

GRADE
12

Reviewer for
GRADE 12-STEM
(S.Y. 2021-2022)

GRADE
12

PART 1 – FIRST SEMESTER

BY ELMER FELISILDA

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GENERAL CHEMISTRY 1

GENERAL CHEMISTRY 1

A. Introduction

We are reviewing chemistry because

- Your entire body is made up of chemicals
- Chemical processes underlie all body processes
- The food you eat, the medicines you take, it's all chemistry!

Matter is anything that has mass and occupies space. Everything on earth has mass and takes up space

Chemistry is the study of matter and the changes it undergoes

Particles composing matter

Particles composing matter		
Atoms	Molecules	Ions
These are the smallest unit of matter that can't be broken down chemically	These are groups of two or more atoms that are chemically bonded	These are particles that have gained or lost one or more of their valence electrons (+: Cation, -: Anion)

States of matter

States of matter

Solid

Liquid

Gas

Plasma

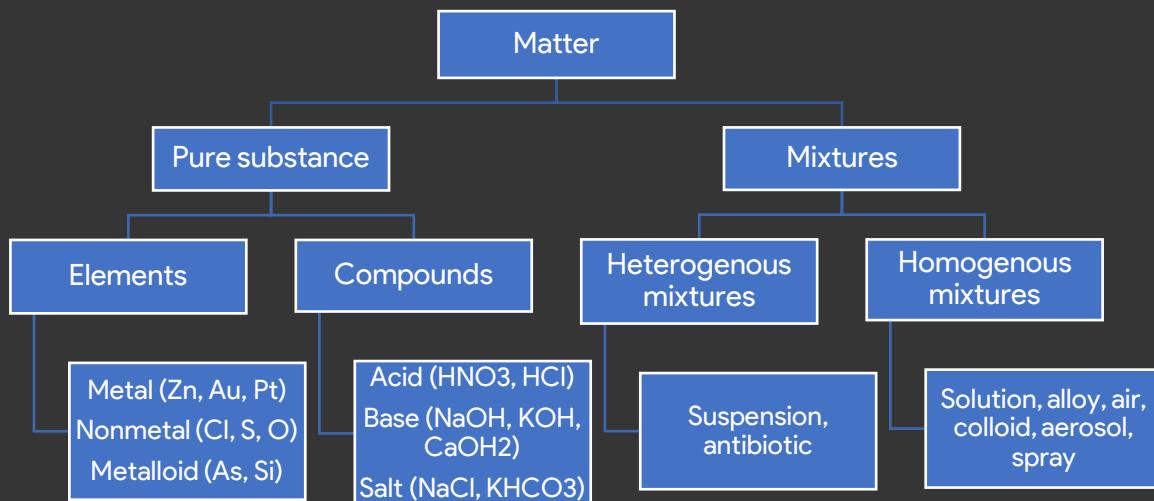
- 4th state of matter
- A hot ionized gas consisting of approximately equal numbers of positively charged ions and negatively charged electrons
- The characteristics of plasmas are significantly different from those of ordinary neutral gasses so that plasmas are considered a distinct “fourth state of matter”.
- Examples: lightning, solar wind, aurora, fluorescent lights, nuclear fireballs

Bose-Einstein Condensate

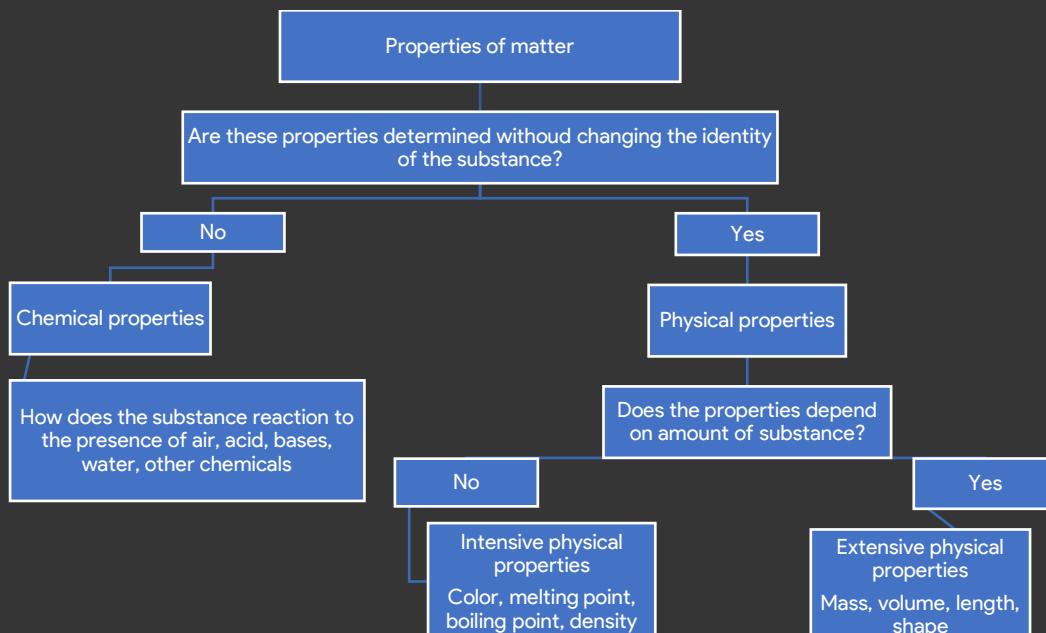
- 5th state of matter
- It is a state of matter in which separate atoms or subatomic particles, cooled to near absolute zero

- When they reach that temperature, the atoms are hardly moving relative to each other; they have almost no free energy to do so. At that point, atoms begin to clump together, and enter the same energy states.

Matter



Properties of matter



Physical change

- It is a change in which the physical form (or state) of a substance, but not its composition altered.

- Cutting of papers
- Melting of ice cream

Chemical change

- It is a change in which a substance is converted into a new substance with different composition and properties.
- Burning of trees
- Ripening of fruits

B. Methods of separating components of mixtures

If an element cannot be decomposed by ordinary chemical means, while the components of a compound can be separated by chemical means, the components of mixture can be separated by mechanical means.

1. Winnowing

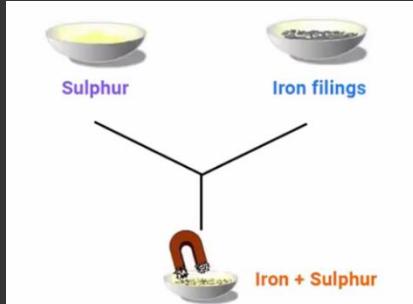
- A traditional way of separating the palay seeds from the hay by utilizing the wind or blowing air



-

2. Magnetism

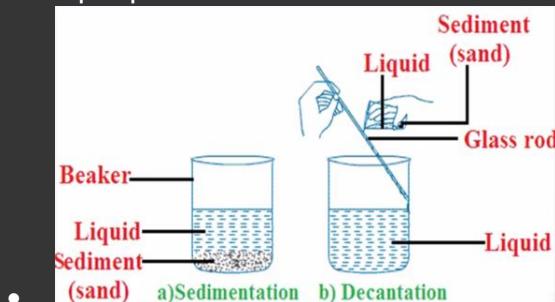
- A process of separating components of mixture of metallic and non-metallic substance by using a magnet



-

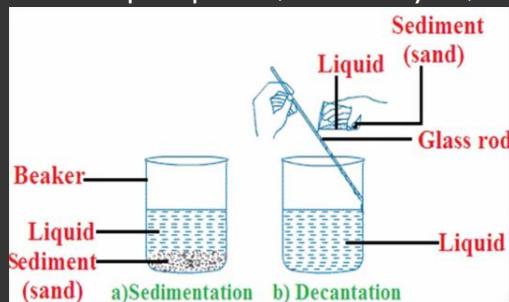
3. Sedimentation

- A physical water treatment using gravity to separate the suspended solids from the liquid portion



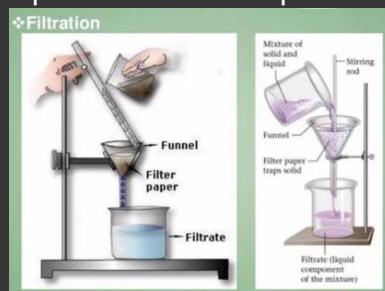
4. Decantation

- Method of separating components of mixtures by removing a layer of liquid, generally one from the settled decant (liquid portion), or to remove undesired liquid from the precipitate (or other layers)



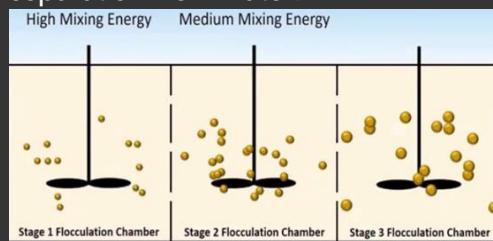
5. Filtration

- It is the solid substance left on the filtering medium called residue, while the clear liquid substance that passes thru the filtering medium is called filtrate.



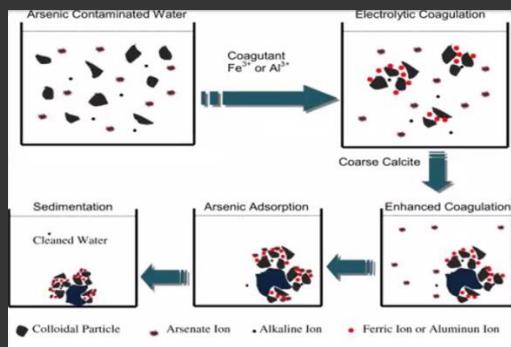
6. Flocculation

- One of the easiest ways to make turbid water clean. It describes the chemical process of contact and adhesion particles from larger cluster allowing the easy separation from water.



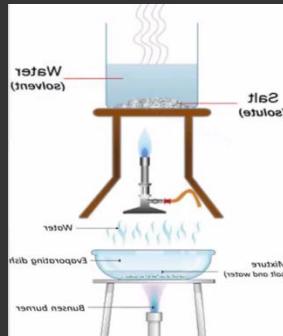
7. Coagulation

- Using a coagulating agent to remove the impurities of an unclear solution. It allows the removal of suspended and colloidal particles which is the first stage in solid-liquid separation.



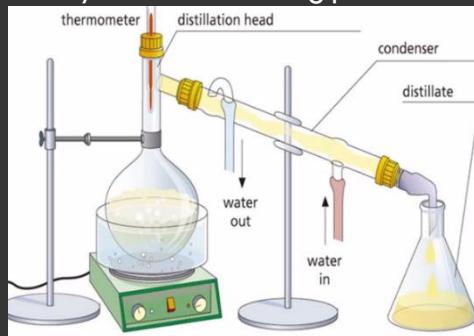
8. Evaporation

- Used to separate soluble solids from liquid utilizing heat
- I.e., in salt solution, salt can be separated from water by evaporation

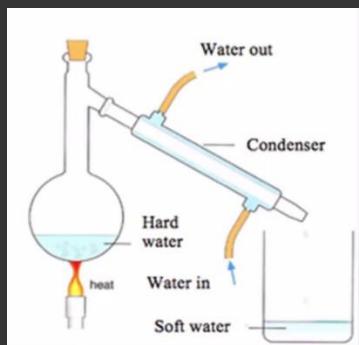


9. Distillation

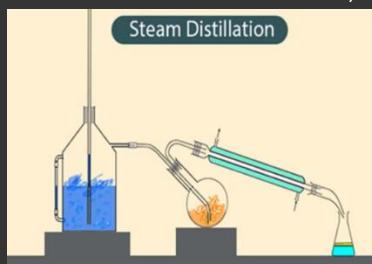
- A widely used method of separating mixtures based on differences in boiling points. The substance left in the distilling flask usually with higher boiling point is called residue if solid or distill if liquid. The substance that passes thru the condenser usually with lower boiling point is called the distillate



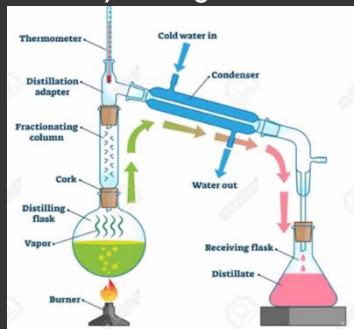
- Simple distillation
 - Set-up is used for mixtures whose difference in boiling points is at least 70 degrees Celsius



- Steam distillation
 - It is used for the purification of mixtures in which the components of mixtures are heat sensitive, meaning easily decomposed by direct heating.

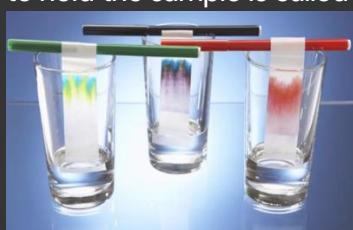


- Fractional distillation
 - Used to separate constituents whose boiling points are nearly similar or differ by 25 degrees Celsius, at 1 atmospheric pressure

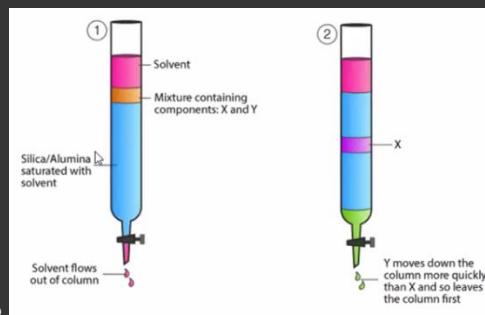


10. Chromatography

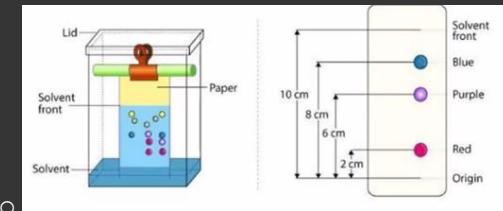
- It came from the Greek word chroma and graphe which means "color writing" is a method of separating mixtures either in gars or liquid form using difference in solubility or using the appropriate solvent, the mobile phase while the medium used to hold the sample is called the stationary phase.



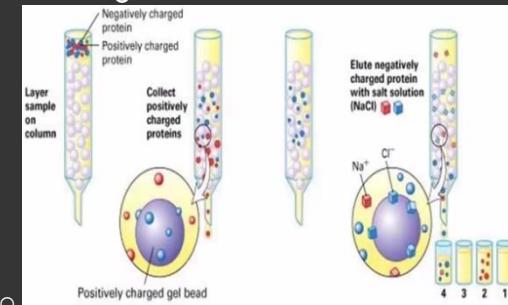
- Adsorption chromatography
 - Analytical separation of a chemical mixture based on the interaction of the adsorbate with the adsorbent.



- Partition chromatography
 - The separation of components between two liquid phases viz original solvent and the film of solvent used in the column.



- Ion exchange chromatography
 - Separates ions and polar molecules based on their affinity to the ion exchanger



C. Basic Law of Chemical Matter

Brief history

4th century BC, Democritus and Leuccippus proposed the idea of an atom. Because of the absence of explanation supported by experimentations, their ideas were not considered useful in the chemical wonders

In 1700, two chemists started to explain chemical behavior in terms of atoms. Dr. Priestly and Lavoisier and the other scientist establish the period for the foundation of the chemistry in about 1785

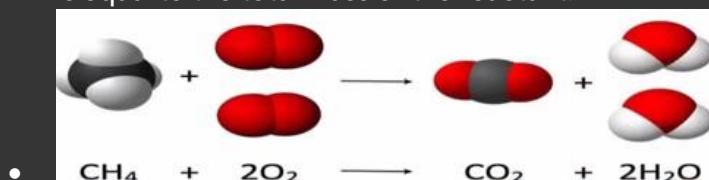
Lavoisier formulated the Law of Conservation of Mass. And in 1803, an English chemist, John Dalton, proposed and developed the atomic theory

Basic Law of Chemical Matter

These laws were inferred from several experiments conducted during the 18th century using a balance for the measurements:

1. Law of Conservation of Mass

- Antoine Lavoisier, a brilliant French chemist, formulated this law by describing one of his experiments involving mercuric oxide.
- He placed a small amount of mercuric oxide, a red solid, inside a retort and sealed the vessel tightly.
- In a chemical reaction, no change in mass takes place. The total mass of the products is equal to the total mass of the reactant.



2. Law of Definite Proportion

- Joseph Louis Proust, 1797
- A compound always contains the same constituent elements in a fixed or definite proportion by mass
- If water samples coming from different sources are analyzed, all samples will contain the same ratio by mass of hydrogen to oxygen.
- Example 1:
 - Sample problem: A pure sample of Sodium Fluoride (NaF) contains 35g of Sodium. How many grams of Fluorine are present in this sample?

BY CONVERSION

Given: NaF

Na = 23g; F = 19g

Look up the atomic mass of each element using the periodic table.

Find: grams of F

$$35g \text{ Na} * \frac{19g \text{ F}}{23g \text{ Na}}$$

Given amount of sodium (35g) multiplied by the quotient of the atomic mass of Fluorine (19g), and Sodium (23g).

$$35g \text{ Na} * \frac{19g \text{ F}}{23g \text{ Na}}$$

Cancel Na on both sides

$$35g * \frac{19g \text{ F}}{23g} = 28.91g$$

Solve

$$28.91g$$

Final answer is 28.91 grams of Fluorine.

BY PROPORTION

$$\frac{35g \text{ Na}}{23g \text{ Na}} = \frac{x}{19g \text{ F}}$$

35g is the given amount, 23g is the atomic mass of Sodium. X is the amount of Fluorine we have to look for while 19g is the atomic mass of Fluorine.

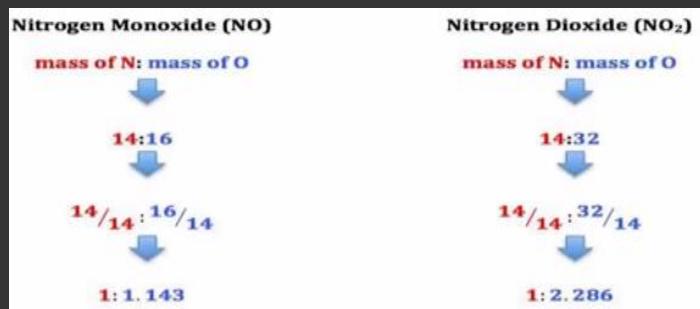
	Cross multiply
$(23g)(x) = (35g)(19g)$	Cross multiplication
$23gx = 665g$	$(23g)(x) = 23gx; (35g)(19g) = 665g$
$\frac{23gx}{23} = \frac{665g}{23}$	Divide both sides by 23 (g can be removed)
$x = 28.91g$	$665 / 23 = 28.91$
$28.91g$	Final answer is 28.91 grams of Fluorine.

- Example 2:
 - If there are 42g of H in a sample of pure methane (CH_4), how many grams of Carbon are present?

BY CONVERSION	
$H = 1g \times 4 = 4g$ $C = 12g \times 1 = 12g$	Multiply the atomic mass of each element by their subscript.
$42g H * \frac{12g C}{4g H}$	42g H is the given number of grams of H, 12g C is the atomic mass of C, and 4g H is the atomic mass of H (x4 since it's its subscript)
$42g H * \frac{12g C}{4g H}$	Cancel H on both side
$42g * \frac{12g C}{4g} = 126g C$	Solve
$126g C$	Final answer is 126 grams of Carbon.
BY PROPORTION	
$\frac{42g H}{4g H} = \frac{x}{12g C}$	42g H is the given number of grams, 4g H is the atomic mass of H (x4 since it's its subscript), 12g is the atomic mass of C. Cross multiply.
$(4g)(x) = (42g)(12g)$	Cross multiplication
$4x = 504$	$(4g)(x) = 4x; (42)(12) = 504$
$\frac{4x}{4} = \frac{504}{4}$	Multiply both sides by 4
$126g C$	Final answer is 126 grams of Carbon.

3. Law of Multiple Proportion

- (John Dalton, 1804) When two elements form a series of compounds, the ratio of the masses of the 2nd element that combine with 1 gram of the first element can always be reduced to small whole numbers



- Example 1
 - Get the ratio of NO and NO₂

N = 14g, O = 16g	Get the atomic mass of both elements
NO	
$\frac{14g}{14g} = \frac{16g}{14g}$	Divide both sides with 14g
$1g = 1.14g$	Divide
NO₂	
O = 32 (16x2)	The grams of oxygen will be 32 because of its subscript.
$\frac{14g}{14g} = \frac{32g}{14g}$	Divide both sides by 14g
$1g = 2.29g$	Divide
Getting the ratio	
$\frac{2.29g}{1.14g}$	Divide the answers on both compounds, 2.29g and 1.14g.
$\frac{2.29g}{1.14g} = 2$	Final answer is 2.

