

Science Skills Unit Notes

Name: _____

DO NOT LOSE!

Area of Focus: Lab Safety

- Handle everything as if it's _____.
 - Pathogenic means that what you are handling could be an infective agent that could cause _____.
 - _____ work station periodically with proper disinfectant.
- Do not _____ vapors or put anything close to your nose to smell unless instructed.
 - When smelling, do not hold smell below nose. Make a _____ from one side to the other.
- Avoid _____ and other bodily fluids.
 - If you are bleeding then please contact _____ immediately to get wound cleaned and covered.
- Please check _____ for cracks or chips prior to use.
 - If glassware is broken please contact _____.
 - Please be safe with glassware to avoid dropping and breaking. Clean immediately.
- Clean spills from the _____ in.
 - Apply paper towels over the spill, then, carefully starting from the outside, wipe in.

- Please do _____ eat food or drink in the classroom.
 - No gum
 - Cough drops
 - Or putting strange things in your mouth.

Keep _____ solutions away from flame.

- If you have long _____ 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 _____ all purpose fire extinguishers.
 - Find key.
 - Pull it out. (Stand back)
 - Pull handle / trigger.
 - Point at the fire until extinguished.
- Keep _____ equipment away from water and vice versa.
- Use proper s_____ protection.
 - G_____ covering eyes.
 - G_____ (Non-latex) for allergy reasons.
- Know where the _____ station is and how to use it. Where is the station?
 - If you get something in your _____
 - Get it out now!
 - Hold eyelid open.
 - Gently run water over your eyes

- Go to school nurse immediately.
- Clean _____ before and after use to avoid harmful residue.
- Avoid _____ 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 _____ at all times.
 - No horseplay.
 - No pushing.
 - No running.
 - No squirting with droppers.

Area of Focus: Magnification

Magnification: The act of _____ something in apparent size.

- The object does not change in size.

De-magnification: To make something _____ in appearance.

This is a stereoscopic microscope. It looks at things in which light _____ 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 _____ slide and cover slip.

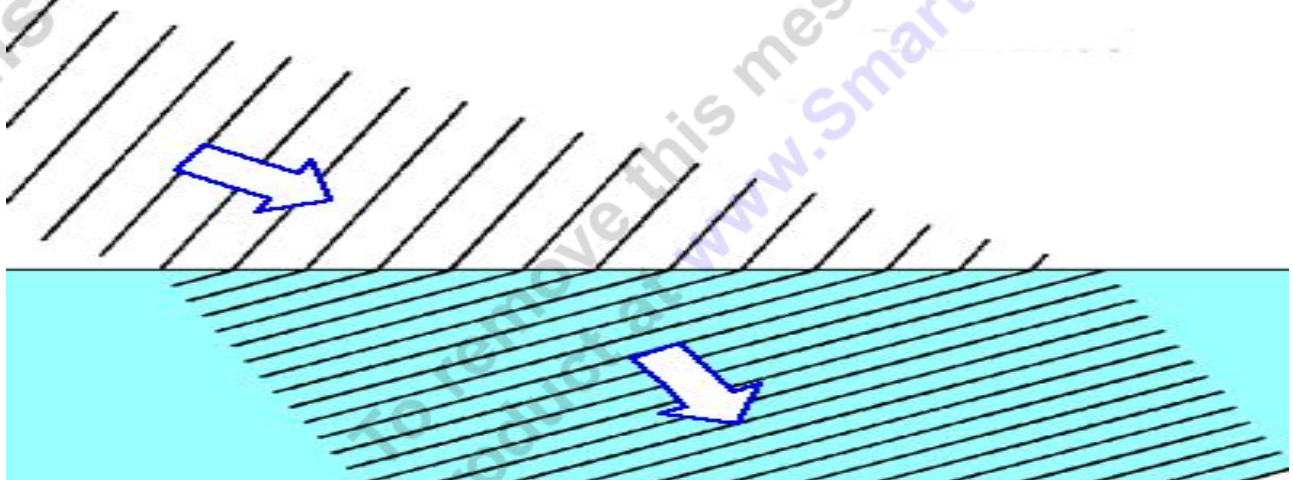
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This is an _____ microscope. It can magnify specimens much smaller than a light, or stereoscope, but doesn't usually view live cells or specimens



