

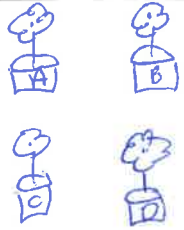





~Scientific Method Notes~

Scientific Method = a process by which scientists do experimental research

Scientific Method Steps

Steps of the Scientific Method	Definition or Written Example	Picture Example
#1 State the Problem/ Ask a Question	- question / observe something ↳ want to figure it out must do research Which fertilizer will make my sunflowers grow the tallest?	
#2 Form a Hypothesis	- an educated guess based on prior knowledge - must be able to be tested Write it in ... If... Then... If I put fertilizer A on my sunflowers, *Variables - see next page* then they will grow.	
#3 Create & Perform Experiment	- the process of testing a hypothesis by carrying out data gathering procedures under controlled conditions # need a material list procedure list I will test 4 different types of fertilizer on my sunflowers and measure the height of plants.	
#4 Collect & Record Data	Qualitative vs Quantitative "N" → measurement using numbers "I" ↓ measurement using your senses *record data in - chart - table - diagram - graph	Plant Growth  Time
#5 Analyze	- to interpret results - sum up experiment My data shows that Miracle-bro works best since the plants grew the tallest.	
#6 Conclusion	- support / refute hypothesis - communicate results I wrote a paper and will present my project at the science fair.	

Other Important Terms

Term	Definition	Example
Observation	To observe means to gather <u>factual</u> information about your surroundings using your <u>5 senses</u>	The flowers grown in Pot A are more vibrant than the others.
Inference	To infer means to use the info gathered during <u>observation</u> to make an <u>opinion</u> about things that are not necessarily seen or known	I smell something... Mom is baking cookies!
Prediction	A prediction is a <u>forecast</u> of what <u>will</u> happen in the <u>future</u> based on past experience	I predict it will rain since the sky is very dark.
Theory	A theory is a <u>well-tested</u> explanation that unifies a broad range of observations and hypotheses and that enables scientists to make <u>accurate</u> predictions about new situations.	Big Bang Theory of Evolution
Law	A law is a statement that describes what is <u>expected</u> to happen under certain sets of conditions	gravity

~VARIABLES~

A variable is a factor that changes in an experiment

Types of variables

Type of Variable	Definition
Independent Variable (IV)	the variable that is <u>purposely</u> changed or manipulated
Dependent Variable (DV)	the variable that <u>responds</u> to the IV (changes because of it)
Constants (3)	all other factors that must remain the <u>same</u> and have a <u>fixed</u> value <u>* must list 3 *</u>
Control	the <u>standard</u> /recommended factor used for <u>comparing</u> experimental effects (the do nothing)

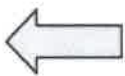
Practice with Variables

IV =
 DV =
 constants₃ =
 control =

Temperature	the measurement of the amount of <u>heat</u> in an object freeze = 0°C or 32°F boiling = 100°C or 212°F room temp = 21°C or 70°F Body Temp = 37°C or 98.6°F	°C F to C = (F-32)/1.8 C to F = (1.8 * C) + 32	It is 93°F or 34°C.
Time	the measurement of the <u>span</u> between 2 events (<u>start</u> and <u>stop</u>)	sec	I swam the 50 in 26.2 sec.

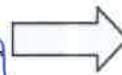
~HOW TO CONVERT USING THE METRIC SYSTEM~

Kilo--	Hecto--	Deka--	standard/ base	deci--	centi--	milli--
King	Henry	Died	slowly	drinking	chocolate	milk
Km Kg KL	Hm Hg HL	Dm Dg DL	Meter (m) Gram (g) Liter (L)	dm dg dL	cm cg cL	mm mg mL
thousand	hundred	ten	one	tenth	hundredth	thousandth
0.001 Km = 1m	0.01 Hm = 1m	0.1 Dm = 1m	1.0 m	10 dm = 1m	100 cm = 1m	1000 mm = 1m



MOVE SMALL TO BIG THEN MOVE THE DECIMAL TO THE **LEFT**

MOVE BIG TO SMALL THEN MOVE THE DECIMAL TO THE **RIGHT**



Practice conversions

$$26.4 \text{ m} \xrightarrow[2R]{2,640} \text{ cm}$$

$$127.45 \text{ mm} \xrightarrow[1L]{12,745} \text{ cm}$$

$$45.01 \text{ L} \xrightarrow[3R]{45,010} \text{ mL}$$

$$0.0034 \text{ Kg} \xrightarrow[6R]{3400} \text{ mg}$$

$$100 \text{ Hm} \xrightarrow[2R]{10,000} \text{ m}$$

$$0.00456 \text{ Dg} \xrightarrow[3R]{4.56} \text{ cg}$$

$$57 \text{ g} \xrightarrow[3L]{0.057} \text{ Kg}$$

~Graphing Notes~

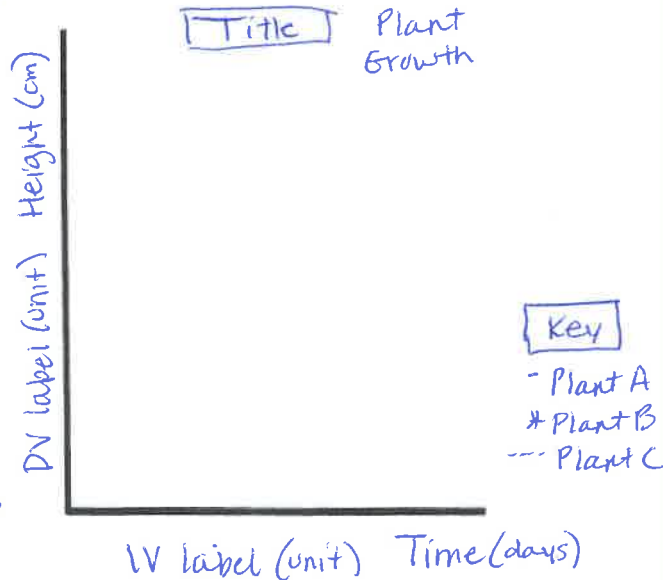
A graph shows data in picture form

The graph allows us to make: interpretations, visually see differences, comparisons, conclusions make draw

ALL GRAPHS MUST HAVE 6 THINGS

1. Title
2. IV label
3. IV unit
4. DV label
5. DV unit
6. Key

The IV is placed on the X axis
The DV is placed on the Y axis



Bar Graphs: used with qualitative data: likes vs- #s
Line Graphs: used with quantitative data: # vs- #

~Metric System~

Definition: a decimal system based on a scale of multiples of 10

AKA: International System of Units (SI)

When measuring YOU must include a unit of measurement and a number stating how many of the units are present. No Naked numbers allowed!

Types of Measurements	Definition	Basic unit	Example
Length	the measurement of how <u>length, height, width</u> of an object	meter (m)	The pen is 17.5 cm long
Mass	the amount of <u>matter</u> in an object always stays <u>constant</u>	gram (g)	The pen's mass is 6g.
Weight	the measure of the pull of <u>gravity</u> on an object does not stay <u>constant</u>	Kilogram (kg)	I weigh 65kg.
Volume	the amount of <u>space</u> an object occupies	Liquids= Liter (L) Solids= cm ³ LxWxH	I drank 1 L of H ₂ O. The cube has a volume of 27 cm ³