- Example 2
 - Get the ratio of CO and CO₂

C = 12g, O = 16g	Get the atomic mass of both elements
CO	
$\frac{12g}{12g} = \frac{16g}{12g}$	Divide both sides by 12g
$1g = 1.33g$	Divide
CO₂	
O = 32 (16x2)	The grams of oxygen will be 32 because of its subscript.
$\frac{12g}{12g} = \frac{32g}{12g}$	Divide both sides by 12g
$1g = 2.67g$	Divide
Getting the ratio	

$\frac{2.67g}{1.33g}$	Divide the two answers on both compounds, 2.67g and 1.33g
$\frac{2.67g}{1.33g} = 2$	Final answer is 2.

D. Isotopes

These are the atoms of the same element which contains the same number of proton but different number of neutrons

Isotopes have the same chemical properties but slightly different physical properties

Isotopes of Some Elements and Their Atomic Mass				
Isotope	Natural Abundance (%)	# Protons	# Neutrons	Atomic Mass
Boron-10	19.9	5	5	10.0129369
Boron-11	80.1	5	6	11.0093054
Carbon-12	98.90	6	6	12.0 EXACTLY
Carbon-13	1.10	6	7	13.003354826
Oxygen-16	99.762	8	8	15.99491463
Oxygen-17	0.038	8	9	16.9991312
Oxygen-18	0.200	8	10	17.9991603
Chlorine-35	75.77	17	18	34.968852721
Chlorine-37	24.23	17	20	36.96590262

Average atomic mass

The calculations of the atomic masses requires the

- Percent (%) abundance of each isotope
- Atomic mass of each isotope of that element
- Sum of weighted averages

Average atomic mass		
$mass_1 * \%abundance * mass_2 * \%abundance \dots$		
Isotope	Mass	Abundance
^{24}Mg	$= 23.99 \text{ amu} \times 78.70/100$	$= 18.88 \text{ amu}$
^{25}Mg	$= 24.99 \text{ amu} \times 10.13/100$	$= 2.531 \text{ amu}$
^{26}Mg	$= 25.98 \text{ amu} \times 11.17/100$	$= 2.902 \text{ amu}$
Atomic mass (average mass) Mg		= 24.31 amu

Example

- Boron has two occurring isotopes: boron-10 with an atomic mass of 10.0129 amu and 0.198 abundance; and boron-11 with an atomic mass of 11.0093 amu and 0.802 abundance. What is the boron's average atomic mass?

$B-10 = (10.0129)(0.198)/100$	$B-11 = (11.0093)(0.802)/100$
$B-10 = (10.0129)(0.198)/100 = 0.0198$	$B-11 = (11.0093)(0.802)/100 = 0.0982$
$0.0198 + 0.0982 = 0.108$	

Stable and unstable isotopes

Stable

- A stable isotope does not undergo radioactive or nuclear decay
- Stable isotopes have a stable proton-neutron combination and do not display any sign of decay. This stability comes from the amount of neutrons present in an atom. If an atom has too many or too few neutrons, it is unstable and tends to disintegrate. Since stable isotopes do not decay, they do not produce radiation or its associated health risks.

Unstable

- An unstable isotope undergoes radioactive or nuclear decay
- They are also known as radioisotopes or radionucleides.
- Radioactive isotopes have an unstable combination of protons and neutrons. These isotopes decay, emitting radiation that includes alpha, beta, and gamma rays. Scientists classify radioactive isotopes according to their creation process: long-lived, cosmogenic, anthropogenic, and radiogenic.

Use of isotopes

Uses of stable isotopes

- Scientists performing environmental and ecological experiments use stable isotopes of oxygen, hydrogen, sulfur, nitrogen, and carbon. For example, in geochemistry, scientists study the chemical composition of geological materials such as minerals and rocks. Stable isotopes are dependable tools for determining many facts about geological materials, such as their age and where they came from.

Use of radioactive isotopes

- Radioactive isotopes find uses in agriculture, food industry, pest control, archaeology, and medicine. Radiocarbon dating, which measures the age of carbon-bearing items, uses a radioactive isotope known as carbon-14. In medicine, gamma rays emitted by radioactive elements are used to detect tumors inside the human body. Food irradiation, the process of exposing food to a controlled level of gamma rays, kills many types of bacteria, making food safer to eat.

E. Chemical formulas and compounds

Chemical compounds are formed when two or more ions combine.

To allow an easier and unambiguous identification of numerous compounds, the International Union of Pure and Applied Chemistry (IUPAC) established a set of rules for chemical nomenclature.

Writing the chemical formula

Steps in writing the chemical formula	Calcium Chloride
Step 1: Identify the symbols and charge of the elements	Ca^{2+}, Cl^{1-} Cation, anion
Step 2: Balance the charges by looking for multiplier(s)	$Ca^{2+(1)}, Cl^{1-(2)}$ Cross multiply
Step 3: Write the multiplier(s) as subscript of each element	$CaCl_2$

Examples

Compounds	Cation and anion	Chemical formula
Sodium Oxide	Na^{1+}, O^{-2}	Na_2O
Barium Fluoride	Ba^{+2}, F^{-1}	BaF_2
Zinc Hydroxide	Zn^{+2}, OH^{-1}	$Zn(OH_2)$
Potassium Phosphate	K^{+1}, PO_4^{-3}	$K_3(PO_4)$
Aluminum Sulfate	Al^{+3}, SO_4^{-2}	$Al_2(SO_4)_3$

In writing chemical formula of a compound, there are a few methods to consider, namely:

1. Traditional or Stack method
 - For methods with two or more charges. Utilizes the ending “ic” which means that the higher charge is used.
 - Example: Ferric Oxide
 - Charges of Fe are 3+ and 2+
 - $Fe^{3+(2)} O^{2-(3)} = Fe_2O_3$
 - “ous” which means that the lower charge is used
 - Example: Ferrous Chloride
 - Charges of Fe are 3+ and 2+
 - $Fe^{2+(1)} Cl^{1-(2)} = FeCl_2$
2. Roman numerals
 - This method uses roman numerals to represent the charge of the metal.
 - This method is a little bit easier to use than the traditional method since the charge of the metal is already given. Looking from the example previously, it can be written as
 - Iron (III) oxide = Fe_2O_3
 - Iron (II) oxide = $FeCl_2$
3. Latin Greek prefixes
 - This method is much easier than the first two methods since one can still identify the chemical formula of a compound even without identifying the charges.

Mono – one	Tetra – four
Di – two	Penta – five
Tri – three	Hexa – six

- Example

- Carbon Dioxide = CO_2
- Phosphorus Pentabromide = PBr_5
- Carbon Tetrachloride = CCl_4

Naming compounds

The process of naming compound allows the chemist to communicate formulae in words rather than in chemical symbols. There are, however, a few rules about naming compounds which need to be known in order to write a formula in word form or translate a compound in word form into chemical symbols.

Ionic compounds

- If the compound is ionic, then the name of the cation (usually metal) comes first, followed by the 'compound' name of the anion. To find the compound name of an anion, replace the end of the element's name with "ide".
- Name of cation + name of anion, suffix 'ide'
- Examples

Name of cation + name of anion, suffix 'ide'		
$NaCl$	Sodium (cation) first, followed by chlorine changed with the suffix 'ide'	Sodium Chloride
Name of cation + name of polyatomic (radical) anions, suffix 'ate'		
Na_2CO_3	Sodium (cation) first, followed by a polyatomic group containing carbon and oxygen to form carbonate	Sodium Carbonate

MgO	Magnesium (cation) first, followed by oxygen changed with the suffix 'ide' because oxygen is the sole ion and not part of a polyatomic group	Magnesium Oxide
$NaHCO_3$	Sometimes if the compound contains 'hydrogen' shortens to 'bi' such as with $NaHCO_3$ which is known as Sodium Hydrogen Carbonate	Sodium Bicarbonate

Hydrogen compounds

- If the compound contains hydrogen and a metal, the metal comes first, followed by the word 'hydride', to denote the hydrogen component.

Metal + hydride		
NaH	Sodium (metal) first, followed by hydrogen changed with the suffix 'ide'	Sodium Hydride

- If the compound contains hydrogen and a non-metal and does not contain water (H_2O) then the hydrogen comes first, followed by the element's name replaced with the 'ide' suffix.

Hydrogen + non-metal, suffix 'ide'		
HF	Hydrogen first, followed by fluorine changed with the suffix 'ide'	Hydrogen Fluoride

- If the hydrogen non-metal compound dissolves in water, it starts with the 'hydro' prefix, followed by the element's name replaced with an 'ic' suffix, followed by 'acid'

Hydro (name of element, suffix 'ic') acid		
HCl	Hydro, then chlorine with an 'ic' suffix, then 'acid'	Hydrochloric Acid

Oxygen compounds

- When naming ionic compounds that contains oxygen, the basic rule is similar. If the compound contains hydrogen and oxygen anion (oxo anion) and does not contain water, then hydrogen comes first, followed by the element name with the suffix 'ate'.

Hydrogen + element, suffix 'ate'		
H_2CO_3	Hydrogen followed by carbon with the suffix 'ate'	Hydrogen Carbonate

- The rule "ate" is used for the most common or the only compound made with an oxyanion. Some compounds, however, form more than one type of compound with oxygen and the amount of oxygen will affect the prefixes and suffixes used.
- This occurs for all oxyanions, with or without hydrogen involved.

Naming more than one type of oxygen compound				
Oxygen level	Prefix	Element (ex. Chlorine)	Suffix	Name
A little oxygen	Hypo-	ClO	-ite	Hypochlorite
Some oxygen		ClO_2	-ite	Chlorite
More oxygen		ClO_3	-ate	Chlorate
A lot of oxygen	Per-	ClO_4	-ate	Perchlorate

- The oxygen level corresponds with the relative amounts in different compounds and not necessarily the specific numbers of oxygen atoms.
- If an element forms just two types of oxyanion compounds, then the suffixes 'ite' and 'ate' will suffice.

Chlorine and oxygen plus hydrogen	
$HClO$	Hypochlorous acid
$HClO_2$	Chlorous acid
$HClO_3$	Chloric acid
$HClO_4$	Perchloric acid

Covalent compounds

- If a compound contains two non-metals in a covalent bond, then
 - The least electronegative element is named first
 - If the compound contains hydrogen, hydrogen is named first

- The number of atoms of each element is indicated by a prefix
- If the first element has only one charge, the prefix is not used
- The name of the element has the suffix ‘ide’

1	Mono- or mon-	6	Hexa-
2	Di-	7	Hepta-
3	Tri-	8	Octa-
4	Tetra-	9	Nona-
5	Penta-	10	Deca-

- Examples

CO	Carbon (least electronegative atom) first, followed by the prefix ‘mon’ to indicate one atom of oxygen, the most electronegative atom, with the suffix ‘ide’	Carbon Monoxide
CO_2	Carbon (least electronegative atom) first, followed by the prefix ‘di’ to indicate two atoms of hydrogen, the most electronegative atom, with the suffix ‘ide’	Carbon Dioxide
H_2O	The prefix ‘di’ to indicate two atoms of hydrogen, which has naming priority, followed by ‘mon’ to indicate one atom of oxygen	Dihydrogen Monoxide

Common names

- There are number of common names that chemists like to use instead of the proper scientific names. Most names and formulae are well-known. It is recommended that common names and formulae be written down as they are encountered so they can be memorized.

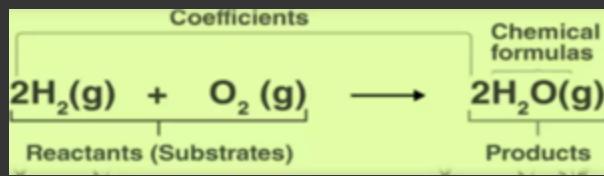
Common name	Proper name	Chemical formula
Water	Dihydrogen Monoxide	H_2O
Baking Soda	Sodium Bicarbonate	$NaHCO_3$
Table Salt	Sodium Chloride	$NaCl$
Limestone	Calcium Carbonate	$CaCO_3$
Quartz	Silicon Dioxide	SiO_2
Alka Seltzer	Sodium Bicarbonate	$NaHCO_3$
Battery Acid	Sulfuric Acid	H_2SO_4
Bleach	Sodium Hypochlorite	$NaClO$

F. Balancing chemical reaction

Law of conservation of mass

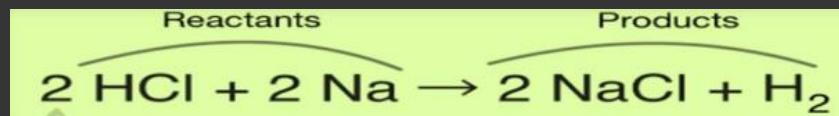
- States that matter can neither be created nor destroyed.
- Applying this law to a chemical reaction means that the mass of the reactant is always equal to the mass of the product.

Another way of describing chemical reactions is by means of skeleton equation



Balancing chemical equations

The numbers in front of the formulas in a balanced equation are called coefficients. These are usually whole numbers and are usually not written if the value is 1.



Steps

1. Write the skeleton equation describing the reaction
2. Count the number of atoms on the reactant side and on the product side of the equation to see whether the equation is already balanced or not
3. Begin by balancing the atoms that occur in the largest number on either of the equation
4. Polyatomic ions that occur on both side of the chemical equations are balanced as ion units
5. Check your answer. Count the number of each type of atom on each side of the equation. Make sure that the coefficients used are whole numbers in their lowest terms

Example 1

- $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{O}_2$

Write the number of subscripts of all elements on both sides		
2	H	2
2	O	3

 - O is not balanced (subscripts on both sides aren't equal), so we try to add a coefficient on either side and check if it's balanced. Let's put a coefficient of 2 in H_2O in the right side.
 - $\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

2	H	4
2	O	4

 - Due to distributive property, H_2 is now H_4 , while O is now O_2 . However, it's still not balanced. Let's put a coefficient of 2 on H_2O_2 in the left side.
 - $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

4	H	4
4	O	4

 - It's now balanced. The balanced equation is $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

Example 2

- $\text{Cu}(\text{NO}_3)_2 + \text{KOH} \rightarrow \text{Cu}(\text{OH})_2 + \text{KNO}_3$
- Write the number of subscripts of all elements on both sides

1	Cu	1
---	----	---

2	N	1
7	O	5
1	K	1
1	H	2

- Note that subscripts inside the parentheses gets multiplied with the subscript outside the parentheses.
- Let's balance N first. We'll put a coefficient of 2 on the KNO_3 .
 - $Cu(NO_3)_2 + KOH \rightarrow Cu(OH)_2 + 2KNO_3$

	1	Cu	1	
	2	N	1	2
	7	O	5	8
	1	K	1	2
	1	H	2	

- N is now balanced.
- Let's balance K next. We'll put a coefficient of 2 on the KOH .
 - $Cu(NO_3)_2 + 2KOH \rightarrow Cu(OH)_2 + 2KNO_3$

	1	Cu	1	
	2	N	1	2
	8	O	5	8
	2	K	1	2
	2	H	2	

- Since both sides are now equal, it is now balanced. The balanced equation is $Cu(NO_3)_2 + 2KOH \rightarrow Cu(OH)_2 + 2KNO_3$.

G. Stoichiometry

It is the study of the relative quantities of reactants and product in a chemical reaction. The word stoichiometry was derived from the two Greek words stoikhein meaning elements, and metron meaning to measure. Taking the two meanings together, stoichiometry literally means “to measure elements”.

Interpreting balanced chemical equations

In stoichiometry, a balanced chemical equation is used as the basis for computing the amount of reactants required to produce specific quantities of products.

Example

- $2Mg + O_2 \rightarrow 2MgO$
- We will get the total mass of both the reactant and product. Let's start with the reactant first.
- Let's first get $2Mg$.

$Mg = 1 * 24.31g = 24.31g Mg$	Get the molar mass of Mg and multiply it with the number of atoms (subscript)
$2 \text{ mole } Mg * \frac{24.31g \text{ Mg}}{1 \text{ mole } Mg}$	2 mole Mg is the coefficient of Mg in the given formula. 24.31g Mg is the one we calculated above. 1 mole Mg is consistent, meaning the denominator will always be 1.

$2 \text{ mole Mg} * \frac{24.31 \text{ g Mg}}{1 \text{ mole Mg}}$	Cancel mole Mg.
$2 * \frac{24.31 \text{ g Mg}}{1} = 48.62 \text{ g Mg}$	Compute.
48.62 g Mg	Mass for 2Mg.

- Get O_2 next.

$O = 2 * 16.00 \text{ g} = 32.00 \text{ g } O_2$	Get the molar mass of O and multiply it with the number of atoms (subscript)
$1 \text{ mole } O_2 * \frac{32.00 \text{ g } O_2}{1 \text{ mole } O_2}$	1 mole O_2 is the coefficient of O_2 in the given formula. 32.00g O_2 is the one we calculated above. 1 mole O_2 is consistent, meaning the denominator will always be 1.
$1 \text{ mole } O_2 * \frac{32.00 \text{ g } O_2}{1 \text{ mole } O_2}$	Cancel mole O_2
$1 * \frac{32.00 \text{ g } O_2}{1}$	Compute.
$32.00 \text{ g } O_2$	Mass for O_2

- Simply add the mass for 2Mg and O_2 to get the total mass of the reactant.

$48.62 \text{ g Mg} + 32.00 \text{ g O}_2$	Add the masses of the elements.
80.62 g	Total mass of the reactant

- Do the same process to the product.

$Mg = 24.31 * 1 = 24.31$ $O = 16.00 * 1 = 16.00$	Get the molar mass of both element and multiply it with the number of atoms (subscript)
$24.31 + 16.00 = 40.31$	Add them together
$2 \text{ mole MgO} * \frac{40.31 \text{ g MgO}}{1 \text{ mole MgO}}$	2 mole MgO is the coefficient, 40.31 is the combined molar mass, and 1 mole MgO is constant.
$2 \text{ mole MgO} * \frac{40.31 \text{ g MgO}}{1 \text{ mole MgO}}$	Cancel mole MgO
$2 * \frac{40.31 \text{ g MgO}}{1}$	Solve
80.62 g MgO	Total mass of the product.

Mole-to-mole relationships in balanced chemical equations

You have learned that the coefficients of the reactants and the product in a balanced chemical equation indicate their mole relationships. The coefficients in the balanced chemical equation to derived conversion factors called mole ratios.

Mole ratio is a ratio between the number of moles of any two substances in a balanced chemical equation.

Example 1

- One source of carbon dioxide gas, an example of a greenhouse gas, is the combustion of hydrocarbons like propane, C_3H_8 . How many moles of carbon dioxide gas is produced from the complete combustion of 10 moles of C_3H_8 with excess oxygen gas.

- $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$
- Balance the equation first.
- Balanced equation: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- We are asked to find the total moles of CO_2 from the combustion of 10 moles of C_3H_8 .

$10 \text{ mole } C_3H_8 * \frac{3 \text{ mole } CO_2}{1 \text{ mole } C_3H_8}$	10 mole is the given moles of C_3H_8 , 3 mole CO_2 is the moles in the balanced equation, while 1 mole C_3H_8 is constant.
$10 \text{ mole } C_3H_8 * \frac{3 \text{ mole } CO_2}{1 \text{ mole } C_3H_8}$	Cancel mole C_3H_8 .
$10 * \frac{3 \text{ mole } CO_2}{1}$	Solve.
30 moles CO_2	Final answer is 30 moles of Carbon Dioxide.

Example 2

- When dinitrogen pentoxide (N_2O_5) is heated, it undergoes decomposition, forming nitrogen dioxide gas (NO_2) and oxygen gas (O_2). How many moles of each of the product is formed when 0.025 mole of (N_2O_5) is decomposed?
 - $N_2O_5 \rightarrow NO_2 + O_2$
 - Balance the equation first.
 - Balanced equation: $2N_2O_5 \rightarrow 4NO_2 + O_2$
 - We are asked to find how many moles of NO_2 and O_2 is formed when 0.025 mole of N_2O_5 is decomposed.

NO_2	
$0.025 \text{ mole } N_2O_5 * \frac{4 \text{ mole } NO_2}{1 \text{ mole } N_2O_5}$	0.025 mole is the given moles of N_2O_5 , 4 mole is from the balanced equation, and 1 mole is constant.
$0.025 \text{ mole } N_2O_5 * \frac{4 \text{ mole } NO_2}{1 \text{ mole } N_2O_5}$	Cancel mole N_2O_5 then solve.
$0.1 \text{ mole } NO_2$	Answer for NO_2 .
O_2	
$0.025 \text{ mole } N_2O_5 * \frac{1 \text{ mole } O_2}{1 \text{ mole } N_2O_5}$	0.025 mole is the given moles of N_2O_5 , 1 mole O_2 is from the balanced equation, and 1 mole N_2O_5 is constant.
$0.025 \text{ mole } N_2O_5 * \frac{1 \text{ mole } O_2}{1 \text{ mole } N_2O_5}$	Cancel mole N_2O_5 then solve.
$0.3 \text{ mole } O_2$	Answer for O_2 .
0.1 mole NO_2 and 0.3 mole O_2	Final answer

Chemical reactions

H. Introduction

We are reviewing chemistry because

- Your entire body is made up of chemicals
- Chemical processes underlie all body processes
- The food you eat, the medicines you take, it's all chemistry!