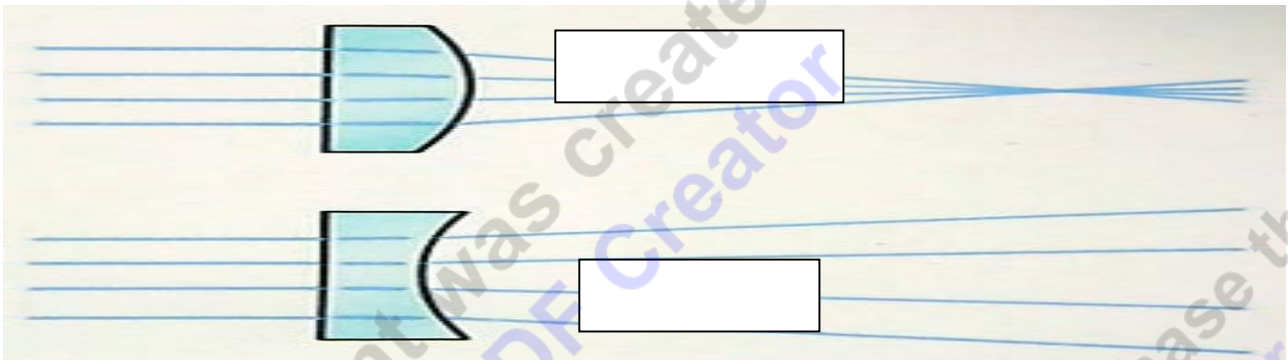
- Light is a _____ and a wave and goes out in a straight line unless it bumps something.
- **Refraction:** The _____ of a wave when it enters a medium where it's speed is different.



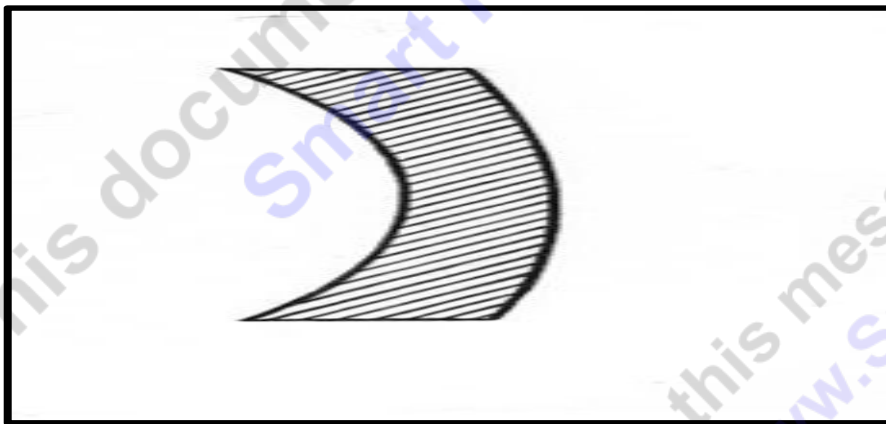
- **Diffraction:** Bending of _____.

■ **Lens:** A transparent optical device used to converge or diverge transmitted light and to form images.

