

# 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.

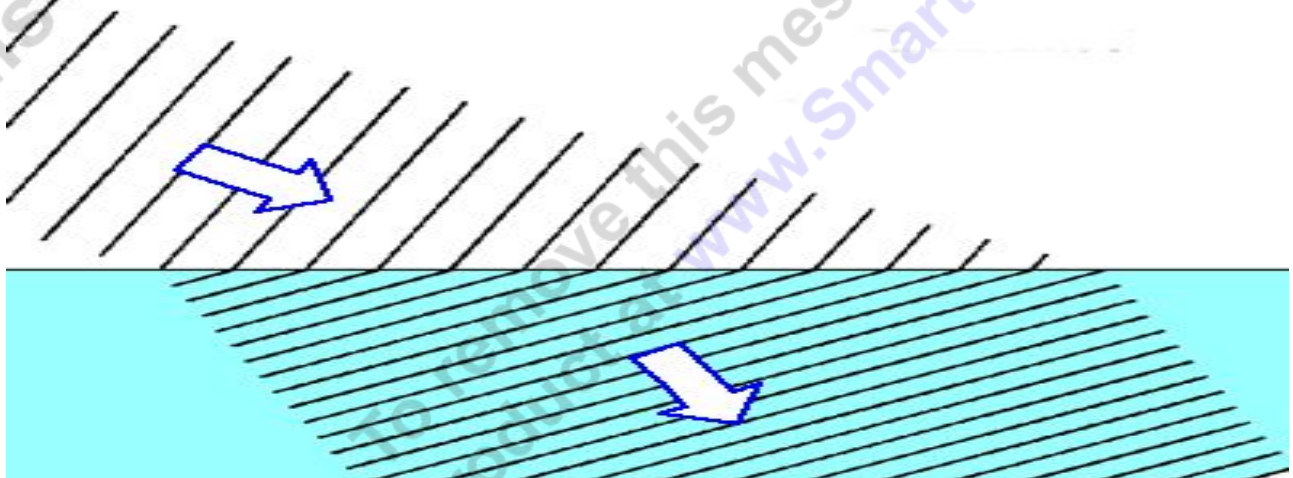
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This is an \_\_\_\_\_ microscope. It can magnify specimens much smaller than a light, or stereoscope, but doesn't usually view live cells or specimens



- 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.

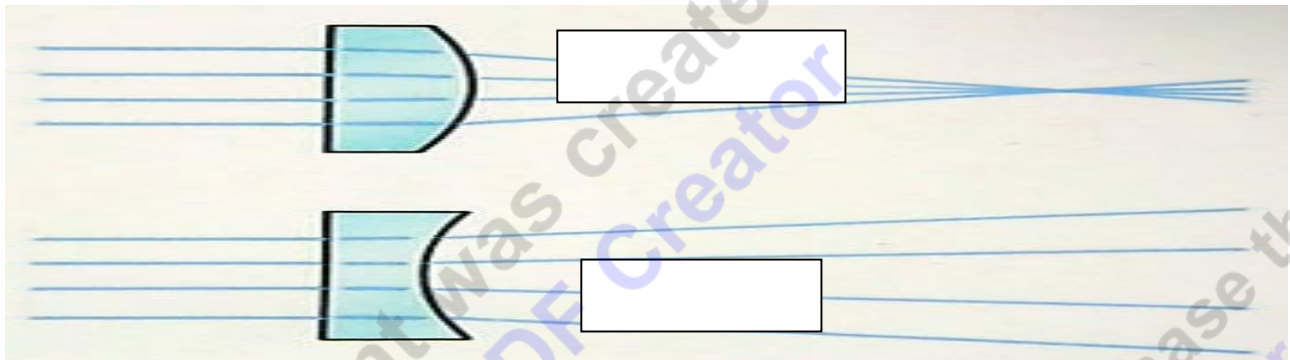


- **Diffraction:** Bending of \_\_\_\_\_.