Matter is anything that has mass and occupies space. Everything on earth has mass and takes up space

Chemistry is the study of matter and the changes it undergoes

Particles composing matter

Particles composing matter		
Atoms	Molecules	Ions
These are the smallest unit of matter that can't be broken down chemically	These are groups of two or more atoms that are chemically bonded	These are particles that have gained or lost one or more of their valence electrons (+: Cation, -: Anion)

States of matter

States of matter

Solid

Liquid

Gas

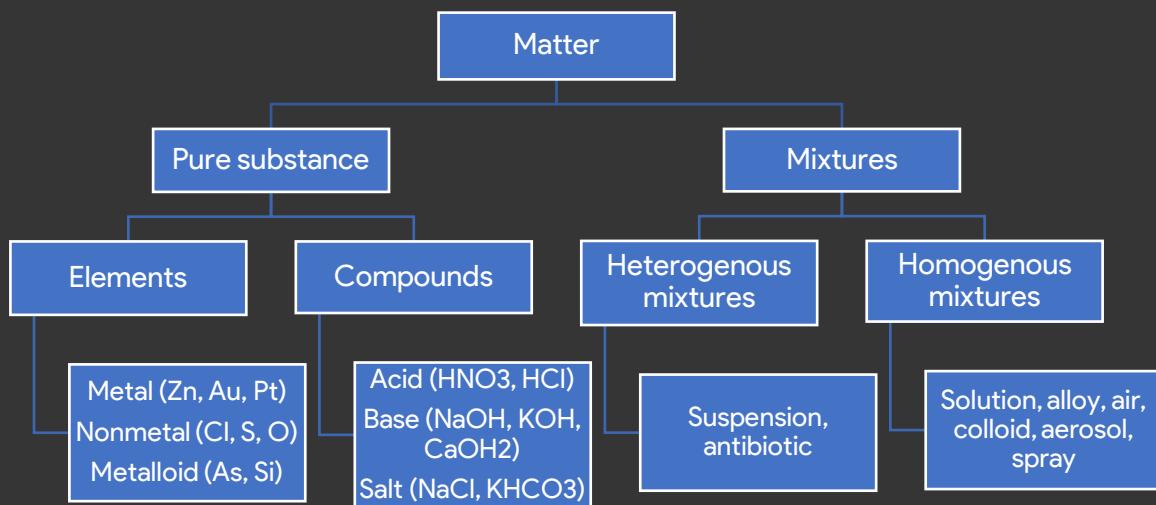
Plasma

- 4th state of matter
- A hot ionized gas consisting of approximately equal numbers of positively charged ions and negatively charged electrons
- The characteristics of plasmas are significantly different from those of ordinary neutral gasses so that plasmas are considered a distinct “fourth state of matter”.
- Examples: lightning, solar wind, aurora, fluorescent lights, nuclear fireballs

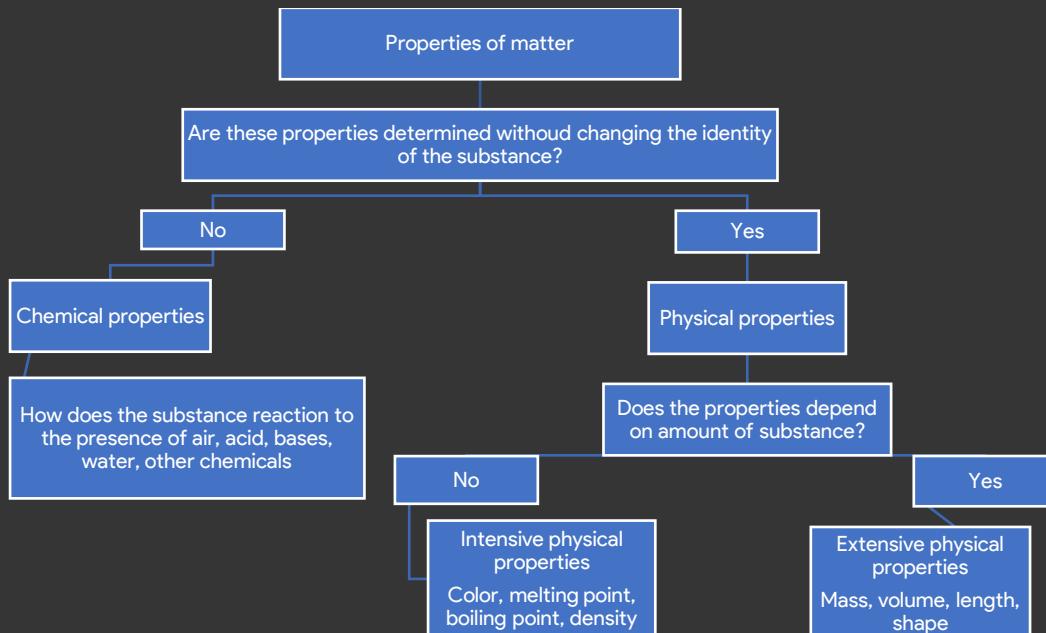
Bose-Einstein Condensate

- 5th state of matter
- It is a state of matter in which separate atoms or subatomic particles, cooled to near absolute zero
- When they reach that temperature, the atoms are hardly moving relative to each other; they have almost no free energy to do so. At that point, atoms begin to clump together, and enter the same energy states.

Matter



Properties of matter



Physical change

- It is a change in which the physical form (or state) of a substance, but not its composition altered.
- Cutting of papers
- Melting of ice cream

Chemical change

- It is a change in which a substance is converted into a new substance with different composition and properties.
- Burning of trees
- Ripening of fruits

I. Methods of separating components of mixtures

If an element cannot be decomposed by ordinary chemical means, while the components of a compound can be separated by chemical means, the components of mixture can be separated by mechanical means.

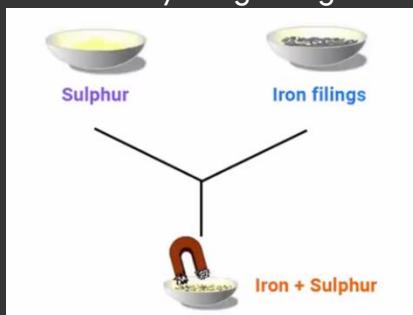
11. Winnowing

- A traditional way of separating the palay seeds from the hay by utilizing the wind or blowing air



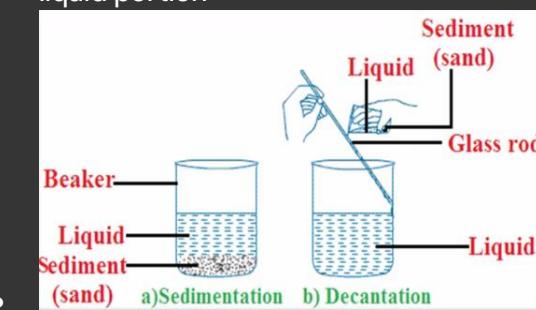
12. Magnetism

- A process of separating components of mixture of metallic and non-metallic substance by using a magnet



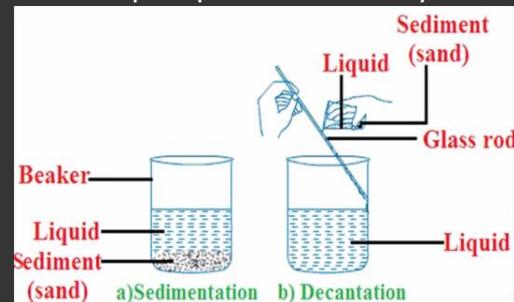
13. Sedimentation

- A physical water treatment using gravity to separate the suspended solids from the liquid portion



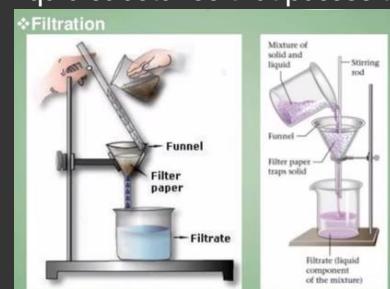
14. Decantation

- Method of separating components of mixtures by removing a layer of liquid, generally one from the settled decant (liquid portion), or to remove undesired liquid from the precipitate (or other layers)



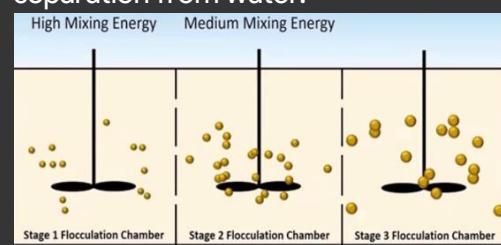
15. Filtration

- It is the solid substance left on the filtering medium called residue, while the clear liquid substance that passes thru the filtering medium is called filtrate.



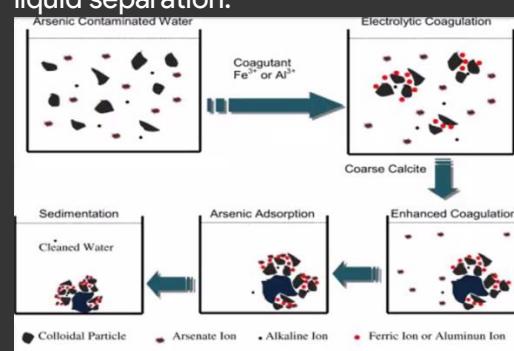
16. Flocculation

- One of the easiest ways to make turbid water clean. It describes the chemical process of contact and adhesion particles from larger cluster allowing the easy separation from water.



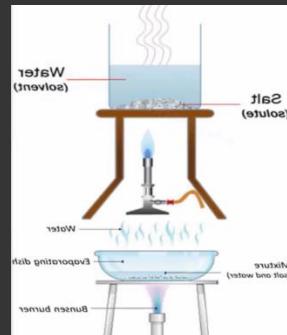
17. Coagulation

- Using a coagulating agent to remove the impurities of an unclear solution. It allows the removal of suspended and colloidal particles which is the first stage in solid-liquid separation.



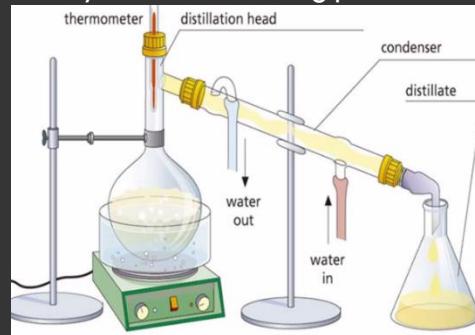
18. Evaporation

- Used to separate soluble solids from liquid utilizing heat
- I.e., in salt solution, salt can be separated from water by evaporation



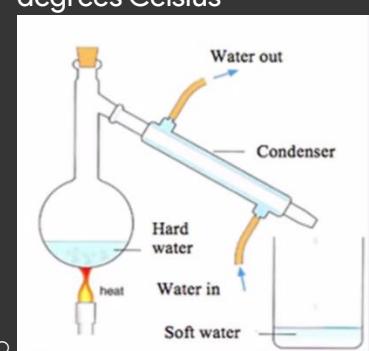
19. Distillation

- A widely used method of separating mixtures based on differences in boiling points. The substance left in the distilling flask usually with higher boiling point is called residue if solid or distill if liquid. The substance that passes thru the condenser usually with lower boiling point is called the distillate



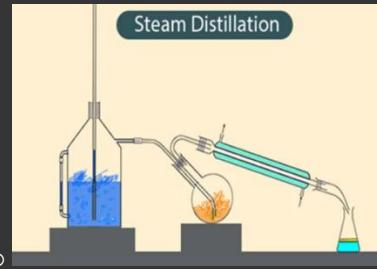
- Simple distillation

- Set-up is used for mixtures whose difference in boiling points is at least 70 degrees Celsius

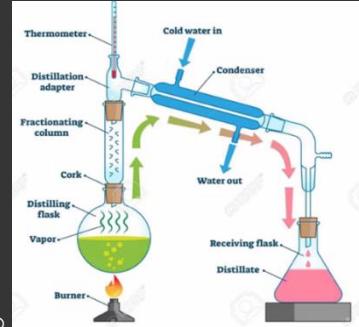


- Steam distillation

- It is used for the purification of mixtures in which the components of mixtures are heat sensitive, meaning easily decomposed by direct heating.



- Fractional distillation
 - Used to separate constituents whose boiling points are nearly similar or differ by 25 degrees Celsius, at 1 atmospheric pressure

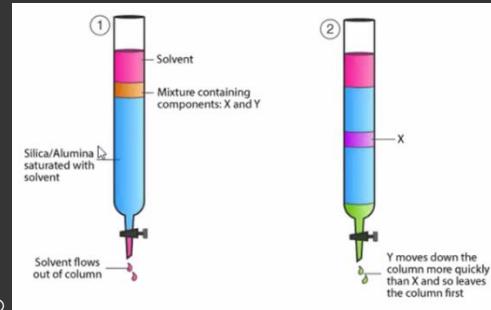


20. Chromatography

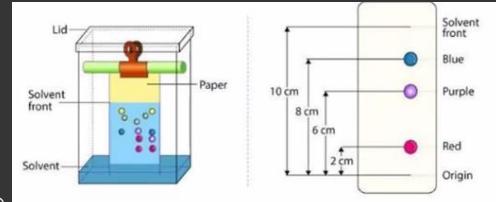
- It came from the Greek word chroma and graphe which means "color writing" is a method of separating mixtures either in gaseous or liquid form using difference in solubility or using the appropriate solvent, the mobile phase while the medium used to hold the sample is called the stationary phase.



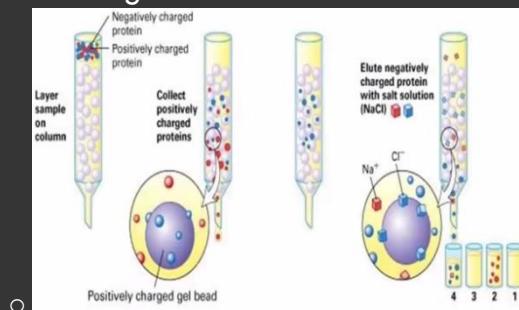
- Adsorption chromatography
 - Analytical separation of a chemical mixture based on the interaction of the adsorbate with the adsorbent.



- Partition chromatography
 - The separation of components between two liquid phases viz original solvent and the film of solvent used in the column.



- Ion exchange chromatography
 - Separates ions and polar molecules based on their affinity to the ion exchanger



J. Basic Law of Chemical Matter

Brief history

4th century BC, Democritus and Leuicippus proposed the idea of an atom. Because of the absence of explanation supported by experimentations, their ideas were not considered useful in the chemical wonders

In 1700, two chemists started to explain chemical behavior in terms of atoms. Dr. Priestly and Lavoisier and the other scientist establish the period for the foundation of the chemistry in about 1785

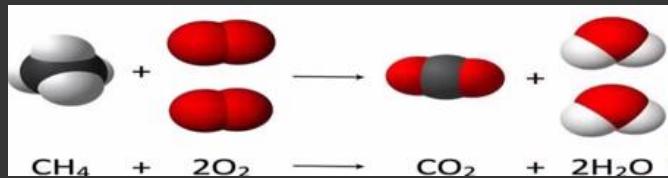
Lavoisier formulated the Law of Conservation of Mass. And in 1803, an English chemist, John Dalton, proposed and developed the atomic theory

Basic Law of Chemical Matter

These laws were inferred from several experiments conducted during the 18th century using a balance for the measurements:

4. Law of Conservation of Mass

- Antoine Lavoisier, a brilliant French chemist, formulated this law by describing one of his experiments involving mercuric oxide.
- He placed a small amount of mercuric oxide, a red solid, inside a retort and sealed the vessel tightly.
- In a chemical reaction, no change in mass takes place. The total mass of the products is equal to the total mass of the reactant.



5. Law of Definite Proportion

- Joseph Louis Proust, 1797
- A compound always contains the same constituent elements in a fixed or definite proportion by mass
- If water samples coming from different sources are analyzed, all samples will contain the same ratio by mass of hydrogen to oxygen.
- Example 1:
 - Sample problem: A pure sample of Sodium Fluoride (NaF) contains 35g of Sodium. How many grams of Fluorine are present in this sample?

BY CONVERSION	
Given: NaF	
Na = 23g; F = 19g	Look up the atomic mass of each element using the periodic table.
Find: grams of F	
$35\text{g Na} * \frac{19\text{g F}}{23\text{g Na}}$	Given amount of sodium (35g) multiplied by the quotient of the atomic mass of Fluorine (19g), and Sodium (23g).
$35\text{g Na} * \frac{19\text{g F}}{23\text{g Na}}$	Cancel Na on both sides
$35\text{g} * \frac{19\text{g F}}{23\text{g}} = 28.91\text{g}$	Solve
28.91g	Final answer is 28.91 grams of Fluorine.
BY PROPORTION	
$\frac{35\text{g Na}}{23\text{g Na}} = \frac{x}{19\text{g F}}$	35g is the given amount, 23g is the atomic mass of Sodium. X is the amount of Fluorine we have to look for while 19g is the atomic mass of Fluorine. Cross multiply
$(23g)(x) = (35g)(19g)$	Cross multiplication
$23gx = 665g$	$(23g)(x) = 23gx; (35g)(19g) = 665g$
$\frac{23gx}{23} = \frac{665g}{23}$	Divide both sides by 23 (g can be removed)
$x = 28.91\text{g}$	$665 / 23 = 28.91$
28.91g	Final answer is 28.91 grams of Fluorine.

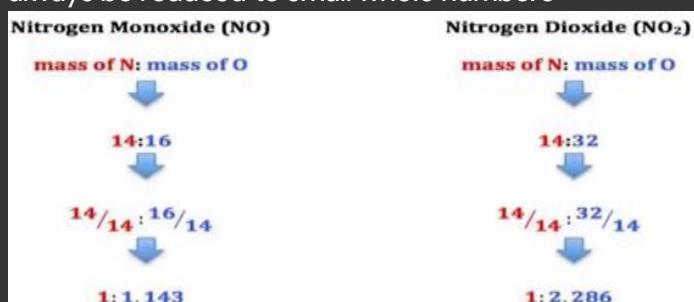
- Example 2:

- If there are 42g of H in a sample of pure methane (CH_4), how many grams of Carbon are present?

BY CONVERSION	
$H = 1g \times 4 = 4g$ $C = 12g \times 1 = 12g$	Multiply the atomic mass of each element by their subscript.
$42g H * \frac{12g C}{4g H}$	42g H is the given number of grams of H, 12g C is the atomic mass of C, and 4g H is the atomic mass of H (x4 since it's its subscript)
$42g H * \frac{12g C}{4g H}$	Cancel H on both side
$42g * \frac{12g C}{4g} = 126g C$	Solve
126g C	Final answer is 126 grams of Carbon.
BY PROPORTION	
$\frac{42g H}{4g H} = \frac{x}{12g C}$	42g H is the given number of grams, 4g H is the atomic mass of H (x4 since it's its subscript), 12g is the atomic mass of C. Cross multiply.
$(4g)(x) = (42g)(12g)$	Cross multiplication
$4x = 504$	$(4g)(x) = 4x; (42)(12) = 504$
$\frac{4x}{4} = \frac{504}{4}$	Multiply both sides by 4
126g C	Final answer is 126 grams of Carbon.

6. Law of Multiple Proportion

- (John Dalton, 1804) When two elements form a series of compounds, the ratio of the masses of the 2nd element that combine with 1 gram of the first element can always be reduced to small whole numbers



- Example 1
 - Get the ratio of NO and NO₂

N = 14g, O = 16g	Get the atomic mass of both elements
NO	
$\frac{14g}{14g} = \frac{16g}{14g}$	Divide both sides with 14g
$1g = 1.14g$	Divide
NO ₂	

O = 32 (16x2)	The grams of oxygen will be 32 because of its subscript.
$\frac{14g}{14g} = \frac{32g}{14g}$	Divide both sides by 14g
1g = 2.29g	Divide
Getting the ratio	
$\frac{2.29g}{1.14g}$	Divide the answers on both compounds, 2.29g and 1.14g.
$\frac{2.29g}{1.14g} = 2$	Final answer is 2.

- Example 2

- Get the ratio of CO and CO₂

C = 12g, O = 16g	Get the atomic mass of both elements
CO	
$\frac{12g}{12g} = \frac{16g}{12g}$	Divide both sides by 12g
1g = 1.33g	Divide
CO ₂	
O = 32 (16x2)	The grams of oxygen will be 32 because of its subscript.
$\frac{12g}{12g} = \frac{32g}{12g}$	Divide both sides by 12g
1g = 2.67g	Divide
Getting the ratio	
$\frac{2.67g}{1.33g}$	Divide the two answers on both compounds, 2.67g and 1.33g
$\frac{2.67g}{1.33g} = 2$	Final answer is 2.