■ Convex top / Concave bottom



Concavo-convex



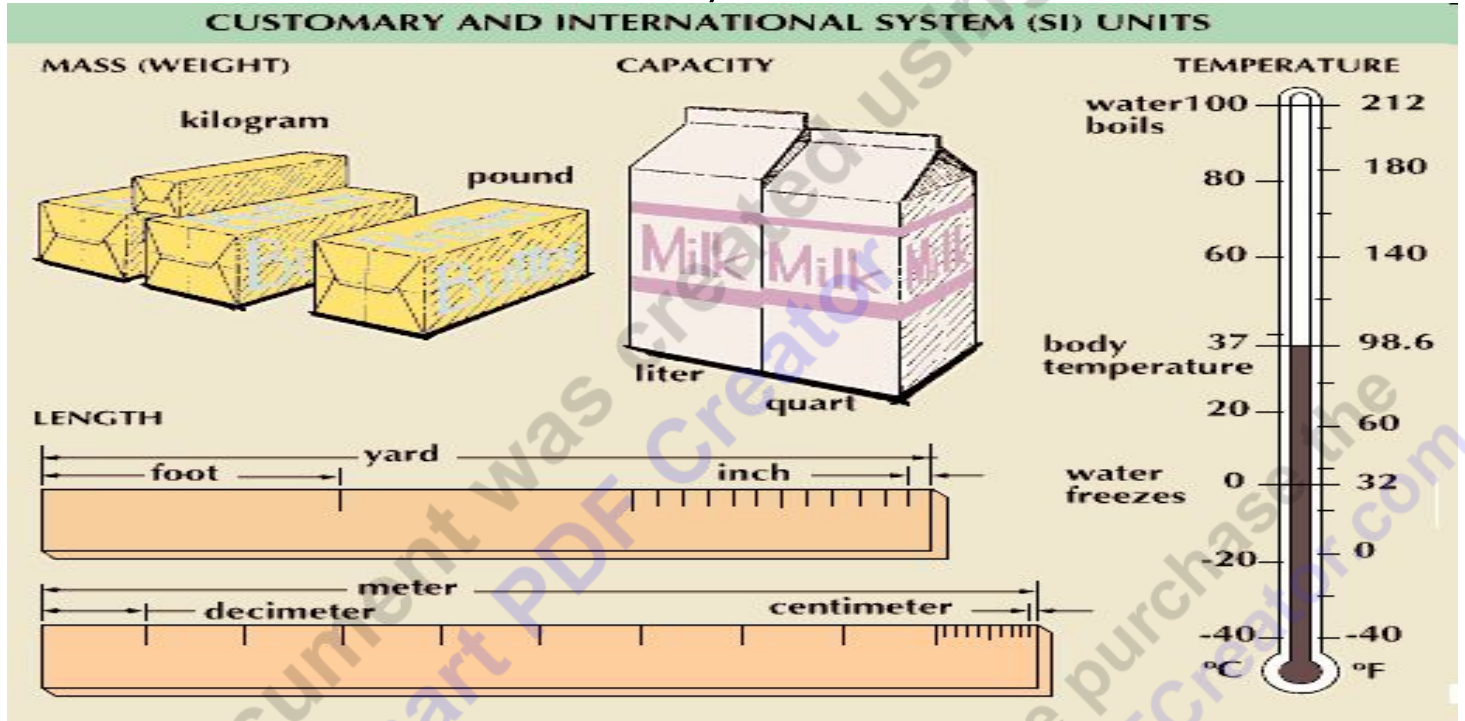
When carrying a microscope, carry it by the _____, and have one _____ under the base.

Always _____ 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 U_____ (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