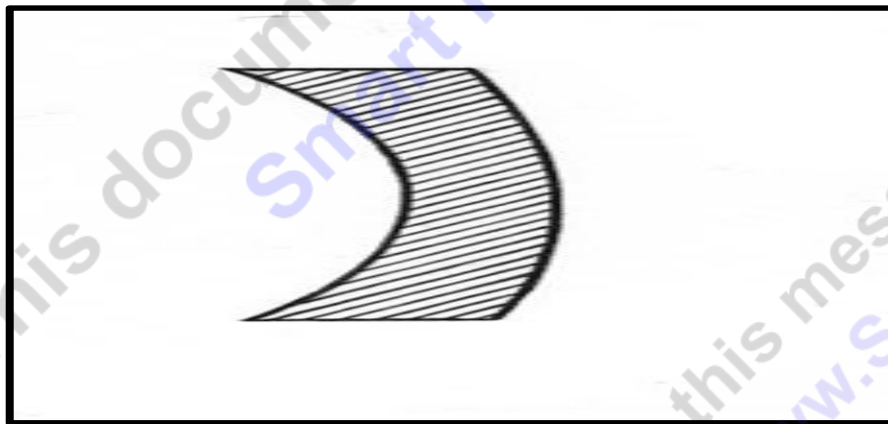


■ **Lens:** A transparent optical device used to converge or diverge transmitted light and to form images.

■ Convex top / Concave bottom



Concavo-convex



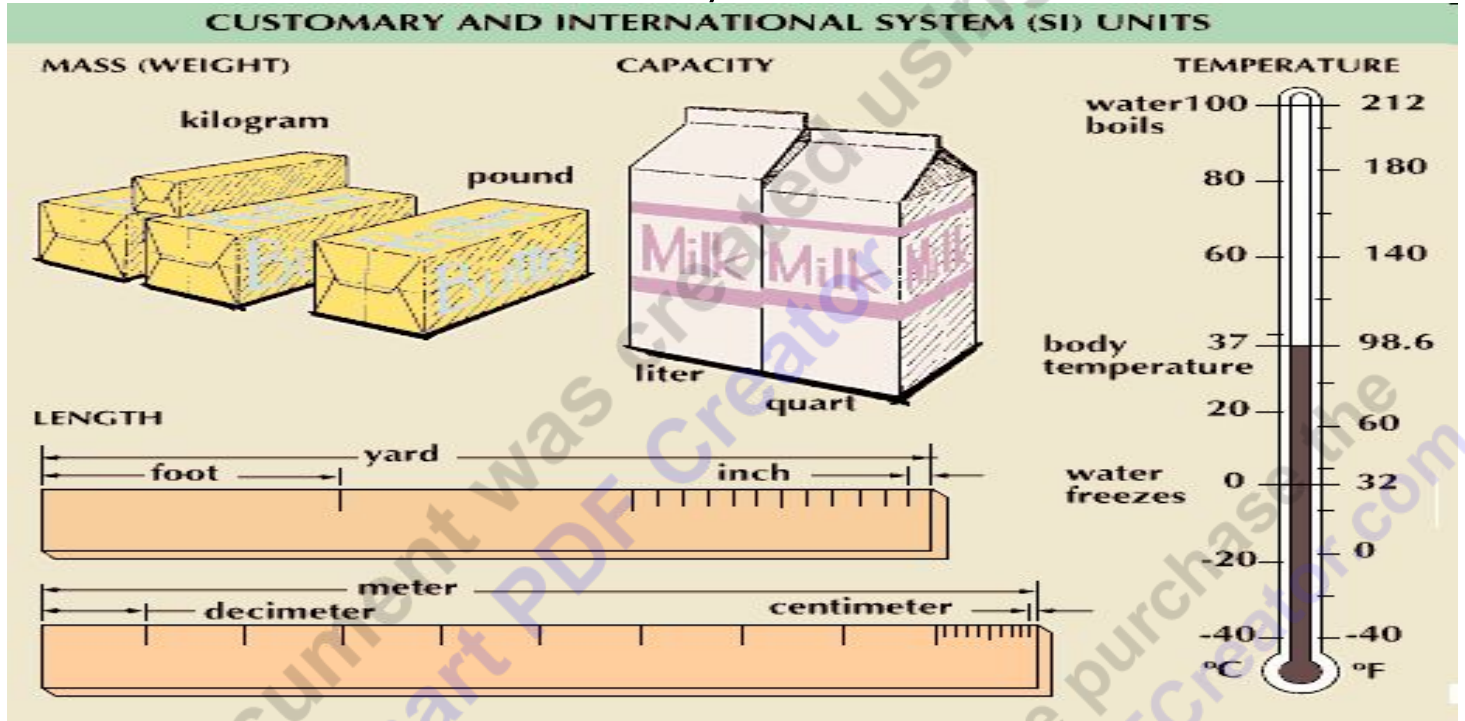
When carrying a microscope, carry it by the \_\_\_\_\_, and have one \_\_\_\_\_ under the base.