K. Isotopes

These are the atoms of the same element which contains the same number of proton but different number of neutrons

Isotopes have the same chemical properties but slightly different physical properties

Isotopes of Some Elements and Their Atomic Mass				
Isotope	Natural Abundance (%)	# Protons	# Neutrons	Atomic Mass
Boron-10	19.9	5	5	10.0129369
Boron-11	80.1	5	6	11.0093054
Carbon-12	98.90	6	6	12.0 EXACTLY
Carbon-13	1.10	6	7	13.003354826
Oxygen-16	99.762	8	8	15.99491463
Oxygen-17	0.038	8	9	16.9991312
Oxygen-18	0.200	8	10	17.9991603
Chlorine-35	75.77	17	18	34.968852721
Chlorine-37	24.23	17	20	36.96590262

Average atomic mass

The calculations of the atomic masses requires the

- Percent (%) abundance of each isotope
- Atomic mass of each isotope of that element
- Sum of weighted averages

Average atomic mass		
Isotope	Mass	Abundance
^{24}Mg	= 23.99 amu x 78.70/100	= 18.88 amu
^{25}Mg	= 24.99 amu x 10.13/100	= 2.531 amu
^{26}Mg	= 25.98 amu x 11.17/100	= <u>2.902 amu</u>
Atomic mass (average mass) Mg		= 24.31 amu

Example

- Boron has two occurring isotopes: boron-10 with an atomic mass of 10.0129 amu and 0.198 abundance; and boron-11 with an atomic mass of 11.0093 amu and 0.802 abundance. What is the boron's average atomic mass?

$B-10 = (10.0129)(0.198)/100$	$B-11 = (11.0093)(0.802)/100$
$B-10 = (10.0129)(0.198)/100 = 0.0198$	$B-11 = (11.0093)(0.802)/100 = 0.0982$
$0.0198 + 0.0982 = 0.108$	

Stable and unstable isotopes

Stable

- A stable isotope does not undergo radioactive or nuclear decay
- Stable isotopes have a stable proton-neutron combination and do not display any sign of decay. This stability comes from the amount of neutrons present in an atom. If an atom has too many or too few neutrons, it is unstable and tends to disintegrate. Since stable isotopes do not decay, they do not produce radiation or its associated health risks.

Unstable

- An unstable isotope undergoes radioactive or nuclear decay
- They are also known as radioisotopes or radionucleides.
- Radioactive isotopes have an unstable combination of protons and neutrons. These isotopes decay, emitting radiation that includes alpha, beta, and gamma rays. Scientists classify radioactive isotopes according to their creation process: long-lived, cosmogenic, anthropogenic, and radiogenic.

Use of isotopes

Uses of stable isotopes

- Scientists performing environmental and ecological experiments use stable isotopes of oxygen, hydrogen, sulfur, nitrogen, and carbon. For example, in geochemistry, scientists study the chemical composition of geological materials such as minerals and rocks. Stable isotopes are dependable tools for determining many facts about geological materials, such as their age and where they came from.

Use of radioactive isotopes

- Radioactive isotopes find uses in agriculture, food industry, pest control, archaeology, and medicine. Radiocarbon dating, which measures the age of carbon-bearing items, uses a radioactive isotope known as carbon-14. In medicine, gamma rays emitted by radioactive elements are used to detect tumors inside the human body. Food irradiation, the process of exposing food to a controlled level of gamma rays, kills many types of bacteria, making food safer to eat.

L. Chemical formulas and compounds

Chemical compounds are formed when two or more ions combine.

To allow an easier and unambiguous identification of numerous compounds, the International Union of Pure and Applied Chemistry (IUPAC) established a set of rules for chemical nomenclature.

Writing the chemical formula

Steps in writing the chemical formula	Calcium Chloride
Step 1: Identify the symbols and charge of the elements	Ca^{2+}, Cl^{1-} Cation, anion
Step 2: Balance the charges by looking for multiplier(s)	$Ca^{2+(1)}, Cl^{1-(2)}$ Cross multiply
Step 3: Write the multiplier(s) as subscript of each element	$CaCl_2$

Examples

Compounds	Cation and anion	Chemical formula
Sodium Oxide	Na^{1+}, O^{-2}	Na_2O
Barium Fluoride	Ba^{+2}, F^{-1}	BaF_2
Zinc Hydroxide	Zn^{+2}, OH^{-1}	$Zn(OH)_2$
Potassium Phosphate	K^{+1}, PO_4^{-3}	$K_3(PO_4)$
Aluminum Sulfate	Al^{+3}, SO_4^{-2}	$Al_2(SO_4)_3$

In writing chemical formula of a compound, there are a few methods to consider, namely:

4. Traditional or Stack method

- For methods with two or more charges. Utilizes the ending “ic” which means that the higher charge is used.
 - Example: Ferric Oxide
 - Charges of Fe are 3+ and 2+
 - $Fe^{3+(2)} O^{2-(3)} = Fe_2O_3$
 - “ous” which means that the lower charge is used
 - Example: Ferrous Chloride
 - Charges of Fe are 3+ and 2+
 - $Fe^{2+(1)} Cl^{1-(2)} = FeCl_2$

5. Roman numerals

- This method uses roman numerals to represent the charge of the metal.
- This method is a little bit easier to use than the traditional method since the charge of the metal is already given. Looking from the example previously, it can be written as
 - Iron (III) oxide = Fe_2O_3
 - Iron (II) oxide = $FeCl_2$

6. Latin Greek prefixes

- This method is much easier than the first two methods since one can still identify the chemical formula of a compound even without identifying the charges.

Mono – one	Tetra – four
Di – two	Penta – five
Tri - three	Hexa - six

o Example

- Carbon Dioxide = CO_2
- Phosphorus Pentabromide = PBr_5
- Carbon Tetrachloride = CCl_4

Naming compounds

The process of naming compound allows the chemist to communicate formulae in words rather than in chemical symbols. There are, however, a few rules about naming compounds which need to

be known in order to write a formula in word form or translate a compound in word form into chemical symbols.

Ionic compounds

- If the compound is ionic, then the name of the cation (usually metal) comes first, followed by the 'compound' name of the anion. To find the compound name of an anion, replace the end of the element's name with "ide".
- Name of cation + name of anion, suffix 'ide'
- Examples

Name of cation + name of anion, suffix 'ide'		
$NaCl$	Sodium (cation) first, followed by chlorine changed with the suffix 'ide'	Sodium Chloride
Name of cation + name of polyatomic (radical) anions, suffix 'ate'		
Na_2CO_3	Sodium (cation) first, followed by a polyatomic group containing carbon and oxygen to form carbonate	Sodium Carbonate
MgO		
MgO	Magnesium (cation) first, followed by oxygen changed with the suffix 'ide' because oxygen is the sole ion and not part of a polyatomic group	Magnesium Oxide
$NaHCO_3$		
$NaHCO_3$	Sometimes if the compound contains 'hydrogen' shortens to 'bi' such as with $NaHCO_3$ which is known as Sodium Hydrogen Carbonate	Sodium Bicarbonate

Hydrogen compounds

- If the compound contains hydrogen and a metal, the metal comes first, followed by the word 'hydride', to denote the hydrogen component.

Metal + hydride		
NaH	Sodium (metal) first, followed by hydrogen changed with the suffix 'ide'	Sodium Hydride

- If the compound contains hydrogen and a non-metal and does not contain water (H_2O) then the hydrogen comes first, followed by the element's name replaced with the 'ide' suffix.

Hydrogen + non-metal, suffix 'ide'		
HF	Hydrogen first, followed by fluorine changed with the suffix 'ide'	Hydrogen Fluoride

- If the hydrogen non-metal compound dissolves in water, it starts with the 'hydro' prefix, followed by the element's name replaced with an 'ic' suffix, followed by 'acid'

Hydro (name of element, suffix 'ic') acid		
HCl	Hydro, then chlorine with an 'ic' suffix, then 'acid'	Hydrochloric Acid

Oxygen compounds

- When naming ionic compounds that contains oxygen, the basic rule is similar. If the compound contains hydrogen and oxygen anion (oxo anion) and does not contain water, then hydrogen comes first, followed by the element name with the suffix 'ate'.

Hydrogen + element, suffix 'ate'		
H_2CO_3	Hydrogen followed by carbon with the suffix 'ate'	Hydrogen Carbonate

- The rule "ate" is used for the most common or the only compound made with an oxyanion. Some compounds, however, form more than one type of compound with oxygen and the amount of oxygen will affect the prefixes and suffixes used.
- This occurs for all oxyanions, with or without hydrogen involved.

Naming more than one type of oxygen compound				
Oxygen level	Prefix	Element (ex. Chlorine)	Suffix	Name
A little oxygen	Hypo-	ClO	-ite	Hypochlorite
Some oxygen		ClO_2	-ite	Chlorite
More oxygen		ClO_3	-ate	Chlorate
A lot of oxygen	Per-	ClO_4	-ate	Perchlorate

- The oxygen level corresponds with the relative amounts in different compounds and not necessarily the specific numbers of oxygen atoms.
- If an element forms just two types of oxyanion compounds, then the suffixes 'ite' and 'ate' will suffice.

Chlorine and oxygen plus hydrogen	
$HClO$	Hypochlorous acid
$HClO_2$	Chlorous acid
$HClO_3$	Chloric acid
$HClO_4$	Perchloric acid

Covalent compounds

- If a compound contains two non-metals in a covalent bond, then
 - The least electronegative element is named first
 - If the compound contains hydrogen, hydrogen is named first
 - The number of atoms of each element is indicated by a prefix
 - If the first element has only one charge, the prefix is not used
 - The name of the element has the suffix 'ide'

1	Mono- or mon-	6	Hexa-
2	Di-	7	Hepta-
3	Tri-	8	Octa-
4	Tetra-	9	Nona-
5	Penta-	10	Deca-

- Examples

CO	Carbon (least electronegative atom) first, followed by the prefix 'mon' to indicate one	Carbon Monoxide
------	---	-----------------

	atom of oxygen, the most electronegative atom, with the suffix 'ide'	
CO_2	Carbon (least electronegative atom) first, followed by the prefix 'di' to indicate two atoms of hydrogen, the most electronegative atom, with the suffix 'ide'	Carbon Dioxide
H_2O	The prefix 'di' to indicate two atoms of hydrogen, which has naming priority, followed by 'mon' to indicate one atom of oxygen	Dihydrogen Monoxide

Common names

- There are number of common names that chemists like to use instead of the proper scientific names. Most names and formulae are well-known. It is recommended that common names and formulae be written down as they are encountered so they can be memorized.

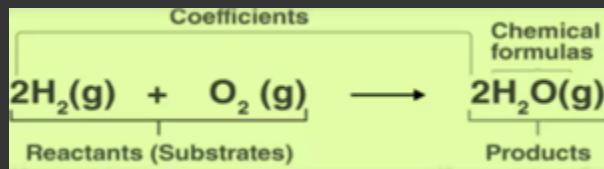
Common name	Proper name	Chemical formula
Water	Dihydrogen Monoxide	H_2O
Baking Soda	Sodium Bicarbonate	$NaHCO_3$
Table Salt	Sodium Chloride	$NaCl$
Limestone	Calcium Carbonate	$CaCO_3$
Quartz	Silicon Dioxide	SiO_2
Alka Seltzer	Sodium Bicarbonate	$NaHCO_3$
Battery Acid	Sulfuric Acid	H_2SO_4
Bleach	Sodium Hypochlorite	$NaClO$

M. Balancing chemical reaction

Law of conservation of mass

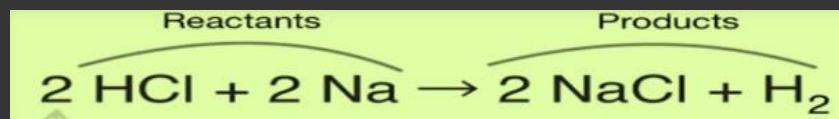
- States that matter can neither be created nor destroyed.
- Applying this law to a chemical reaction means that the mass of the reactant is always equal to the mass of the product.

Another way of describing chemical reactions is by means of skeleton equation



Balancing chemical equations

The numbers in front of the formulas in a balanced equation are called coefficients. These are usually whole numbers and are usually not written if the value is 1.



Steps

- Write the skeleton equation describing the reaction

- Count the number of atoms on the reactant side and on the product side of the equation to see whether the equation is already balanced or not
- Begin by balancing the atoms that occur in the largest number on either of the equation
- Polyatomic ions that occur on both side of the chemical equations are balanced as ion units
- Check your answer. Count the number of each type of atom on each side of the equation. Make sure that the coefficients used are whole numbers in their lowest terms

Example 1

- $H_2O_2 \rightarrow H_2O + O_2$

Write the number of subscripts of all elements on both sides

2	H	2
2	O	3

- O is not balanced (subscripts on both sides aren't equal), so we try to add a coefficient on either side and check if it's balanced. Let's put a coefficient of 2 in H_2O in the right side.
- $H_2O_2 \rightarrow 2H_2O + O_2$

2	H	4
2	O	4

- Due to distributive property, H₂ is now H₄, while O is now O₂. However, it's still not balanced. Let's put a coefficient of 2 on H_2O_2 in the left side.
- $2H_2O_2 \rightarrow 2H_2O + O_2$

4	H	4
4	O	4

- It's now balanced. The balanced equation is $2H_2O_2 \rightarrow 2H_2O + O_2$

•

Example 2

- $Cu(NO_3)_2 + KOH \rightarrow Cu(OH)_2 + KNO_3$
- Write the number of subscripts of all elements on both sides

1	Cu	1
2	N	1
7	O	5
1	K	1
1	H	2

- Note that subscripts inside the parentheses gets multiplied with the subscript outside the parentheses.
- Let's balance N first. We'll put a coefficient of 2 on the KNO_3 .
 - $Cu(NO_3)_2 + KOH \rightarrow Cu(OH)_2 + 2KNO_3$

1	Cu	1	
2	N	1	2
7	O	5	8
1	K	1	2
1	H	2	

 - N is now balanced.
- Let's balance K next. We'll put a coefficient of 2 on the KOH .



	1	Cu	1	
	2	N	1	2
8	7	O	5	8
2	4	K	1	2
2	4	H	2	

- Since both sides are now equal, it is now balanced. The balanced equation is $Cu(NO_3)_2 + 2KOH \rightarrow Cu(OH)_2 + 2KNO_3$.

N. Stoichiometry

It is the study of the relative quantities of reactants and product in a chemical reaction. The word stoichiometry was derived from the two Greek words stoikhein meaning elements, and metron meaning to measure. Taking the two meanings together, stoichiometry literally means “to measure elements”.

Interpreting balanced chemical equations

In stoichiometry, a balanced chemical equation is used as the basis for computing the amount of reactants required to produce specific quantities of products.

Example

- $2Mg + O_2 \rightarrow 2MgO$
- We will get the total mass of both the reactant and product. Let's start with the reactant first.
- Let's first get $2Mg$.

$Mg = 1 * 24.31g = 24.31g Mg$	Get the molar mass of Mg and multiply it with the number of atoms (subscript)
$2 \text{ mole Mg} * \frac{24.31g Mg}{1 \text{ mole Mg}}$	2 mole Mg is the coefficient of Mg in the given formula. 24.31g Mg is the one we calculated above. 1 mole Mg is consistent, meaning the denominator will always be 1.
$2 \cancel{\text{mole Mg}} * \frac{24.31g Mg}{1 \cancel{\text{mole Mg}}}$	Cancel mole Mg.
$2 * \frac{24.31g Mg}{1} = 48.62g Mg$	Compute.
$48.62g Mg$	Mass for $2Mg$.

- Get O_2 next.

$O = 2 * 16.00g = 32.00g O_2$	Get the molar mass of O and multiply it with the number of atoms (subscript)
$1 \text{ mole } O_2 * \frac{32.00g O_2}{1 \text{ mole } O_2}$	1 mole O_2 is the coefficient of O_2 in the given formula. 32.00g O_2 is the one we calculated above. 1 mole O_2 is consistent, meaning the denominator will always be 1.
$1 \cancel{\text{mole } O_2} * \frac{32.00g O_2}{1 \cancel{\text{mole } O_2}}$	Cancel mole O_2

	$1 * \frac{32.00\text{g O}_2}{1}$	Compute.
	32.00g O_2	Mass for O ₂
• Simply add the mass for 2Mg and O ₂ to get the total mass of the reactant.	$48.62\text{g Mg} + 32.00\text{g O}_2$	Add the masses of the elements.
	80.62g	Total mass of the reactant
• Do the same process to the product.		
	$Mg = 24.31 * 1 = 24.31$ $O = 16.00 * 1 = 16.00$	Get the molar mass of both element and multiply it with the number of atoms (subscript)
	$24.31 + 16.00 = 40.31$	Add them together
	$2 \text{ mole MgO} * \frac{40.31\text{g MgO}}{1 \text{ mole MgO}}$	2 mole MgO is the coefficient, 40.31 is the combined molar mass, and 1 mole MgO is constant.
	$2 \text{ mole MgO} * \frac{40.31\text{g MgO}}{1 \text{ mole MgO}}$	Cancel mole MgO
	$2 * \frac{40.31\text{g MgO}}{1}$	Solve
	80.62g MgO	Total mass of the product.

Mole-to-mole relationships in balanced chemical equations

You have learned that the coefficients of the reactants and the product in a balanced chemical equation indicate their mole relationships. The coefficients in the balanced chemical equation to derived conversion factors called mole ratios.

Mole ratio is a ratio between the number of moles of any two substances in a balanced chemical equation.

Example 1

- One source of carbon dioxide gas, an example of a greenhouse gas, is the combustion of hydrocarbons like propane, C₃H₈. How many moles of carbon dioxide gas is produced from the complete combustion of 10 moles of C₃H₈ with excess oxygen gas.
 - C₃H₈ + O₂ → CO₂ + H₂O
 - Balance the equation first.
 - Balanced equation: C₃H₈ + 5O₂ → 3CO₂ + 4H₂O
 - We are asked to find the total moles of CO₂ from the combustion of 10 moles of C₃H₈.

	$10 \text{ mole C}_3\text{H}_8 * \frac{3 \text{ mole CO}_2}{1 \text{ mole C}_3\text{H}_8}$	10 mole is the given moles of C ₃ H ₈ , 3 mole CO ₂ is the moles in the balanced equation, while 1 mole C ₃ H ₈ is constant.
	$10 \text{ mole C}_3\text{H}_8 * \frac{3 \text{ mole CO}_2}{1 \text{ mole C}_3\text{H}_8}$	Cancel mole C ₃ H ₈ .
	$10 * \frac{3 \text{ mole CO}_2}{1}$	Solve.
	30 moles CO₂	Final answer is 30 moles of Carbon Dioxide.

Example 2

- When dinitrogen pentoxide (N_2O_5) is heated, it undergoes decomposition, forming nitrogen dioxide gas (NO_2) and oxygen gas (O_2). How many moles of each of the product is formed when 0.025 mole of (N_2O_5) is decomposed?
 - $N_2O_5 \rightarrow NO_2 + O_2$
 - Balance the equation first.
 - Balanced equation: $2N_2O_5 \rightarrow 4NO_2 + O_2$
 - We are asked to find how many moles of NO_2 and O_2 is formed when 0.025 mole of N_2O_5 is decomposed.