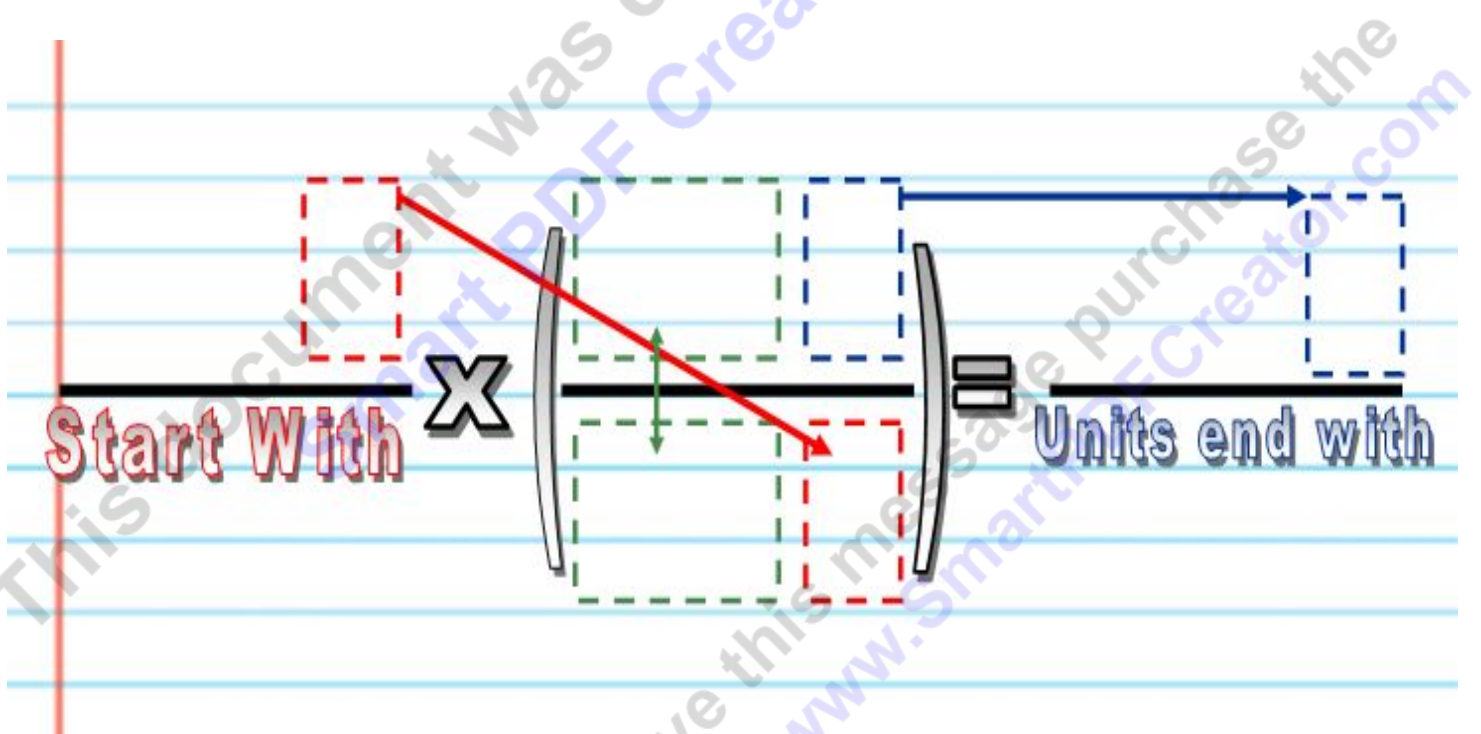
The Metric System: A measurement system based on the powers of _____.

Converting Units

Write the conversion as a fraction

Multiply

Cancel units from the top and bottom



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

$$5.7 \times 10^6 = 57000000$$

1
2
3
4
5
6

yotta [Y]	1 000 000 000 000 000 000 000 000 000	= 10 ²⁴
zetta [Z]	1 000 000 000 000 000 000 000 000	= 10 ²¹
exa [E]	1 000 000 000 000 000 000 000	= 10 ¹⁸
peta [P]	1 000 000 000 000 000	= 10 ¹⁵
tera [T]	1 000 000 000 000	= 10 ¹²
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)
	1	
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 ⁻¹²
femto [f]	0.000 000 000 000 001	= 10 ⁻¹⁵
atto [a]	0.000 000 000 000 000 001	= 10 ⁻¹⁸
zepto [z]	0.000 000 000 000 000 000 001	= 10 ⁻²¹
yocto [y]	0.000 000 000 000 000 000 000 001	= 10 ⁻²⁴

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

- | | | | |
|--------------|------------|-------|-----------|
| ● King - | _____meter | 1000m | 10^3 |
| ● Henry - | _____meter | 100m | 10^2 |
| ● Died - | _____meter | 10m | 10^1 |
| ● While - | Standard | 1m | 100 |
| ● Drinking - | _____meter | .1m | 10^{-1} |
| ● Chocolate | _____meter | .01m | 10^{-2} |
| ● Milk - | _____meter | .001m | 10^{-3} |