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



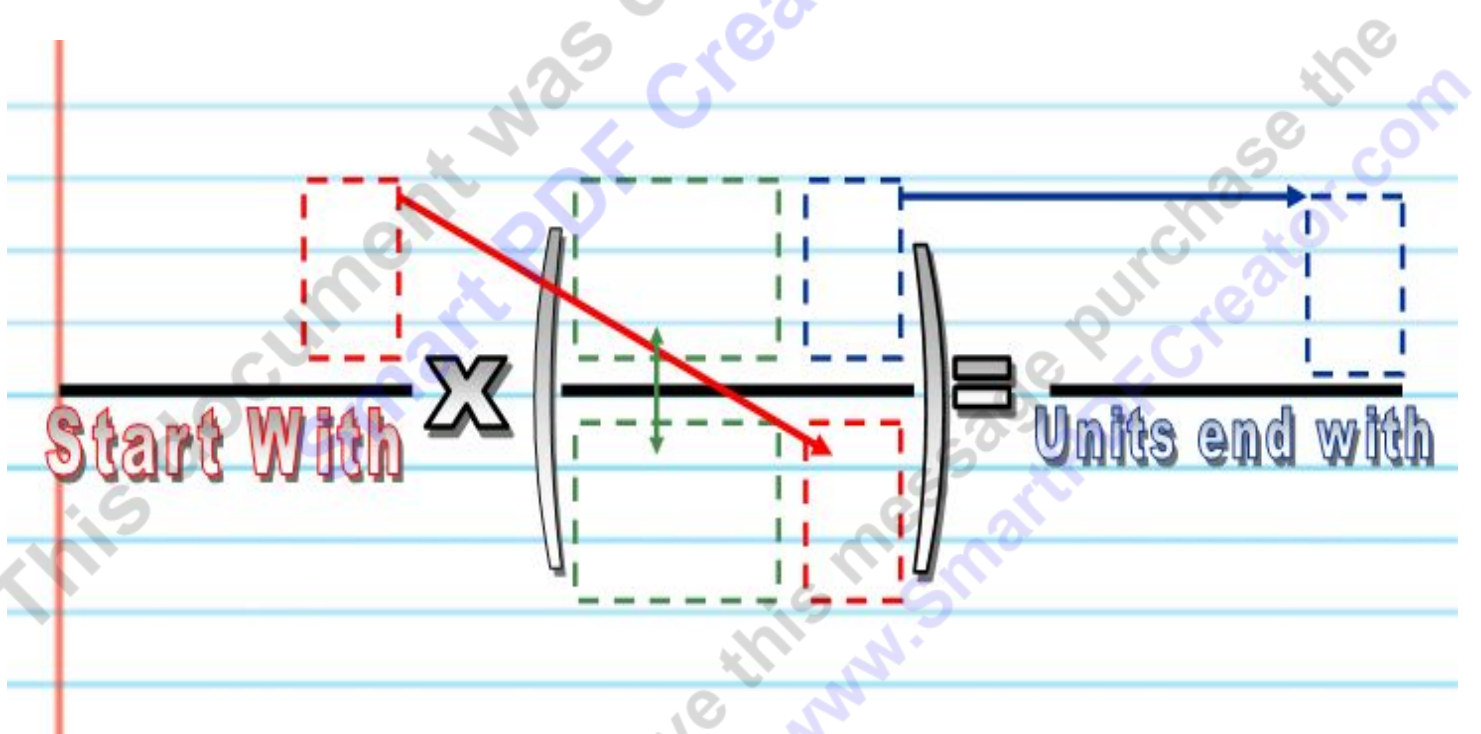
The Metric System: A measurement system based on the powers of \_\_\_\_\_.