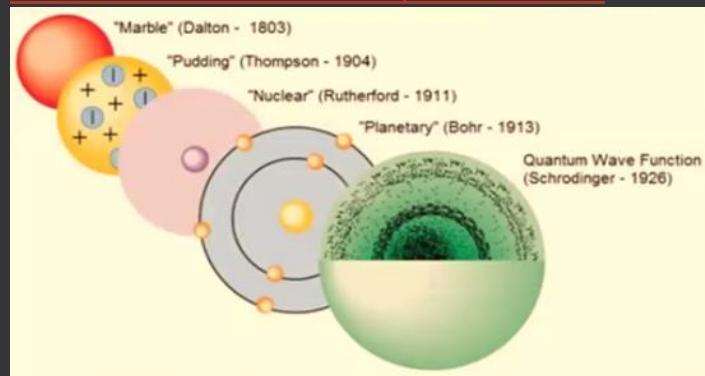
NO_2		
$0.025 \text{ mole } N_2O_5 * \frac{4 \text{ mole } NO_2}{1 \text{ mole } N_2O_5}$	0.025 mole is the given moles of N_2O_5 , 4 mole is from the balanced equation, and 1 mole is constant.	
$0.025 \cancel{\text{mole } N_2O_5} * \frac{4 \text{ mole } NO_2}{1 \cancel{\text{mole } N_2O_5}}$	Cancel mole N_2O_5 then solve.	
$0.1 \text{ mole } NO_2$	Answer for NO_2 .	
O_2		
$0.025 \text{ mole } N_2O_5 * \frac{1 \text{ mole } O_2}{1 \text{ mole } N_2O_5}$	0.025 mole is the given moles of N_2O_5 , 1 mole O_2 is from the balanced equation, and 1 mole N_2O_5 is constant.	
$0.025 \cancel{\text{mole } N_2O_5} * \frac{1 \text{ mole } O_2}{1 \cancel{\text{mole } N_2O_5}}$	Cancel mole N_2O_5 then solve.	
$0.3 \text{ mole } O_2$	Answer for O_2 .	
$0.1 \text{ mole } NO_2 \text{ and } 0.3 \text{ mole } O_2$	Final answer	

Chemical reactions

Types of Chemical Reactions	Explanation	General Reaction
Combination reaction	Two or more compounds combine to form one compound.	$A + B \rightarrow AB$
Decomposition reaction	The opposite of a combination reaction – a complex molecule breaks down to make simpler ones.	$AB \rightarrow A + B$
Precipitation reaction	Two solutions of soluble salts are mixed resulting in an insoluble solid (precipitate) forming.	$A + \text{Soluble salt } B \rightarrow \text{Precipitate} + \text{soluble salt } C$
Neutralization reaction	An acid and a base react with each other. Generally, the product of this reaction is a salt and water.	$\text{Acid} + \text{Base} \rightarrow \text{Salt} + \text{Water}$
Combustion reaction	Oxygen combines with a compound to form carbon dioxide and water. These reactions are exothermic, meaning they give off heat.	$A + O_2 \rightarrow H_2O + CO_2$
Displacement reaction	One element takes place with another element in the compound.	$A + BC \rightarrow AC + B$

O. Electronic Structure of Atoms

Quantum mechanical description of atoms



Marble model: John Dalton (1803)

Plum pudding model: J.J. Thompson (1904)

Nuclear model: Ernest Rutherford (1911)

Planetary model: Neils Bohr (1913)

Quantum Wave Function model: Erwin Schrodinger (1926)

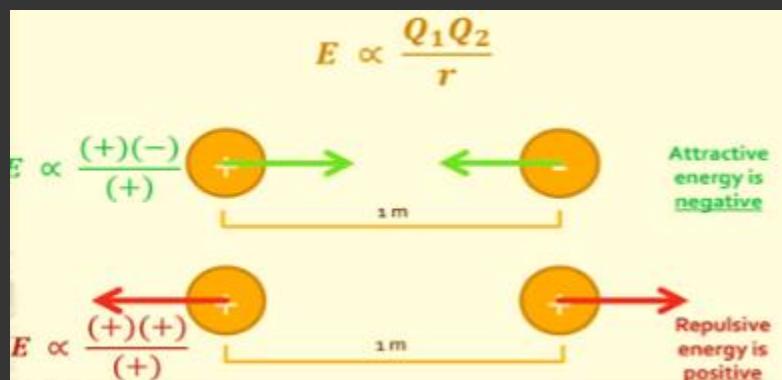
The electrically neutral atom contains a single proton which is positive and a single electron which is negative and is bound to the nucleus by the Coulomb's force or Electrostatic force

Coulomb's inverse-square law first published in 1785 by a French Physicist, Charles Augustin de Coulomb

A law of physics describing the electrostatic interactions between electrically charged particles

If the particles are both positive or negatively charged, the force is repulsive, likewise, if they are opposite charges, it is attractive force.

Atom hydrogen comprises about the 75% of the elemental mass of the universe.



As an Austrian physicist, Erwin Schrodinger presented a wave equation which describes how a wave function advances with time

It describes the behavior of something that is moving in a wave like motion

It is an important second-order linear partial differential equation used to describe waves

Main energy level, sublevel, orbitals

Principal energy level

- The energy level denoted by the principal quantum number (n).

Sublevel

- Division of energy levels. The SPDF sublevel. They have the characteristic shapes and are used to predict and explain the chemical bonds which atoms can form.
- S – sharp, P – principal, D – diffuse, F – fundamental

Principal level	Sublevel/subshell
Level 1	1s
Level 2	2s, 2p
Level 3	3s, 3p, 3d
Level 4	4s, 4p, 4d, 4f

Orbital

- A sublevel is further divided into orbitals. In an atom, the region of space which has the highest of electron is called an orbital.
- An orbital can contain a maximum of two electrons.
- Total no. of electron in an orbit $2n^2$

Sublevels	Number of orbitals	Maximum number of e-
$n = 1$	1 (1s)	2
$n = 2$	4 (2s, 2p)	8
$n = 3$	9 (3s, 3p, 3d)	18
$n = 4$	16 (4s, 4p, 4d, 4f)	32

Subshell	Number of orbitals	Historical names of subshell	Max number of electrons
S	1	Sharp	2
P	3	Principal	6
D	5	Diffused	10
F	7	Fundamental	14

Note: The names of the different subshells came from early studies of atomic spectral lines

P. Electron Configurations

Distribution of electrons of an atom in atomic or molecular orbitals

Aufbau Principle

Comes from the German word "Aufbauen" meaning "to build"

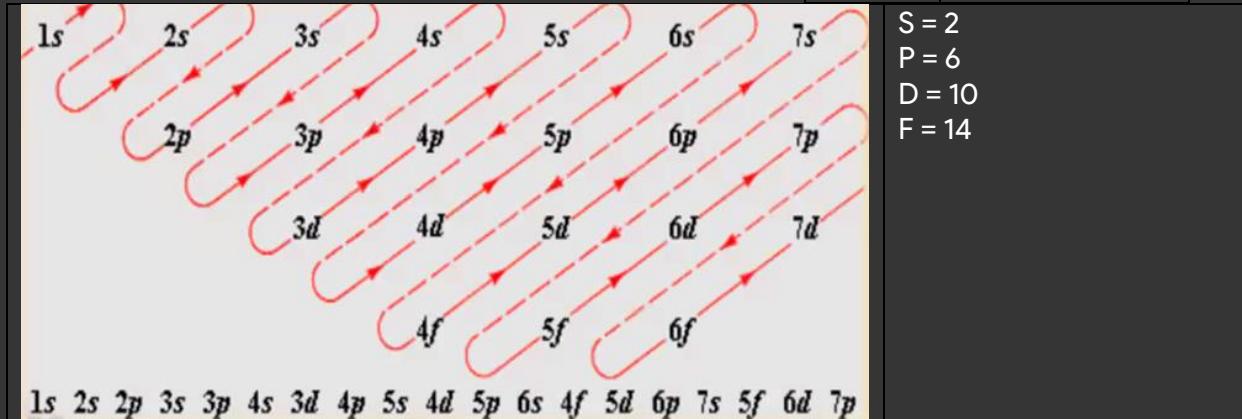
In essence in writing electron configuration, we are building up electron orbitals as we proceed from atom to atom

We fill the orbitals in order of increasing atomic number

States that "electrons orbiting one or more atoms before filling higher levels"

In this way, the electrons of an atom, molecule, or ion complement into the most stable electron configuration possible

Subshell	No. of orbitals (boxes)
S	1
P	3
D	5
F	7



Examples

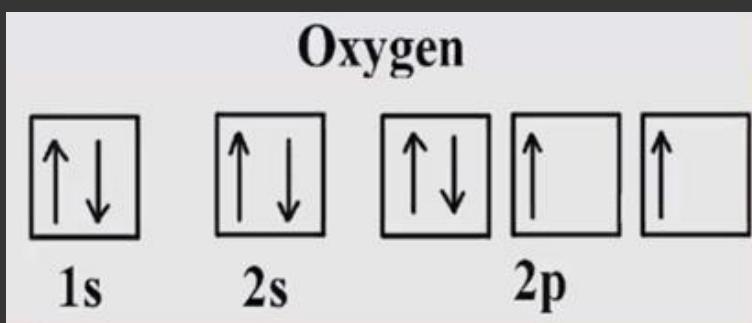
Element	Atomic no.	Aufbau Principle
Cl	17	$1s^2 2s^2 2p^6 3s^2 3p^5$
Ca2	20	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

Hund's Rule

States that "for degenerate orbitals, the lowest energy is attained when the number of electrons with the same spin is maximized"

Electrons must occupy every orbital singly first before any orbital is doubly occupied

Another method of distributing the electrons in the main energy level, subshell, and orbitals is the orbital notation



Example

Arrows: Up, up, up, then down, down, down

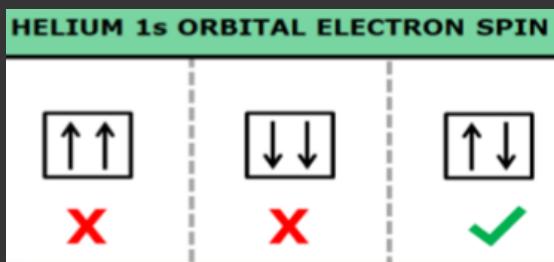
Element	Aufbau Principle	Hund's Rule

Cl	$1s^2 2s^2 2p^6 3s^2 3p^5$	
		*Note that the empty white boxes between the yellow ones are just there to separate the yellow boxes and is not part of the actual graphic.

Pauli's Exclusion Principle

States that "in an atom or molecule, no two electrons can have the same set of four electronic quantum numbers"

As an orbital can contain a maximum of only two electrons, two electrons must have opposing spins. This means if one assigned an up-spin (+1/2), the other must be down-spin (-1/2)



Example

Arrows: Up, down, up, down, up, down		
Element	Aufbau Principle	Hund's Rule
Cl	$1s^2 2s^2 2p^6 3s^2 3p^5$	
	Pauli's Exclusion Principle	
N	$1s^2 2s^2 2p^3$	Hund's Rule:  
	Pauli's Exclusion Principle	

Q. Quantum Numbers

The first two methods of distributing the electrons describe all the electrons of a given atom. Another way of describing electron is using the four quantum numbers

These are

- Principal quantum number (n)
 - Directly describes the size of the electron orbital or the energy level in the atom. n is from 1,2,3,4...
 - Energy level during the electron distribution
- Orbital quantum number or angular quantum number/azimuthal quantum number (l)
 - It describes the shape of the orbital

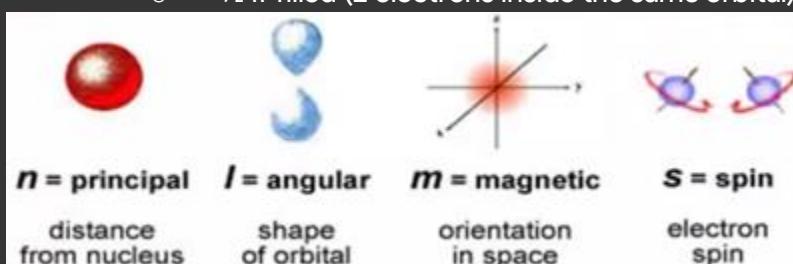
S	P	D	F
---	---	---	---

0	1	2	3
---	---	---	---

- Magnetic quantum number (m)
 - It describes the orientation in space of an orbital of a given energy level and shape

s	0					
p	-1	0	+1			
d	-2	-1	0	+1	+2	
f	-3	-2	-1	0	+1	+2

- Spin quantum number (s)
 - Describes the spin of electrons in an orbital
 - $+\frac{1}{2}$ if half-filled (1 electron inside the orbital) \uparrow
 - $-\frac{1}{2}$ if filled (2 electrons inside the same orbital) \downarrow



Example

Element	Aufbau Principle	Hund's Rule
Cl	$1s^2 2s^2 2p^6 3s^2 3p^5$	$\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow$
	Pauli's Exclusion Principle	$\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow$

Quantum Numbers			
n (Principal quantum number)	l (Orbital quantum number)	m_l (Magnetic quantum number)	m_s (Spin quantum number)
3	1	-1, 0, +1	+1/2

Lewis Structure or Electron-Dot Diagram

A method of representing atoms or molecules by showing electrons as dots surrounding the symbol of the element

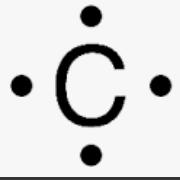
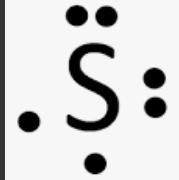
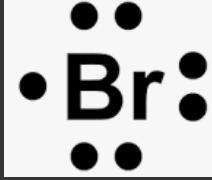
To draw the diagram, you must first get the element's valence electron, which is the group number (columns) from the periodic table

Lewis Dot Symbols for the Representative Elements & Noble Gases

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1 1A	2 2A																18 8A
• H																	He :
• Li	• Be :																
• Na	• Mg :	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9 8B	10	11 1B	12 2B	• B :	• C :	• N :	• O :	• F :	
• K	• Ca :											• Al :	• Si :	• P :	• S :	• Cl :	• Ar :
• Rb	• Sr :											• Ga :	• Ge :	• As :	• Se :	• Br :	• Kr :
• Cs	• Ba :											• In :	• Sn :	• Sb :	• Te :	• I :	• Xe :
• Fr	• Ra :											• Tl :	• Pb :	• Bi :	• Po :	• At :	• Rn :

Draw the dots on the 4 sides of the element, number of dot corresponds to the valence electron, with the pattern: top, right, bottom, left

Example

Element	C	S	Br
Valence Electron	4ve-	6ve-	7ve-
Electron dot structure			

Paramagnetism and diamagnetism

Paramagnetism

- Refers to the magnetic state of an atom with one or more unpaired electrons. Hund's rule states that the electrons must occupy every orbital singly first before any orbital is doubly occupied. This may leave the atom with many unpaired electrons
- These unpaired electrons are attracted by magnetic fields due to the electron's magnetic dipole moments
- It is a form of magnetism whereby materials are attracted by an externally applied magnetic field

Diamagnetism

- Substances are characterized by paired electrons
- According to Pauli's Exclusion Principle which states that no two identical electrons may take up the same quantum state at the same time, the electron spins are oriented in opposite directions

- This will cause the magnetic field of the electrons to cancel out; thus, there is no net magnetic moment, and the atom cannot be attracted into magnetic field. In fact, diamagnetic substances are weakly repelled by a magnetic field

Paramagnetic vs. Diamagnetic					
Paramagnetic			Diamagnetic		
					
When I hear ...	I think ...	I then think ...			
Paramagnetic	"Unpaired"-a-magnetic	Attracted to magnets because it has unpaired electrons.			
Diamagnetic	The other one (all paired)	Slightly repelled by magnets because it has all paired electrons.			

R. Chemical Bonding

Valence electrons

- It is an electron in the outer shell associated with an atom, and that can participate in the formation of a chemical bond if the outer shell is closed

Octet rule

- It refers to the tendency of atoms to prefer to have eight electrons in the valence shell. When atoms have fewer than eight electrons, they tend to react and form more stable compounds.

Electron dot structure

- A representation of the valence electrons of an atom that uses dots around the symbol of the element. The number of the dots equals the number of valence electrons in the atom
- Atoms are stable when they have 8 valence electrons. When the atoms have 8 valence electrons, it is called an octet rule

Atoms must lose, gain, or share electrons to the attain the octet rule

There is always an exception

- The element Hydrogen (H) and helium (He). Hydrogen needs only one more to fill its valence shell = stable/
- Helium has a full valence shell - it is stable and does not bond with other atoms => stable
- Noble gases => happy element because they are already stable

It is defined as any rearrangement in two atoms that generates a force, causing the atoms to be found to each other, forming a molecule

Chemical bond is formed by joining of two or more atoms. It is an attraction between atoms

Strong chemical bonds are the intramolecular forces which hold atoms together in molecules. Substance change from one state to another due to attractive forces between their particles known as intermolecular forces.

Forming an ion

An atom with unbalanced electrostatic charge is called an ion

A cation is formed when metals of group I and II lose their valence electrons to attain stable configuration like the noble gas. They have low ionization energy

Nonmetals under group 16 and 17 have very high ionization energy. The higher the ionization energy, the more energy is needed to remove the valence electron

Ionic bonding

The transfer of electron form metal to a non-metal forms a cation and anion, respectively.

Transferring of electrons from metal to nonmetal

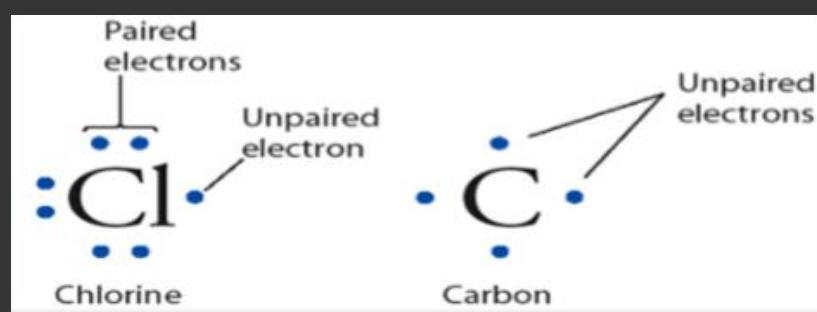
The electrostatic force between a cation and an anion result to the formation of ionic bond

It is called as electrovalent bond, a type of bond that involves the complete transfer of valence electron from one atom to another

It occurs between metals and a non-metal

Metal - donor of electron, nonmetals - acceptor of electron

A notation showing the valence electrons surroundings the atomic symbol



Losing and gaining electrons

Metals form CATIONS (+)



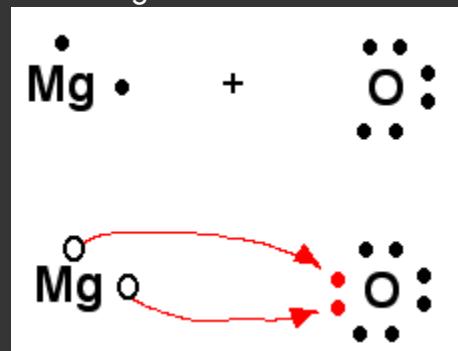
Nonmetals form ANIONS (-)



When the valence shell is full, the atoms is stable, less likely to react.

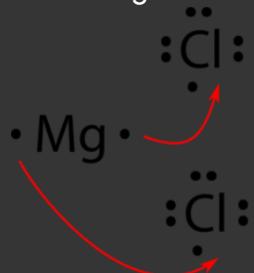
Example 1

- MgO

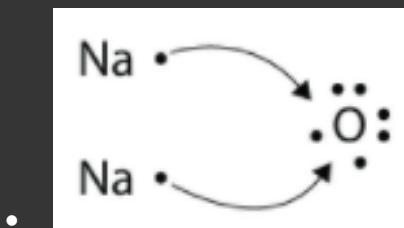


Example 2

- MgCl



Example 3



Covalent bonding

Chemical bond that involves the sharing of electron pairs between atoms. These electron pairs are known as shared pairs or bonding pairs.

The stable balance of attractive and repulsive force between atoms, when they share electrons, is known as covalent bonding.