- | ● <u>Quantity</u> | <u>Base Unit</u> | <u>Symbol</u> |
|----------------------|------------------|---------------|
| ● Length | _____ | M |
| ● M_____ | Kilogram | _____ |
| ● Temperature | K_____ | K |
| ● T_____ | Second | s |
| ● Amount | M_____ | mol |
| ● Force | Newton | N |
| ● Electric Current | A_____ | a |
| ● Luminous Intensity | Candela | cd |
| ● V_____ | Liter | l |

Area of Focus: Mass

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

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

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

1 milligram = 0.001 grams

1 centigram = 0.01 grams

1 decigram = 0.1 grams

1 kilogram = 1000. grams

Area of Focus: Volume, Liter, l

Volume: The three-dimensional _____ an object occupies.

The standard unit of _____ 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 _____ that matter occupies.

- Matter is anything that has _____ and takes up _____.

How to find the volume of a cube?

- Length x Width x Height - _____ cm³

Volume of a cylinder: Where Pi = 3.14

Density: How much _____ is contained in a given volume. We use grams/cm³ (grams per cubic centimeter)

- Density – mass _____ volume

Mass

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

An object will float in water.

- Density of less than one = _____.
- Density of more than one = _____.

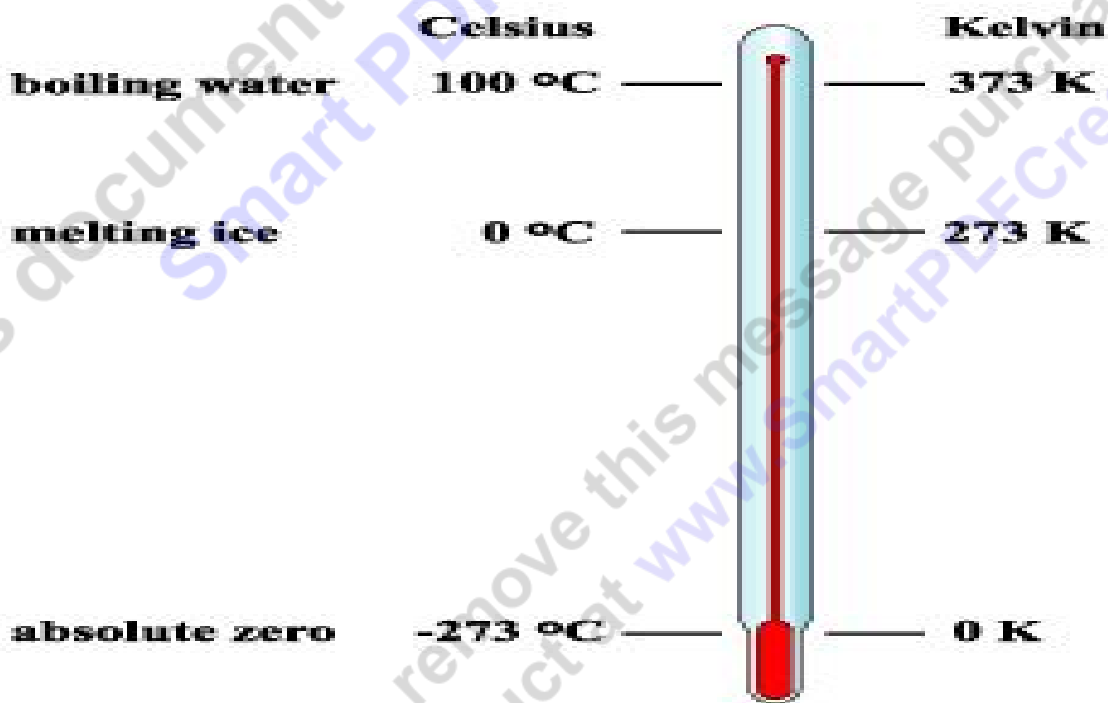
New Area of Focus: Temperature.