### 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 <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	= 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)
	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 <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 -	_____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 - \_\_\_\_\_ cm<sup>3</sup>

Volume of a cylinder: Where Pi = 3.14

Density: How much \_\_\_\_\_ is contained in a given volume. We use grams/cm<sup>3</sup> (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.

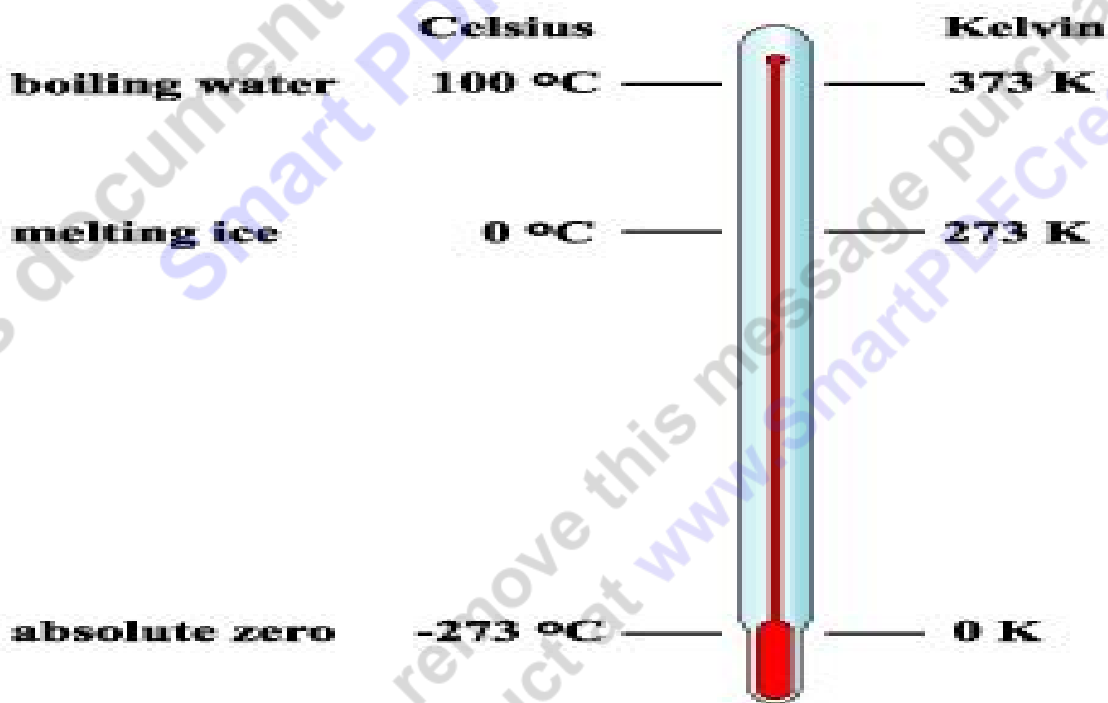
Temperature: The degree of hotness or coldness of a body or environment.



- 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.

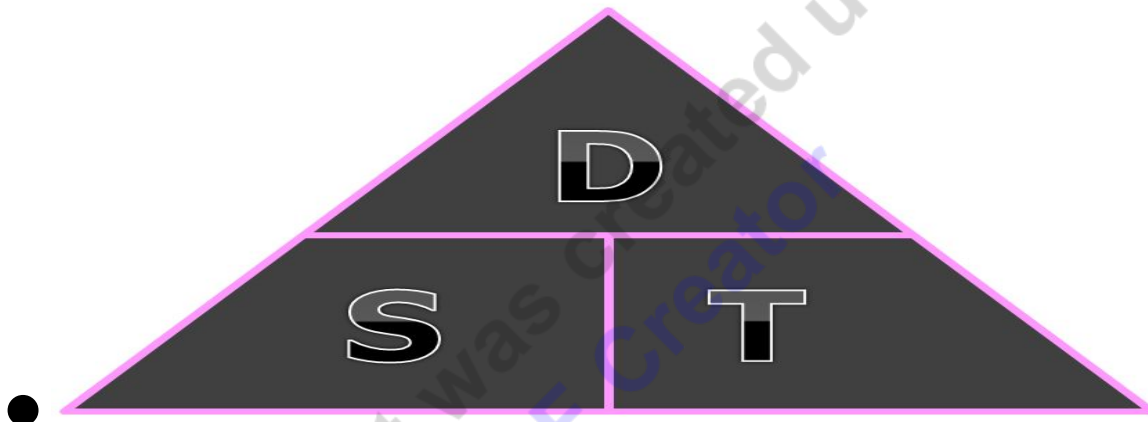


New Area of Focus: Time.