Electronegativity

- The ability of an atom to draw electrons to itself
- If the covalent bond is made between one atom that is really electronegative and another that is not, the electrons will not be shared evenly in the bond
- Uneven sharing results in the formation of what is called a dipole, or the separation of charges between two covalent bonded atoms
- If the difference in electronegativity of the two elements is between 0.5 to 1.6, it is considered as polar bond
- If the difference in electronegativity is less than 0.5, the bond is considered a nonpolar bond
- Any two element more than 1.6 and the molecules become charged ions and form bond instead
- Nobel gasses are aligned with a nonpolar bond

Polar bond

- The electrons are shared unequal (between non-metals with different electronegativity)

Nonpolar bond

- The bonding electrons are equally shared by the atoms, i.e. a bond between two nonmetal atoms that have the same electronegativity and therefore have equal sharing bonding electron pair

Polar covalent bond

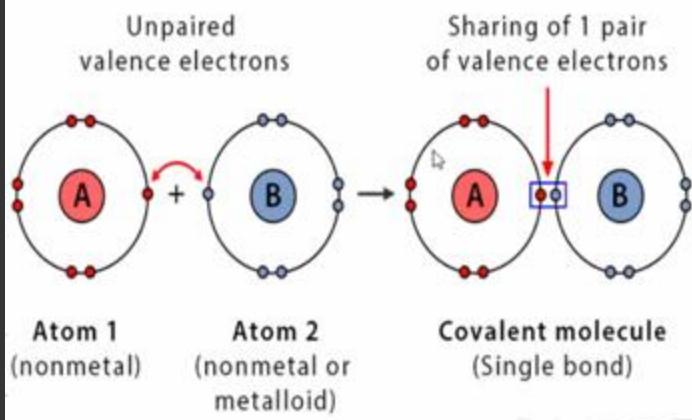
- A type of bond between two nonmetal atoms that have different electronegativities and therefore have unequal sharing of the bonding electron pair

Non-polar molecules	Polar molecules
Noble Gases	C ₂ H ₆ O Ethanol
Diatomeric elements (H ₂ , N ₂ , etc.)	H ₂ O Water
C ₆ H ₆ Benzene	NH ₃ Ammonia
C ₂ H ₄ Ethylene	SO ₂ Sulphur Dioxide
CH ₄ Methane	CO ₂ Carbon Dioxide
H ₂ S Hydrogen Sulphide	

Single Covalent Bond

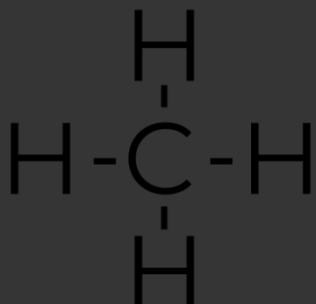
- Covalent bond formed by the mutual sharing of one electron pair between two atoms (2e-)
- It is denoted by a single short line

Single Covalent Bond

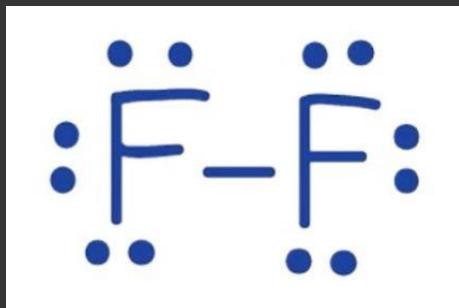


- Example

- CH_4



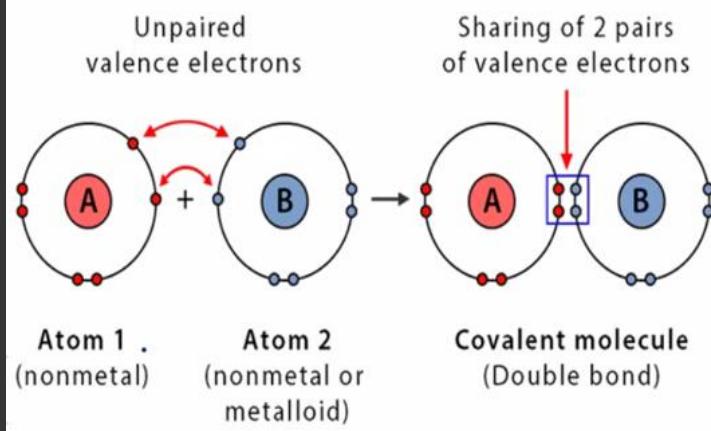
- F_2



Double Covalent Bond

- A covalent bond formed between two atoms by the mutual sharing of two electron pairs ($4e^-$)
- Denoted by a double short line

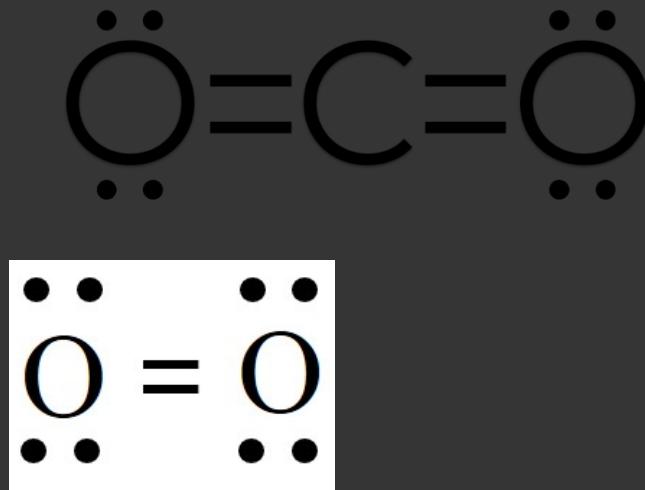
Double Covalent Bond



- Example

- CO_2

- O_2

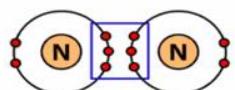


Triple Covalent Bond

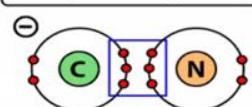
- A covalent bond formed by the mutual sharing of three electron pairs ($6e^-$)
- Denoted by a triple short line

Triple Covalent Bond Examples

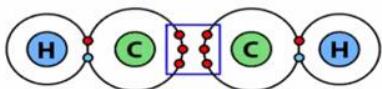
1. Nitrogen (N_2)



2. Cyanide (CN^-)

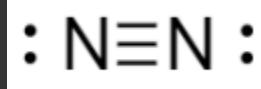


3. Ethyne (C_2H_2)



- Example

- N_2



S. Carbon Atoms

In the 17th century, carbon was recognized as an element after Robert Boyle proposed the element

In 1789, Antoine Laurent Lavoisier initiated chemistry textbook writing and wrote down carbon as an oxidize and acidifiable nonmetallic element

Carbon is the 6th element in the PT that has an atomic mass of 12 and atomic number of 6. It is the sixth most abundant element in the universe. The carbon atom is central to all organic compounds. It can form a huge variety of chains of different lengths

A lot of substances found in nature contains carbon in their molecular structure

In the living world, carbon in combination with other elements like H, O, N, P, and S forms the basis for millions of organic compounds

The study of carbon containing compounds is organic chemistry. This branch of chemistry will not only study the composition of all living organisms but will also deal with the substances we use everyday

Hydrocarbons

Hydrocarbon chains are organic molecules made up mainly of carbon and hydrogen

They are often used as fuel just like methane and propane as well as butane in lighters

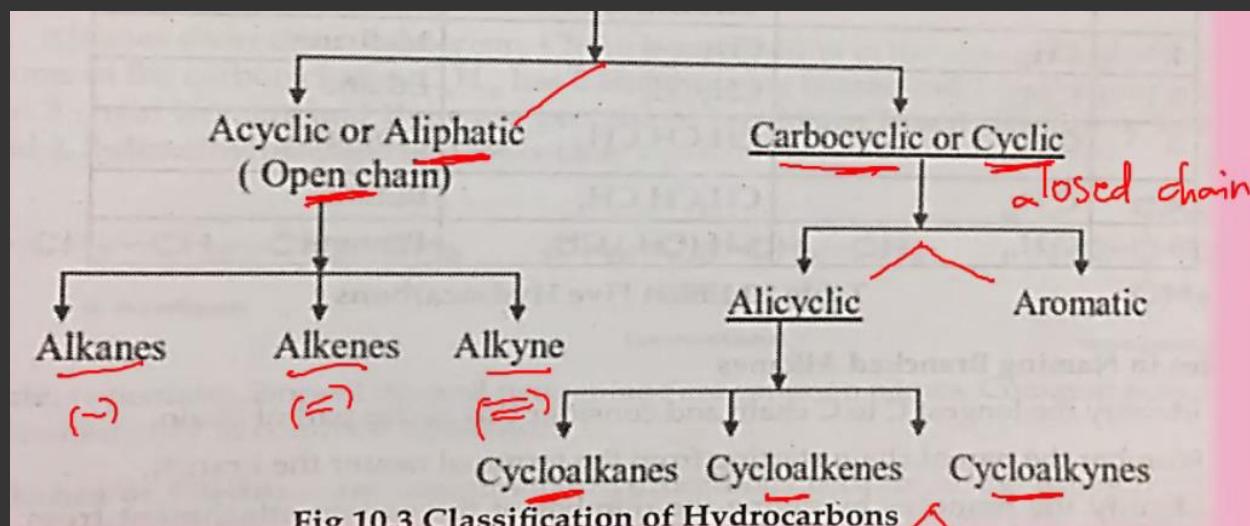


Fig 10.3 Classification of Hydrocarbons

The simplest hydrocarbon is methane (CH_4)

Carbon atoms have the unique property of forming strong covalent bonds with each other

They can link together to form a long chain or closed chains

The structures are drawn either condensed structural formula or line angle formula

The system of naming is devised by the International Union of Pure and Applied Chemistry (IUPAC)

Aliphatic hydrocarbons

- They are noncyclic hydrocarbons which may be straight or branched chain hydrocarbons.
- Alkanes, alkenes, and alkynes are considered as aliphatic hydrocarbons.

NUMBER OF CARBON	PREFIX	NUMBER OF CARBON	PREFIX
1	Meth-	6	Hex-
2	Eth-	7	Hept-
3	Prop-	8	Oct-
4	But-	9	Non-
5	Pent-	10	Dec-

Alkanes

- It has a group formula of C_nH_{2n+2} where n refers to the number of carbon atoms.
- Their group names end in -ane.
- They are saturated hydrocarbons because C to C and C to H bonds are all single bond.
- The IUPAC name of unbranched alkanes consists of two parts
 - A prefix telling the number of carbon atoms
 - A suffix which tells the kind of hydrocarbon

<u>No. of C n</u>	Molecular formula	Condensed structural formula	IUPAC name
1	CH_4	CH_4	Methane
2	C_2H_6	CH_3CH_3	Ethane
3	C_3H_8	$CH_3CH_2CH_3$	Propane
4	C_4H_{10}	$CH_3CH_2CH_2CH_3$	Butane
5	C_5H_{12}	$CH_3CH_2CH_2CH_2CH_3$	Pentane

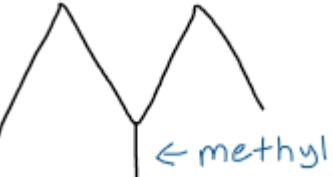
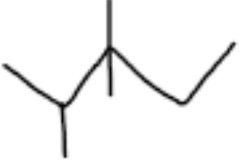
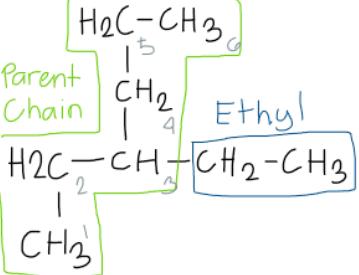
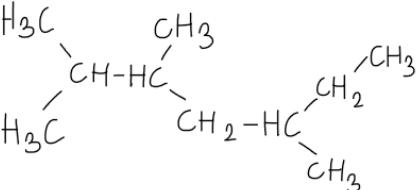
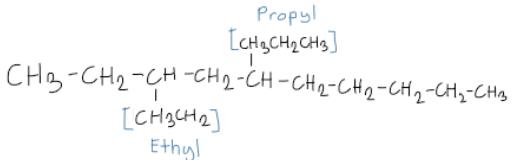
Naming alkanes

- Identify the longest C to C chain and consider this as the parent chain.
- Number the parent chain starting from the terminal nearer to the branch.
- Identify the branches by giving the number of carbon attachment from the parent structure with prefix signifying the branch ending in -yl. Substituents are named alphabetically.

Examples

*some examples may be inaccurate

$\begin{array}{cccc} 1 & 2 & 3 & 4 \\ [CH_3 - CH - CH_2 - CH_3] & & & \\ & & & \\ methyl [CH_3] & & & \end{array}$ <p style="margin-left: 100px;">Alkyl Halide</p> <p style="margin-left: 100px;">Parent Chain</p>	<p>2-methyl butane</p> <p>2: position of A.H. in the parent chain</p> <p>Methyl: Alkyl Halide</p> <p>Butane: Parent chain</p>
$\begin{array}{ccccc} & & [CH_3] & & \\ & & & & \\ & & methyl & & \\ & & & & \\ CH_3 - CH_2 - C - CH_2 - CH_3 & & & & \\ & & & & \\ & & [CH_2CH_3] & & Ethyl \end{array}$	<p>3-ethyl, 3-methyl pentane</p>
	<p>Hexane</p>

		3-methyl pentane
		2,3,3-trimethyl pentane
		3-ethyl hexane
		2,3,5-trimethyl heptane
		3-ethyl-5-propyl decane

Alkenes

- These are unsaturated hydrocarbons because of the presence of double bond between two carbon atoms.
- The double bond is the identifying characteristic of alkenes.
- The molecules of alkenes contain a smaller number of hydrogen atoms as compared to the corresponding paraffins.
- The group formula for alkenes is C_nH_{2n}
- Their names end in -ene.
- Its simplest and first member is ethene or ethylene.
- IUPAC name of unbranched alkene is prefix + position of double bond + -ene.
- Number the parent chain nearest the double bond.

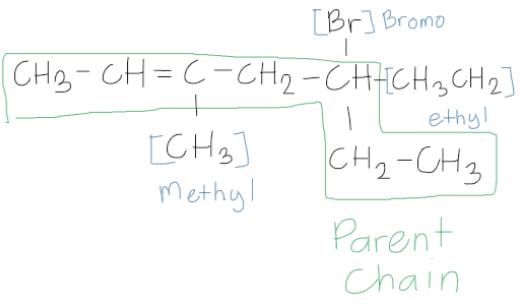
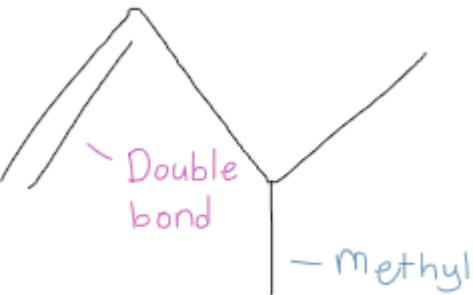
n	Molecular formula	Condensed structural formula	IUPAC name
2	C_2H_4	$CH_2=CH_2$	Ethene
3	C_3H_6	$CH_2=CHCH_3$	Propene
4	C_4H_8	$CH_2=CHCH_2CH_3$	But-1-ene
		$CH_3CH=CHCH_3$	But-2-ene
5	C_5H_{10}	$CH_2=CHCH_2CH_2CH_3$	Pent-1-ene
		$CH_3CH=CHCH_2CH_3$	Pent-2-ene

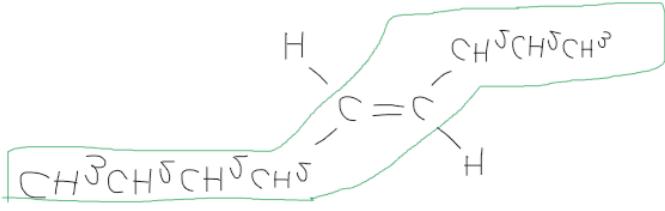
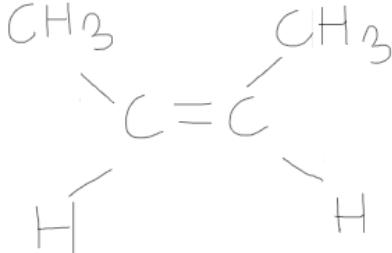
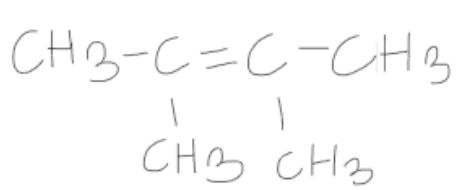
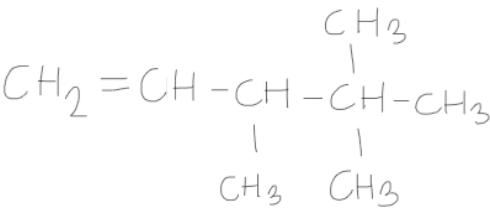
Naming alkenes

- Identify the longest C to C chain with the double bond and consider this as the parent structure.
- Number the parent structure starting from the terminal nearer the double bond.
- Identify the substituents attached to the parent structure.
- In numbering the parent structure, the priority is the double bond and not the branches.,

Examples

*some examples may not be accurate

	5-bromo, 5-ethyl, 3-methyl hept-2-ene
	3-methyl but-1-ene

	Non-4-ene
	But-2-ene
	2,3-dimethyl but-2-ene
	3,4,4-trimethyl pent-1-ene
	Hept-3-ene

Alkynes

- Unsaturated hydrocarbons which triple bond between two carbon atoms with a smaller number of hydrogen atoms as compared to alkanes with the same number of carbon atoms.
- This triple bond is shared by three pair of electrons between two carbon atoms and indicates a higher degree of unsaturated hydrocarbons.
- Their group formula is C_nH_{2n-2}
- The name of alkynes ends in -yne.
- The simplest member of the group is ethyne or acetylene.
- IUPAC naming of alkyne is prefix + position of triple bond + -yne
- Number the parent chain nearest the triple bond.

n	Molecular formula	Condensed structural formula	IUPAC name
2	C_2H_2	$CH \equiv CH$	Ethyne
3	C_3H_4	$CH \equiv CHCH_3$	Propyne
4	C_4H_6	$CH \equiv CHCH_2CH_3$	But-1-yne
		$CH_3C \equiv CCH_3$	But-2-yne
5	C_5H_8	$CH \equiv CCH_2CH_2CH_3$	Pent-1-yne
		$CH_3C \equiv CCH_2CH_3$	Pent-2-yne

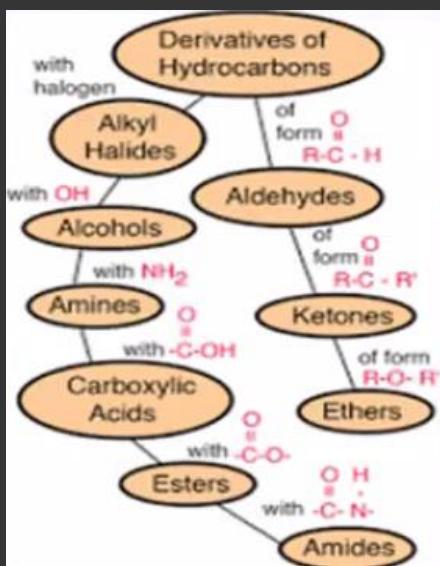
Naming alkynes

- Identify the longest C to C chain with the triple bond and consider this as the parent structure.
- Number the parent structure starting from the terminal nearer the triple bond.
- Identify the substituents attached to the parent structure.
- In numbering the parent structure, the priority is the triple bond and not the branches.

Examples	
*some examples may not be accurate	<p>2,3-dimethyl hex-1-yne / 1-hexyne</p>
	<p>8-bromo, 2,3-dimethyl, 6-propyl non-4-yne</p>

T. Hydrocarbon Derivatives

The hydrogen atom/s of hydrocarbon when replaced with another atom or group atoms are called hydrocarbon derivatives.



A particular functional group will almost always display its characteristics and chemical behavior when it is present in a compound

Hydrocarbon Derivatives	Group Formula	Functional Group
Alcohols	R-OH	-OH (hydroxyl)
Alkyl halides	R-X Where: X= Cl, Br, I	-X
Alkyl amines	R-NH ₂	-NH ₂ (Amino)
Aldehydes	R-CHO	-C=O (carbonyl) H
Ketones	R-CO-R	-CO-
Ethers	R-O-R	-O- (oxy)
Carboxylic acids	R-COOH	-COOH (carboxyl)
Esters	R-COOR ₁	-COO-

Alcohol

- It has a hydroxyl group (-OH) bonded to a carbon atom.
- Its general formula is R-OH where R is an alkyl group.
- Alcohols are named by replacing the suffix -ane with -anol
- If there is more than one hydroxyl group (-OH), the suffix is expanded to include a prefix that indicates the number of hydroxyl group on the present. (-anediol, -anetriol, etc.)

Primary (alcohol)

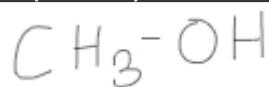
- The carbon with -OH is only attached to one alkyl group.

General Formula



Examples

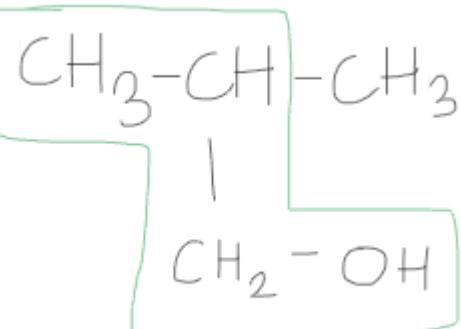
*some examples may not be accurate



Methanol



Ethanol

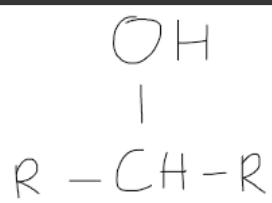


2-methyl propanol

Secondary (alcohol)

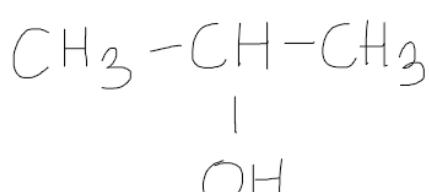
- The carbon with -OH group is attached to the alkyl groups. The groups may be the same or different.

General Formula

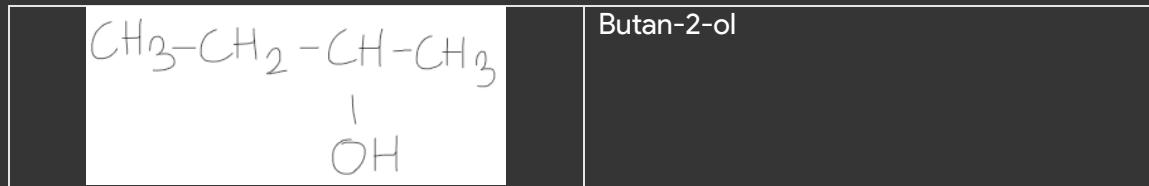


Examples

*some example may not be accurate

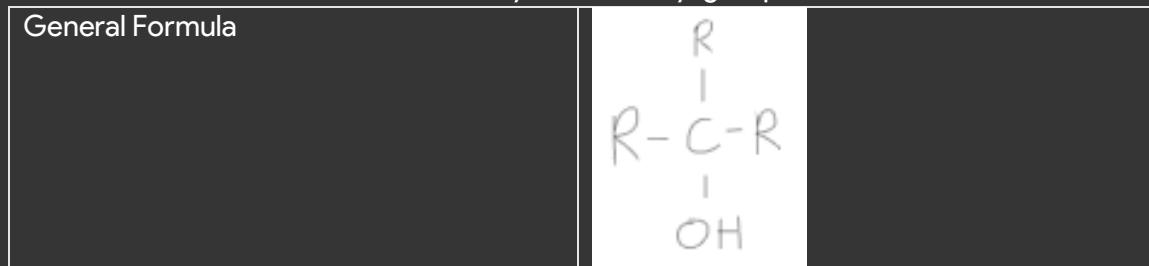


Propan-2-ol



Tertiary (alcohol)

- The carbon with -OH is attached directly to three alkyl groups.