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

- Corresponds to its molecular activity.

Temperature:

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

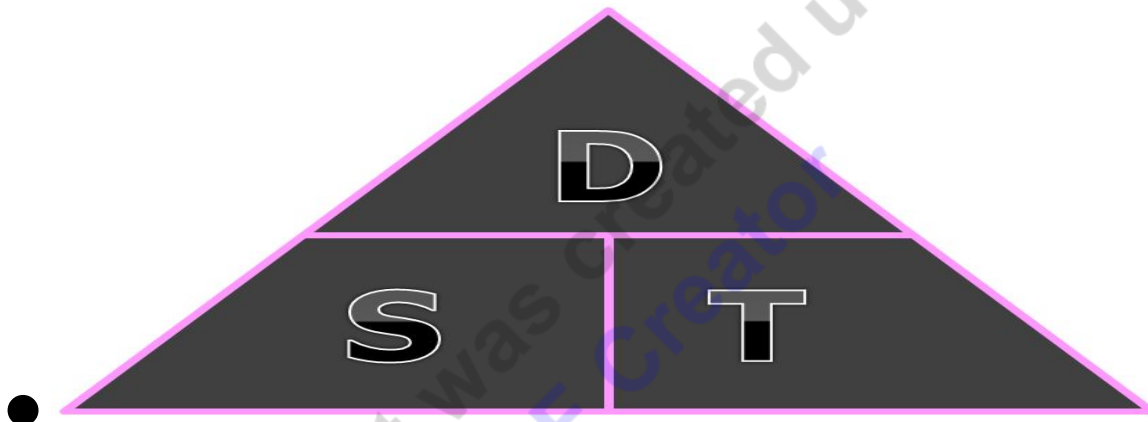


New Area of Focus: Time.

Time: A measuring system used to sequence _____, to compare the durations of events

and the intervals between them, and to quantify the motions of objects.

- Speed: A measure of motion, = distance _____ by time. D/T



Distance = Speed * time (M_____)

Speed = Distance divided by time

Time = Distance _____ by Speed

- Velocity = Speed (distance / time) and _____.

- velocity = Distance Divided by Time

- Acceleration = The rate of _____ in velocity. (m/s)

The final velocity – the _____ velocity, divided by time.

$$\text{also... } a = (v_2 - v_1) / (t_2 - t_1)$$

The SI Unit for acceleration is m/s^2

■ Deceleration – To _____ velocity.

The same formula but value will be negative. – m/s^2

■ Momentum: A measure of the _____ of a body equal to the product of its mass and velocity.

■ Momentum = Mass _____ velocity

■ Law Conservation of Momentum: The momentum of an object is the product of its mass and its _____.

■ Angular momentum: Rotating objects tend to remain rotating at the same speed / direction unless acted upon.

■ When you draw the weights inward, your moment of inertia decreases, and your velocity increases (spin faster).

● Amount of Work (w) done depends on two things:
The amount of F _____ (F) exerted.

The Distance (d) over which the Force is applied.

■ Equation for Work - $w = F \times$ _____

- Joule: Unit of _____, work, or amount of heat.
 - Equal to the energy expended in applying a force of one newton through a _____ of one meter.

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

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

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

- Coulomb: The measurement of a number of _____.

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

- Use to be the light of a standard _____.

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

Science is...

- A study of natural _____.
- A systematic study and _____.

Knowledge through experience.

A good Scientist is....

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

Science is a systematic attempt to get around human limitations.

