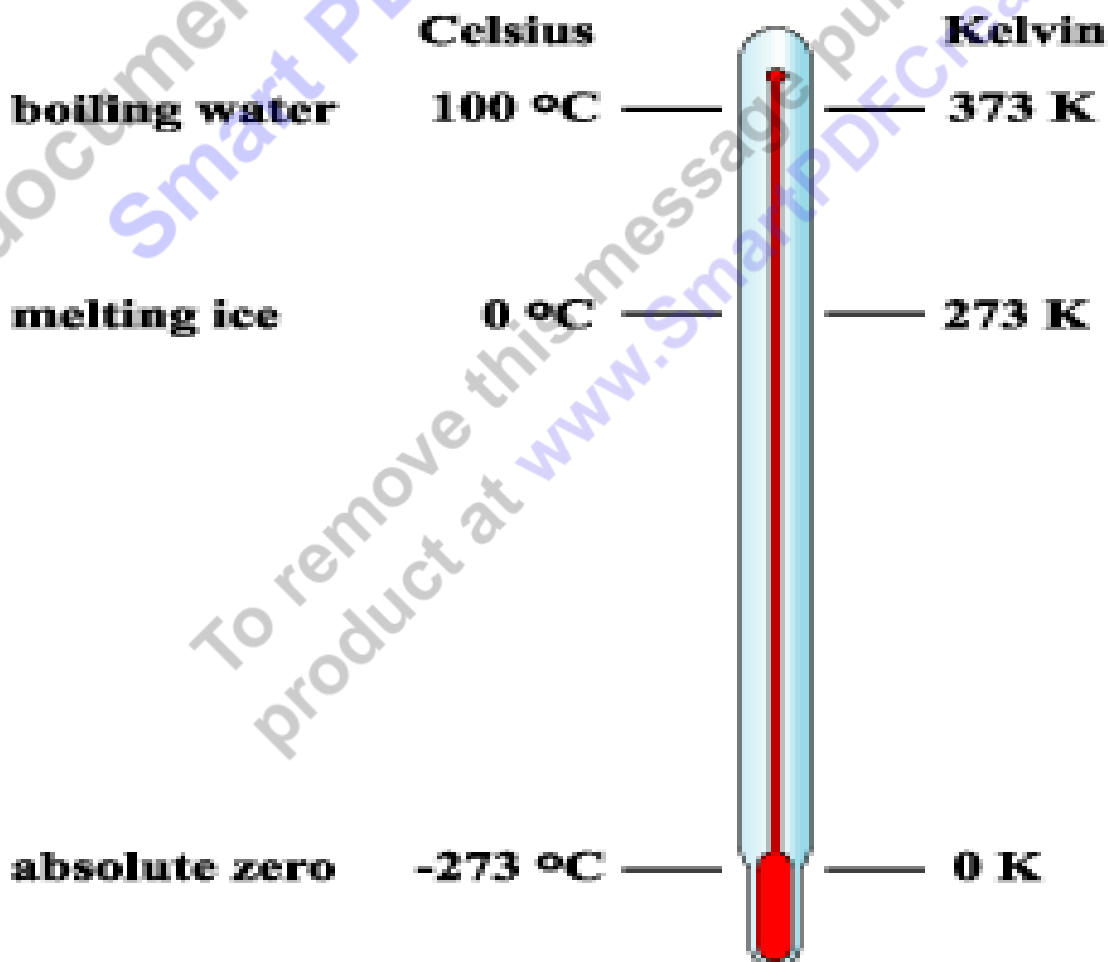
New Area of Focus: Temperature.

Temperature: The degree of hotness or coldness of a body or environment.

- Corresponds to its molecular activity.

Temperature:

- Measured in degrees Celsius.
- Zero Degrees Celsius is freezing point of water, 100 degrees Celsius is boiling point.
- Kelvin Scale: Zero Kelvin is absolute zero where molecular motion stops. That is the coldest something can be. (never been reached.)
  - Water freezes at 273.16K; water boils at 373.16K.  $K = C + 273.16^\circ$



New Area of Focus: Time.

Time: A measuring system used to sequence events, to compare the durations of events and the intervals between them, and to quantify the motions of objects.

Distance divided by time = Speed.

- Distance (meters)
- Time (seconds)
- Speed (meters/second)

New Area of Focus: Some of the other SI units.

The mole: The molecular weight of a substance expressed in grams.

Ampere: The unit of measurement of electric current, equal to one coulomb per second.

- Coulomb: The measurement of a number of electrons.

Candela: The unit of luminous intensity. One candela is equivalent to 12.57 lumens.

- Use to be the light of a standard candle.

New Area of Focus: Observation, Inferences, and the Scientific Method.

Science is...

A study of natural phenomenon.

A systematic study and method.

Knowledge through experience.

A good Scientist is....