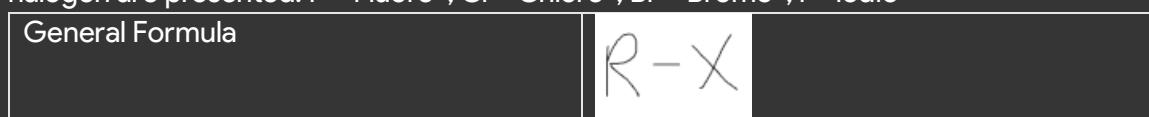
Examples

*some examples may not be accurate



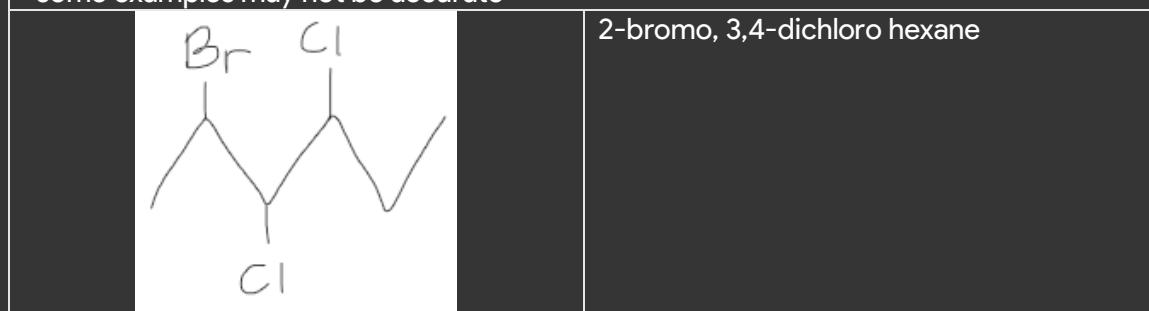
Alkyl Halides

- The halogen is treated as a substituent on an alkane chain. The halo-substituent is considered of equal rank with an alkyl substituent in the numbering of the parent chain. The halogen are presented: F = Fluoro-, Cl = Chloro-, Br = Bromo-, I = Iodo-



Examples

*some examples may not be accurate



Aldehydes and ketones

- Aldehydes and ketones are functional isomers. Both substances have the functional group carbonyl (C=O) group linked to an alkyl radical and to a hydrogen atom.

- The double bond between oxygen and carbon atoms of the carbonyl group has a considerable amount of ionic character because of pi delocalization.
- In aldehydes, the substituent are R and H.
- In ketone, the substituents are both R groups.
- Aldehydes are named by replacing the terminal -e of the corresponding alkane name with -al.
- Ketones use the suffix -one.

General Formula for aldehydes	$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{H} \end{array}$	
General Formula for ketones	$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{R} \end{array}$	

Examples for aldehydes *some examples may not be accurate	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}-\text{H} \end{array}$	Ethanal
	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{H} \end{array}$	Methanal
Examples for aldehydes *some examples may not be accurate	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}-\text{CH}_3 \end{array}$	2-propanone
	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}-\text{CH}_3\text{CH}_2\text{CH}_3 \\ \\ \text{CH}_2\text{CH}_3 \end{array}$	2-ethyl, 2-pentanone

Ether

- Organic compound in which two hydrocarbon groups are bonded to the same atom of oxygen.
- They can be represented by the general formula of R-O-R' where R may be the same hydrocarbon group.
- Ethers are like alkanes that are not very reactive compounds, so they are commonly used as solvents.
- Ethers are pleasant smelling liquids at room temperature.
- They are less soluble in water and have lower boiling points which explain why they are volatile. They are less attractive.
- They are used as solvents for fats, oils, waxes, gums, and hydrocarbons.

General Formula	$R-O-R'$
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Examples *some examples may not be accurate	
$CH_3-CH_2-O-CH_2-CH_3$	Diethyl ether
CH_3-O-CH_3	Dimethyl ether

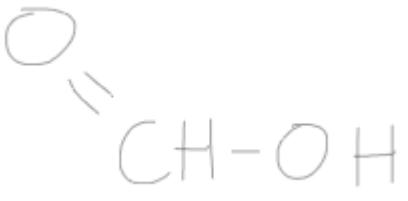
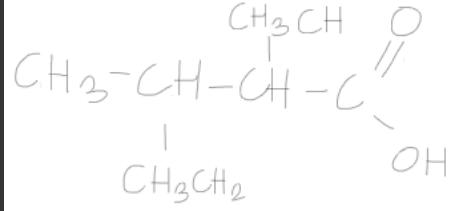
Carboxylic acid

- Polar and can form hydrogen bonds with each other.
- An organic compound that contains carboxyl group.
- Simple open-chain carboxyl acid are named by replacing the terminal -e of the alkane name with -oic acid.
- The common example of carboxylic acid are ethanoic acid (acid and vinegar) methanoic acid (secreted by ants which causes the pain from the sting)
- Other examples are acetic acid which is used for coagulant in making rubber.
- An organic compound that have carboxylic acid groups in which the hydrogen of the hydroxyl group has been replaced by alkyl group.
- The R can be H or hydrocarbon group.

General Formula	$R-C(=O)OH$
-----------------	-------------

Examples

*some examples may not be accurate

		Methanoic acid
		Ethanoic acid
		2,3-diethyl butanoic acid

Ester

- Named by first giving the name of alkyl group attached to oxygen, and then identifying the carboxylic acid.
- In doing so, the -ic acid ending is replaced by -oate.

General Formula		
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Examples

*some examples may not be accurate

	 $\text{CH}_3-\text{C}(=\text{O})-\text{O}-\text{CH}_3 \text{CH}_2$	Ethyl ethanoate
	 $\text{CH}_3-\text{CH}_2-\text{C}(=\text{O})-\text{O}-\text{CH}_3$	Methyl propanoate

Summarization

Hydrocarbon derivatives	Suffix	Formula	Example	
Alcohol	-ol	$R-OH^I$	CH_3-OH	Methanol
Alkyl Halides		$R-X$	$CH_3-CH(Br)-CH(Br)-CH_3$ CH_3CH_2	2,3-dibromo, 2-ethyl butane
Aldehydes	-al	$\begin{array}{c} O \\ \\ R-C-H \end{array}$	$CH_3-C(=O)-H$	Ethanal
Ketones	-one	$\begin{array}{c} O \\ \\ R-C-R \end{array}$	$CH_3-C(=O)-CH_3$	Propanone
Ether	-ether	$R-O-R'$	$CH_3-CH_2-O-CH_2-CH_3$	Diethyl ether
Carboxylic Acid	-oic acid	$\begin{array}{c} O \\ \\ R-C-OH \end{array}$	$CH_3-C(=O)-OH$	Ethanoic acid
Ester	-oate	$\begin{array}{c} O \\ \\ R-C-O-R' \end{array}$	$CH_3-C(=O)-O-CH_3CH_2CH_3$	Propyl ethanoate



GENERAL PHYSICS 1

GENERAL PHYSICS 1

A. Introduction to physics

- Physics is an experimental science.
- Physicists perform experiments to test hypotheses.

- Conclusions in experiment are derived from measurement.
- Physicists use numbers to describe measurements such a number is called a physical quantity.

Contributions of physics to humanity

1. Laws of motion
2. Understanding of light, matter, and physical processes
3. Quantum mechanics (towards inventions leading to the components in a cellphone)

B. Units, physical quantities, measurement, and graphical presentation

- Measurement is the process of comparing something with a standard
- Two systems of units have evolved: the metric system and the English system
- The metric system has two variations: the mks (meter, kilometer, seconds) and cgs (centimeter, gram, seconds) systems
- The English system (British system) otherwise known as the fps (foot, pound, seconds) system
- Since 1960 the system of units used by scientists and engineers is the "metric system" which is officially known as the "International System" or SI units (abbreviation of its French term, Système International)
- To make sure that scientists from different parts of the world understand the same thing when referring to a measurement, standards have been defined for measurements of length, time, and mass

Conversion of units

Few countries use the British system of units (e.g., the US). However, the conversion between the British system of units and SI units have been defined exactly as follows:

- Length: 1 inch = 2.54 cm
- Force: 1 pound = 4.448221615260 newtons

Example:

1. The ball drops 5 meters. How many centimeters did it drop?

$\frac{5m}{1} * \frac{100cm}{1m}$	Since 5m (meters) is a whole number, its denominator would be one. 100 cm (centimeters) is equivalent to 1 meter.
$\frac{5m}{1} * \frac{100cm}{1m}$	Remove m on both sides.
$5 * 100cm$	$5 / 1 = 5, 100 / 1 = 100$. Multiply 5 with 100 cm.
$5 * 100cm = 500cm$	Final answer is 500 centimeters.

2. How many grams are in 3.25 kg?

$\frac{3.25\text{kg}}{1} * \frac{1000\text{g}}{1\text{kg}}$	Since 3.25 kg is a whole number, its denominator would be 1. 1 kg is equivalent to 1000g.
$\frac{3.25\text{kg}}{1} * \frac{1000\text{g}}{1\text{kg}}$	Remove kg on both sides.
$3.25 * 1000\text{g}$	$3.25 / 1 = 3.25, 1000 / 1 = 1000.$
$3.25 * 1000\text{g} = 3,250\text{g}$	Final answer is 3,250 grams.

3. How many inches are in 2.0 meters?

$\frac{2.0\text{m}}{1} * \frac{39.37\text{in}}{1\text{m}}$	Since 2.0m is a whole number, its denominator would be 1. 1m is equivalent to 39.37in.
$\frac{2.0\text{m}}{1} * \frac{39.37\text{in}}{1\text{m}}$	Remove m on both sides.
$2.0 * 39.37\text{in}$	$2 / 1 = 2, 39.37 / 1 = 39.37.$
$2.0 * 39.37\text{in} = 78.74\text{in}$	Final answer is 78.74 inches.

4. How many seconds are in 1.25 minutes?

$\frac{1.25\text{min}}{1} * \frac{60\text{s}}{1\text{min}}$	1 min is equivalent to 60 s
$\frac{1.25\text{min}}{1} * \frac{60\text{s}}{1\text{min}}$	Remove min on both sides.
$1.25 * 60\text{s}$	$1.25 / 1 = 1.25, 60 / 1 = 60$
$1.25 * 60\text{s} = 75\text{s}$	Final answer is 75 seconds.

5. Convert 60 km/h to m/s.

$\frac{60\text{km}}{1\text{h}} * \frac{1000\text{m}}{1\text{km}} * \frac{1\text{h}}{60\text{min}} * \frac{1\text{min}}{60\text{s}}$	60km per 1h (given) 1km is equivalent to 1000m 1h is equivalent to 60min 1m is equivalent to 60s
$\frac{60\text{km}}{1\text{h}} * \frac{1000\text{m}}{1\text{km}} * \frac{1\text{h}}{60\text{min}} * \frac{1\text{min}}{60\text{s}}$	Remove similar signs
$\frac{60}{1} * \frac{1000\text{m}}{1} * \frac{1}{60} * \frac{1}{60\text{s}}$	$(60)(1000)(1)(1) = 60,000\text{m}$ $(1)(1)(60)(60) = 3,600\text{s}$
$\frac{60000\text{m}}{3600\text{s}}$	$60000\text{m} / 3600\text{s} = 16.67$
$60 \text{ km/h} = 16.67 \text{ m/s}$	Final answer is 16.67 m/s

Significant figures

Rules

- All non-zero numbers are significant.
 - Example: The number 33.2 has 3 significant figures (3, 3, 2).
- Zeroes between two non-zero digits are significant.
 - Example: 2051 has 4 significant figures (2, 0, 5, 1).
- Leading zeroes are not significant.
 - Example 1: 0.54 has 2 significant figures (5, 4).
 - Example 2: 0.0032 has 2 significant figures (3, 2).
- Trailing zeroes to the right of the decimal are significant.
 - Example: 92.00 has 4 significant figures (9, 2, 0, 0).
- All zeroes to the right of the non-zero digit are not a significant figure.

- Example 1: 20 has 1 significant figure (2).
- Example 2: 20350 has 4 significant figures (2, 0, 3, 5).

Scientific notations

Also called the "powers-of-ten notation"

This allows one to write only the significant figures multiplied to 10 with the appropriate power

- Standard: 1.23×10^6
- Non-standard: 123×10^4

Examples

1. $16600.01 \rightarrow 1.660001 \times 10^4$
2. $0.000556 \rightarrow 5.56 \times 10^{-4}$
3. $0.0000099800 \rightarrow 9.9800 \times 10^{-6}$
4. $0.0104 \rightarrow 1.04 \times 10^{-2}$
5. $0.1234 \rightarrow 1.234 \times 10^{-1}$

If the decimal movement is into the left, the exponent will be positive. If it's to the right, the exponent is negative. Make sure number of numbers on the left side of the decimal is only one in standard scientific notation.

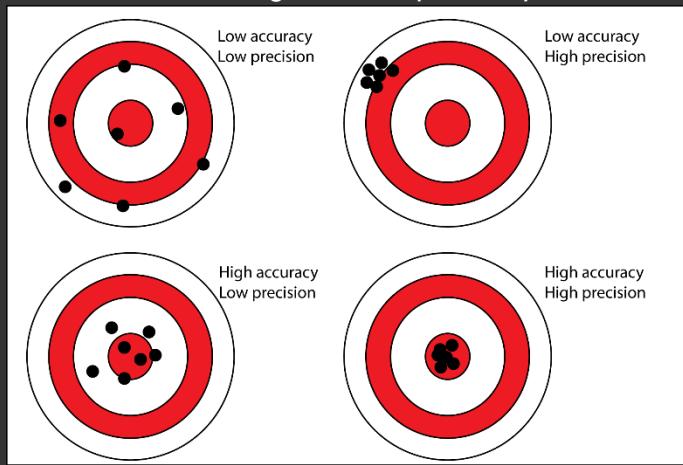
Accuracy and precision

Accuracy

- How close you are to the actual value.
- Depends on the person measuring.

Precision

- How consistent is the results are regardless of proximity to the actual target.



It is important that measuring devices are accurate and precise. If not, results can be misleading or even fatal.

No matter how careful you are when conducting experiments, there will likely be an experimental error.

Types of errors

Random error

- Error that occurs randomly and affect measurements in an unpredictable manner (conditions or apparatus).
- Probability of the measured value being too high or too low.
- Random errors cannot be eliminated but can be reduced by repeat trials.
- Sources of random errors
 - Changes in environment during the experiment (such as temperature)
 - Observer misinterpreting the reading
 - Insufficient data (no repeat trials)

Systematic error

- Error that affects all measurements in the same way.
- It causes the measured valued to be consistently higher or lower than the accepted value.
- They cannot be reduced by conducting repeat trials.
- Sources of systematic error
 - Imperfect instrument calibration
 - Environment interference (such as air, friction, or gravity)
 - Observation error such as parallax
 - Parallax
 - The apparent shift in position when viewed at different angles.

The associated error in a measurement is not to be attributed to human error.

Here, we use the term to refer to the associated uncertainty in obtaining a representative value for the measurement due to undetermined factors.

Why is there uncertainty?

- Since measurements are performed with instruments, and no instrument can read an infinite number of decimal places.

Physical quantities

Fundamental quantities

- These are basic quantities that are independent of one another.
- The SI quantities are length, mass, time, thermodynamic temperature, electric current, luminous intensity, and amount of substance.

Derived quantities

- Are combination of fundamental quantities.
- For example, speed may be defined as distance traveled (length) divided by time.
- Other examples are acceleration, density, work, and energy.

C. Vectors and vector addition

Scalar and vector quantities

Scalar quantity

- It is any quantity in physics that only has magnitude.

Scalar example	Magnitude
Speed	35 m/s
Distance	25 meters
Age	16 years old

Vector quantity

- It is any quantity in physics that has both magnitude and direction.

Vector example	Magnitude and direction
Velocity	35 m/s, North
Acceleration	10 m/s ² , South
Displacement	20 m, East

Vector representation

Represented by an arrow

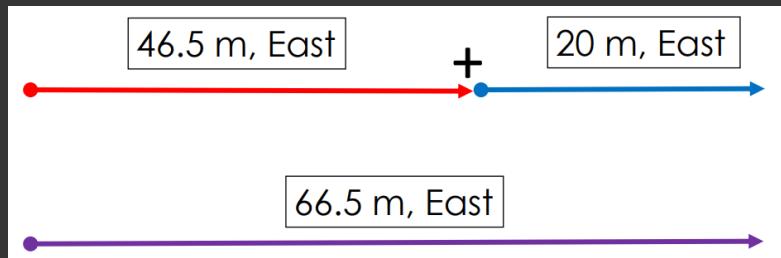
- Tail – indicates the starting point
- Arrowhead – end point (direction)



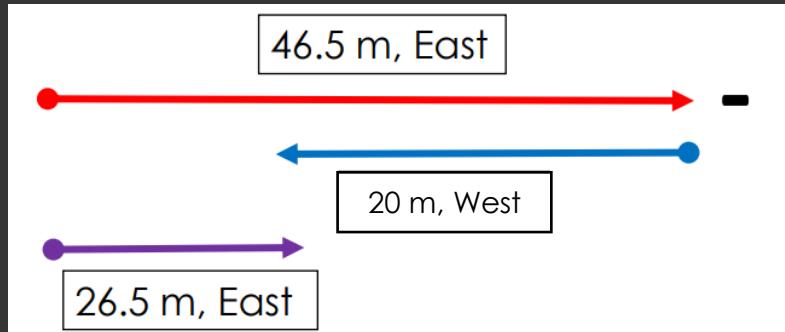
Vector application

Analytical method

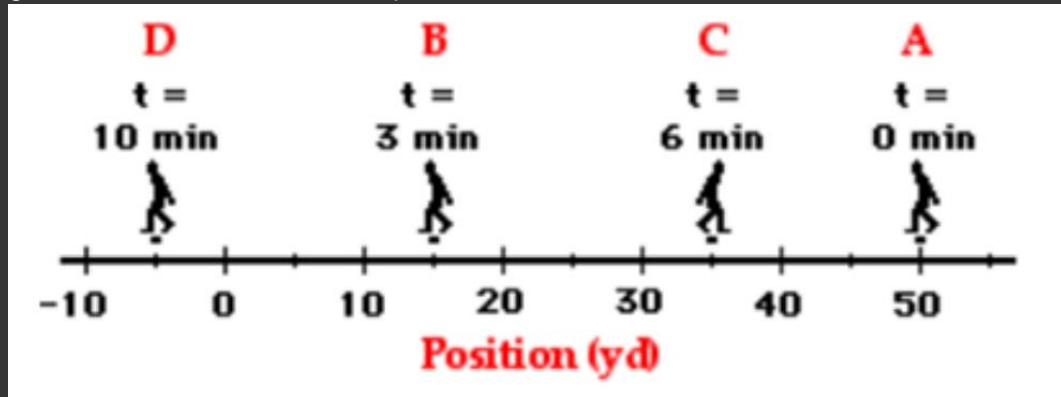
- Addition: when 2 vectors point in the same direction, simply add them together
- When vectors are added together, they should be drawn head to tail to determine the resultant or sum vector.
- The resultant goes from tail A to head of B
- Example 1:
 - A man walks 46.5 m east, then another 20 m east. Calculate his displacement relative to where he started.



- Subtraction: when 2 vectors point to the opposite direction, simply subtract them
- Example 2:
 - A man walks 46.5 m east, then another 20 m west. Calculate his displacement relative to where he started.



- Example 3:
 - A football coach paces back and forth along the sidelines during a close rivalry game. The coach moves from position A to B to C to D.



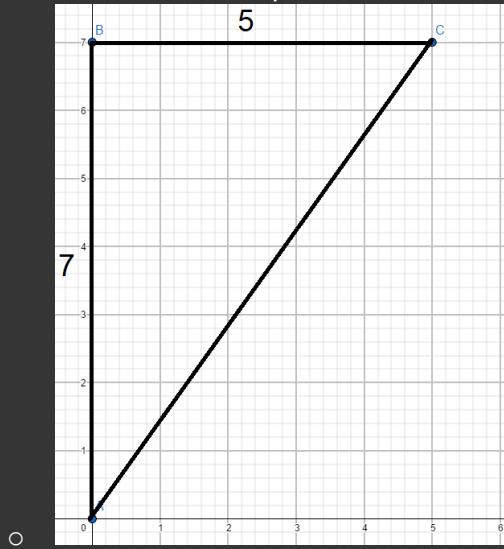
- Final position – initial position

A to B	
$15 - 50 = -35$	15 is the final position (B), while 50 is the initial position (A).
-35 yd West	Final answer is 35 yards West.
B to C	
$35 - 15 = 20$	35 is the final position (C), while 15 is the initial position (B).
20 yd East	Final answer is 20 yards East
C to D	
$-5 - 35 = -40$	-5 is the final position (D), while 35 is the initial position (C).
-40 yd West	Final answer is 40 yards West.
A to D	
$-5 - 50 = -55$	-5 is the final position (D), while 50 is the initial position (A).
-55 yd West	Final answer is 55 yards West.