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

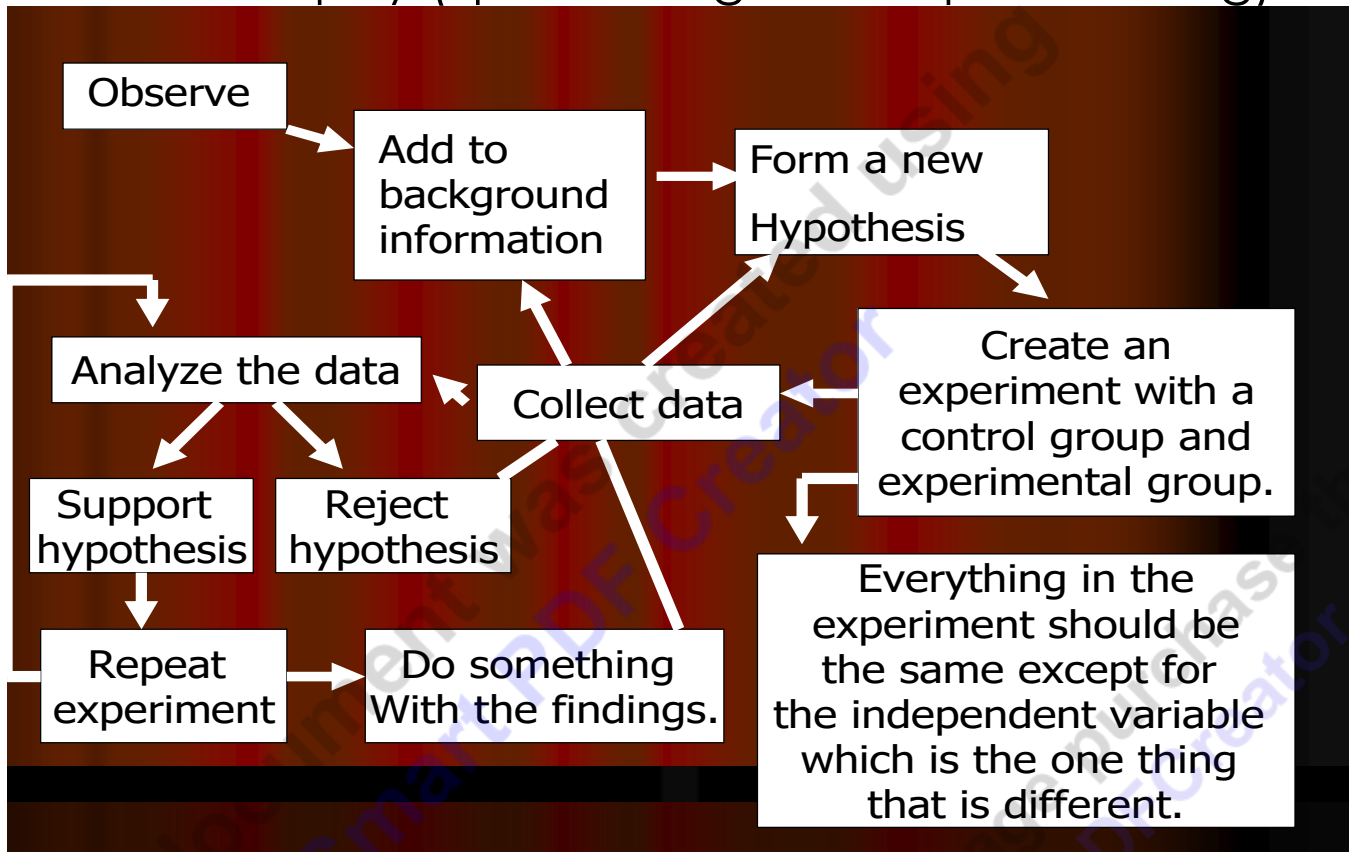
TRY AND WRITE WITHOUT PERSONAL PRONOUNS.

- 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.
- Many more...

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



Variable: Changing quantity of something.

- Independent: (_____) The variable you have control over, what you can choose and manipulate.
- Dependent: (_____) What you measure in the experiment and what is affected during the experiment.
- Control: (_____) Quantities that a scientist wants to remain constant so it a fair test.

Observation – Anything you can see, hear, smell, touch, taste, (Using your _____).

Inference: A _____ based on your observations.

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

HOLD ON TO THESE NOTES. DO NOT LOSE!

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