- -Is safe!
- Is accurate, precise and methodical.
- Is unbiased, a seeker of the truth.
- Can observe and question.
- Can find solutions, reasons, and research.
- Works in all weather conditions if safe.
- Can overcome obstacles.
- Collaborates (talks) with others.

Science is a systematic attempt to get around human limitations.

- Science tries to remove personal experience from the scientific process.

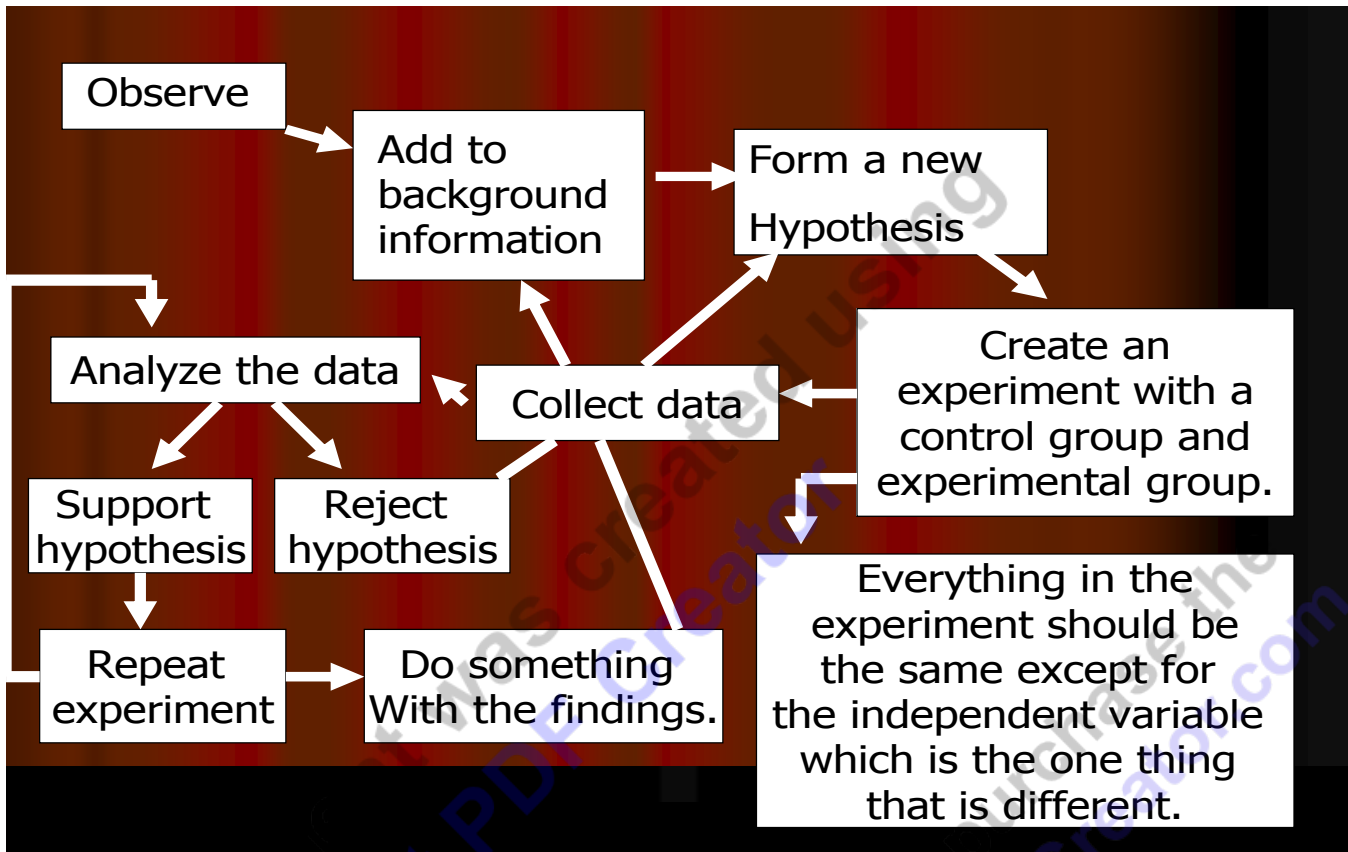
TRY AND WRITE WITHOUT PERSONAL PRONOUNS.

- DO NOT USE...I, me, you, he, she, we, you, they, them, theirs, names, etc

Types of scientists...

- Biology - The study of life.
- Geology - The study of earth.
- Chemistry - The study of Matter.
- Physics - The study of matter and energy.

Scientific method: A process that is the basis for scientific inquiry (questioning and experimenting).



Observation - Anything you can see, hear, smell, touch, taste, (Using your senses).

Inference: A conclusion based on your observations.

Hypothesis: An educated guess to your problem / question that is testable.



Brand of Soda	Calories	Sodium	Sugar	Weight	

HOLD NOTES FOR THE METRICOFE! DO NOT LOSE!

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