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.

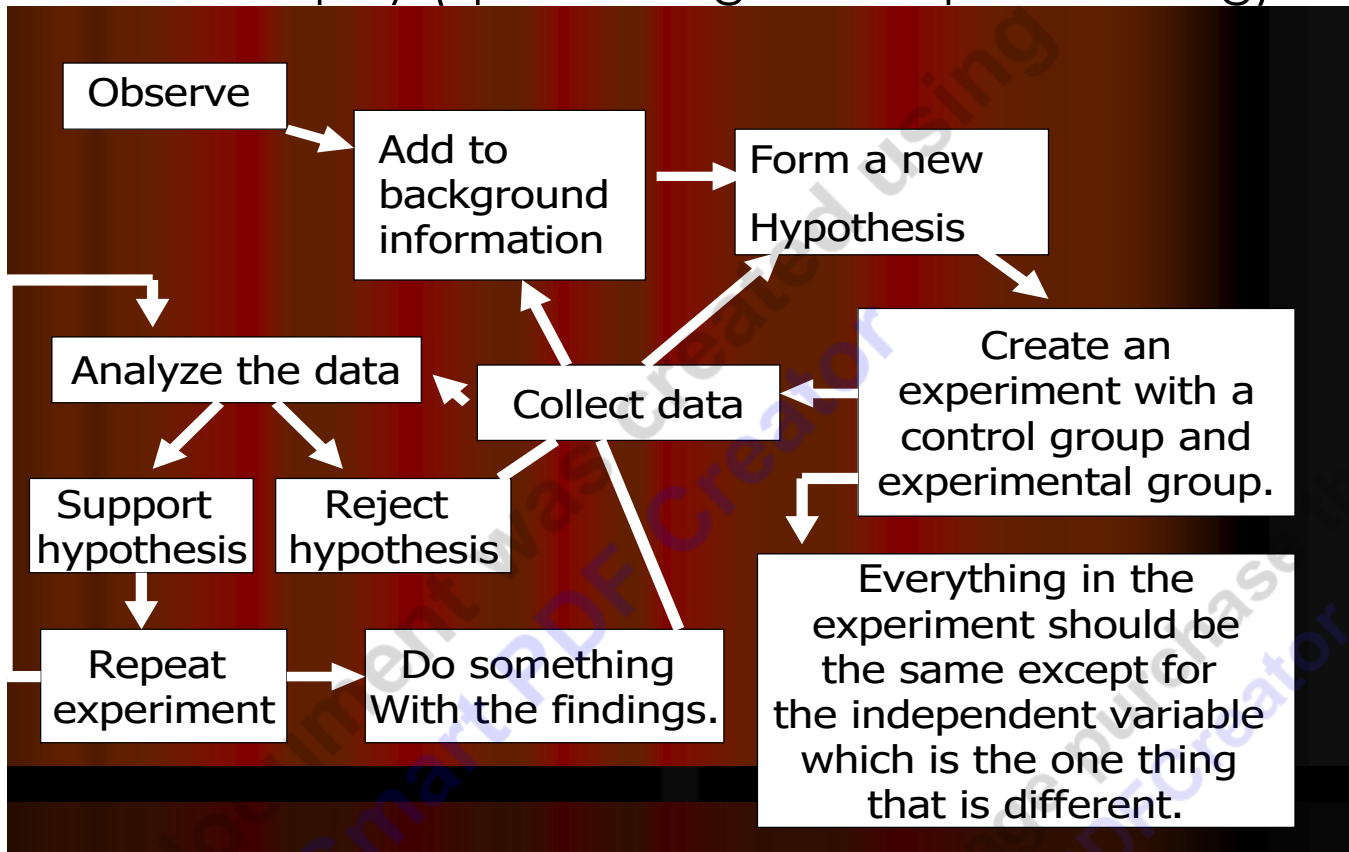
- DO NOT USE...I, me, you, he, she, we, you, they, them, theirs, names, etc

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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