Graphical method

- Aligning vectors head to tail and then drawing the resultant from the tail of the first to the head of the last.
- Example 1

- Jen drives her scooter 7 km north. She stops for lunch and then drives 5 km east. What was her displacement?

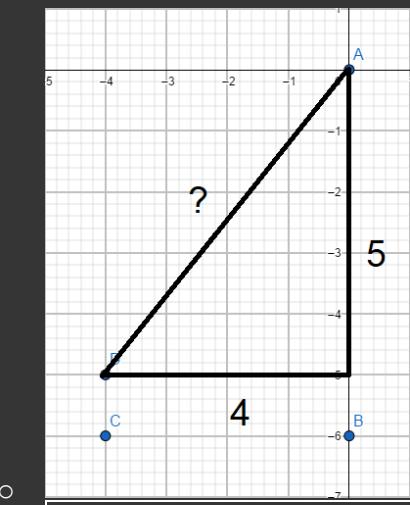


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$a = 7, b = 5, c = ?$	We form a triangle. a side is 7, b side is 5, and we need to find c side, which will be our displacement.
$a^2 + b^2 = c^2$	To find c side, we'll use the Pythagorean theorem.
$\sqrt{a^2 + b^2} = \sqrt{c^2} \rightarrow c = \sqrt{a^2 + b^2}$	We'll use this formula.
$c = \sqrt{7^2 + 5^2}$	Substitute values
$c = 8.6 \text{ km}$	Final answer is 8.6 km.

- Example 2

- On his fishing trip, Justin rides in a boat 6 km south. The fish aren't biting so they go 4 km west. They then follow a school of fish 1 km north. What was their displacement?



○

The goal is to create a triangle. Because of this, a side (6 km) has been reduced to 5 km (analytical method of subtraction of vectors applies here)

$$a = 5, b = 4, c = ?$$

We form a triangle. a side is 5, b side is 4, and we need to find c side, which will be our displacement.

$$c = \sqrt{a^2 + b^2}$$

$$c = \sqrt{5^2 + 4^2}$$

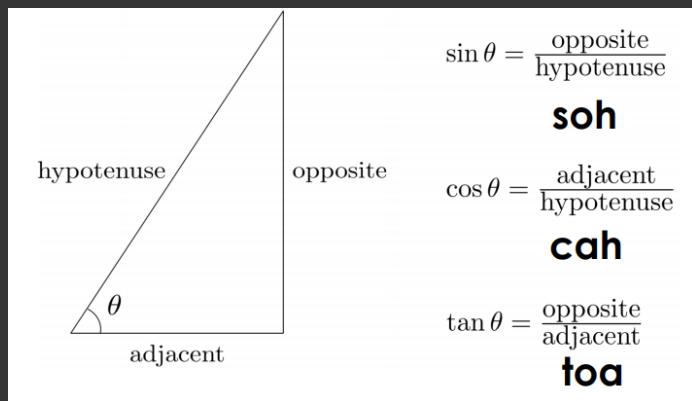
$$c = 6.40 \text{ km, SW}$$

We'll use the same formula again.

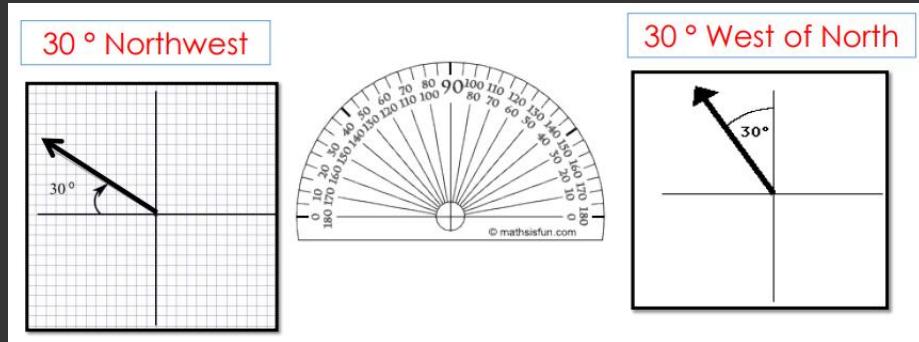
Substitute values.

Final answer is 6.40 kilometers South West.

Trigonometric functions (right triangle)



- There is a difference between Northwest and West of North:

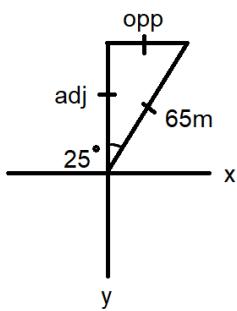


- To find the value of the angle we use a Trigonometric function called Tangent.

	$\tan \theta = \frac{\text{opp}}{\text{adj}}$
$\tan \theta = \frac{160\text{km}}{120\text{km}}$	The opposite side will be the 160km side, as it is opposite of the angle. The adjacent side will be the 120km side, as it is adjacent to the angle. Substitute. 200km is the hypotenuse.
$\tan \theta = 1.33$	160/120 = 1.33.
$\theta = \tan^{-1}(1.33)$	Transpose the tan. Then type it into a scientific calculator
$\theta = 53.06^\circ$	This is the value of our angle.
$d = 200\text{km}, 53.06^\circ \text{ N of E}$	The displacement is 200 km (hypotenuse), and the angle is 53.06 degrees North of East.

- Example 1

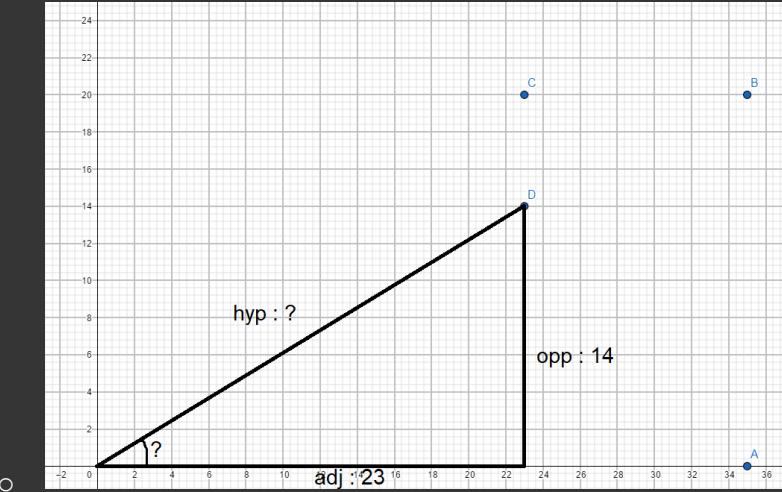
- Suppose a person walked 65 m, 25 degrees East of North. What were his horizontal and vertical components?



The goal is to always make a right triangle. To solve for the components, we often use the trigonometric functions sine and cosine.

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$ & $\sin\theta = \frac{\text{opp}}{\text{hyp}}$	We will be using both formulas.
$\frac{\cos\theta}{1} = \frac{\text{adj}}{\text{hyp}}$ $\text{adj} = \cos\theta \text{hyp}$	We will be finding the adjacent side first. Cross multiply and we will get the following formula.
$\text{adj} = \cos(25)(65)$	The value of theta (θ) in this case is 25 (as in 25 degrees). The value of the hypotenuse (hyp) is 65 (as in 65 meters)
$\text{adj} = \cos(25)(65)$ $\text{adj} = 58.91\text{m}$	Type the equation in a calculator and you'll get the result.
$\text{adj} = 58.91\text{m}$	The final answer for the adjacent side is 58.91 meters.
$\frac{\sin\theta}{1} = \frac{\text{opp}}{\text{hyp}}$ $\text{opp} = \sin\theta \text{hyp}$	Let's look for the opposite side next. Cross multiply and we will get the following formula.
$\text{opp} = \sin(25)(65)$	Substitute values.
$\text{opp} = \sin(25)(65)$ $\text{opp} = 27.47\text{m}$	Type the equation in a calculator and you'll get the result.
$\text{opp} = 27.47\text{m}$	Final answer for the opposite side is 27.47 meters.

- Example 2
 - A bear, searching for food wanders 35 meters east then 20 meters north. Frustrated, he wanders another 12 meters west then 6 meters south. Calculate the bear's displacement.



The goal is to make a right triangle. Because of this, the analytical method of subtraction of vectors applies here.

Opposite side: 20 meters – 6 meters = 14 meters

Adjacent side: 35 meters – 12 meters = 23 meters

$$c = \sqrt{a^2 + b^2}$$

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

To get the hypotenuse side, we'll use the Pythagorean theorem, and to get the theta / angle, we'll use trigonometric function tangent.

$$c = \sqrt{a^2 + b^2}$$

$$c = \sqrt{23^2 + 14^2}$$

Let's first obtain the hypotenuse side. Substitute values.

$$c = 26.93m$$

Solve.

$$c = 26.93m$$

Final answer for c side is 26.93 meters.

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan\theta = \frac{14}{23}$$

Let's then obtain the value of theta. Substitute values.

$$\tan\theta = \frac{14}{23}$$

$$\tan\theta = 0.61$$

Solve.

$$\tan\theta = 0.61$$

$$\theta = \tan^{-1}(0.61)$$

Transpose tan into the other side to isolate theta.

$$\theta = \tan^{-1}(0.61)$$

$$\theta = 31.38^\circ$$

Type the equation in a calculator to get the answer.

$$\theta = 31.38^\circ$$

Final answer for theta is 31.38 degrees.

Final answer:

$$d = 26.93m, 31.38^\circ N \text{ of } E$$

D. Kinematics: Motion along a straight line

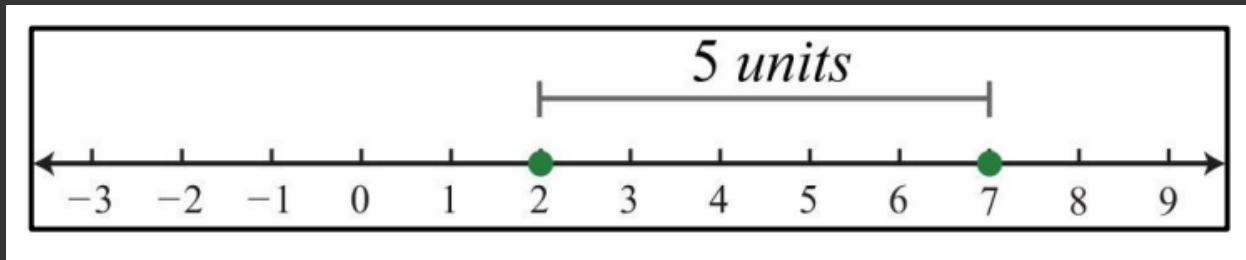
Kinematics is the study that deals with the description of motion

5 descriptors of motion

1. Distance (Scalar, m, km)
2. Displacement (Vector, m, km)
3. Speed (Scalar, m/s, km/h)
4. Velocity (Vector, m/s, km/h)
5. Acceleration (Vector)

Distance (d)

Refers to how far an object travels along a path



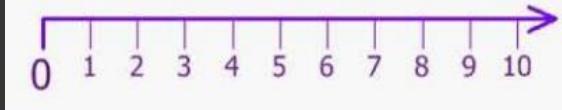
Displacement (d)

Refers to the position of an object in reference to an origin or to a previous position

Displacement formula	$d = d_F - d_i$
Displacement = Final position – initial position	

Example 1

- Find the displacement of the following using diagrams. From 6 to 3.



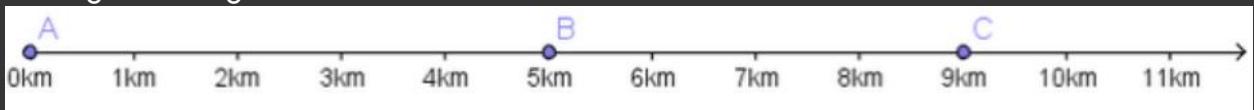
- Since we moved 3 units left, our displacement will be -3. $d = -3$.

Example 2

- A physics teacher walks 4 meters East, 2 meters South, 4 meters West, and finally 2 meters North.
- The displacement will be 0 because the teacher walked back into its original position. $d = 0$.

Example 3

- An object moves from point A to point B to point C, then back to point B, and then to point C along the line figure below.



- Find the distance covered by the moving object.

Point A to point B	We moved 5 km.
Point B to point C	We moved 4 km.
Point C to point B	We moved 4 km.
Point B to point C	We moved 4 km.

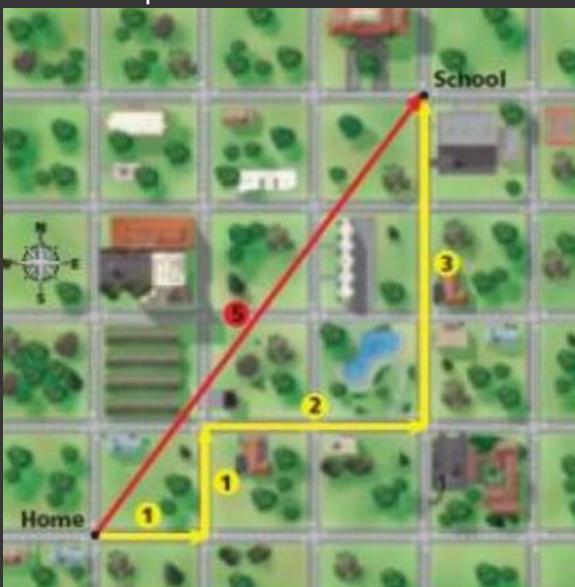
$5+4+4+4 = 17 \text{ km}$	Now that we got the distance travelled from point to point, simply add them together to get the total distance travelled.
17 km	Final distance is 17 km.

- Find the displacement.

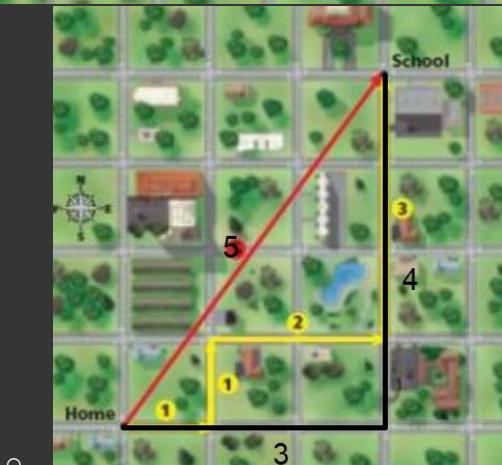
$d = d_F - d_i$	Formula for displacement
$d = 9 - 0$	The initial position is 0 km (point A), while the final position is 9 km (point C). Substitute the values then subtract.
$d = 9 \text{ km East}$	Final displacement is 9 km East.

Example 4

- Get the displacement and distance from home to school



-



-

The goal is to form a triangle.
The hypotenuse side (c) will be 5 (given).
The b side will be 4 (3 km + 1 km)
The a side will be 3

$d = \sqrt{a^2 + b^2}$	We will be using this formula to get the displacement
$d = \sqrt{3^2 + 4^2}$	Substitute values then compute
$d = 5\text{km NE}$	Final displacement is 5 km North East.
$d = 3 + 4$	To get the distance, simply add the a and b side.
$d = 7\text{km}$	Final distance is 7 km.

Speed and velocity

Speed

- It is the rate of change in position of an object

Velocity

- It is the rate of change in position of an object - with direction

Formula for speed and velocity	
$V = \frac{d}{t}$	V = speed or velocity (m/s) d = distance or displacement (m) t = time (s)
Getting the distance/displacement	Getting the time
$d = Vt$	$t = \frac{d}{v}$

Example 1

- A plane travels 350 mph for north 6.5 hours. How far did it travel?

$d = Vt$	Since we have a velocity and time as given, and we have to look for how far the plane travelled, we'll use this formula.
$d = \left(350 \frac{\text{mi}}{\text{h}}\right) \left(6.5 \frac{\text{h}}{1}\right)$	Substitute values.
$d = \left(350 \frac{\text{mi}}{\text{h}}\right) \left(6.5 \frac{\text{h}}{1}\right)$	Cancel out h on both the velocity and time.
$d = (350 \text{ mi})(6.5)$	What remains is the unit mi on 350. Multiply.
$d = 2,275 \text{ mi}$	Final distance is 2,275 miles.

Example 2

- How much time does it take a person to walk 12 km north at a velocity of 6.5 km/h?

$t = \frac{d}{v}$	Since we are looking for the time with the velocity and displacement given, we will use this formula.
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$t = \frac{12 \text{ km}}{6.5 \frac{\text{km}}{\text{h}}}$	Substitute values.
$t = \frac{12 \text{ km}}{6.5 \frac{\text{km}}{\text{h}}}$	Cancel out km on both denominator and numerator.
$t = \frac{12}{6.5 \text{ h}}$	What remains is the unit h on the denominator. Divide.
$t = 1.85 \text{ h}$	Final time is 1.85 hours.

Constant speed/velocity

Formula for constant speed and velocity	$\text{Speed} = \frac{\text{distance travelled}}{\text{time taken}}$
---	--

Average velocity

- Total displacement by the total time it took to move from one place to another

Formula for average velocity	$V_{av} = \frac{\text{total distance}}{\text{total time}}$	$V_{av} = \frac{\text{change in distance}}{\text{change in time}}$
		$V = \frac{\Delta d}{\Delta t} \rightarrow \frac{d_f - d_i}{t_f - t_i}$

Instantaneous velocity

- It is the velocity of an object in motion at a specific point in time

Acceleration

Refers to the velocity of an object in motion at a specific point in time

Formula for speed and velocity	$a = \frac{V_f - V_i}{t}$	$A = \text{acceleration } (\text{m/s}^2)$ $V_f = \text{final velocity } (\text{m/s})$ $V_i = \text{initial velocity } (\text{m/s})$ $t = \text{time } (\text{s})$
	$V_f = at + V_i$	$V_i = at - V_f$

Example 1

- A car increases its velocity from 50 m/s to 80 m/s in 2.0s maintaining its direction. What is its acceleration?

$a = \frac{V_f - V_i}{t}$	We'll use this formula.
$a = \frac{80 \text{ m/s} - 50 \text{ m/s}}{2 \text{ s}}$	Substitute values.
$a = \frac{30 \text{ m/s}}{2 \text{ s}}$	$80 - 50 = 30$
$a = 15 \text{ m/s}^2$	Final acceleration is 15m/s ² .

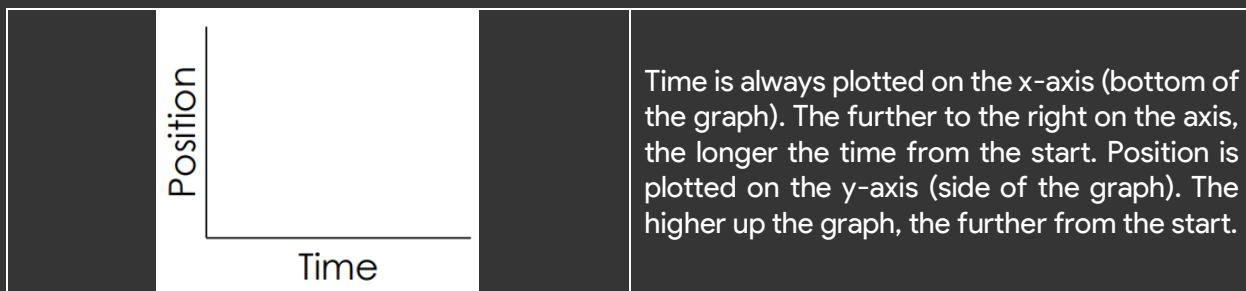
Example 2

- If a Ferrari, with an initial velocity of 10 m/s, accelerates at a rate of 50 m/s/s (50 m/s^2) for 3 seconds, what will its final velocity be?

$V_f = at + V_i$	Since we need to find the final velocity, we'll use this formula.
$V_f = (50 \text{ m/s}^2)(3\text{s}) + 10 \text{ m/s}$	Substitute values
$V_f = (50 \text{ m/s}^2)(3\text{s}) + 10 \text{ m/s}$	Cancel 2 and s on the 3s.
$V_f = (50 \text{ m/s})(3) + 10 \text{ m/s}$	Multiply 50 and 3
$V_f = 150 \text{ m/s} + 10 \text{ m/s}$	Add
$V_f = 160 \text{ m/s}$	Final velocity is 160 m/s.

Position-time graphs

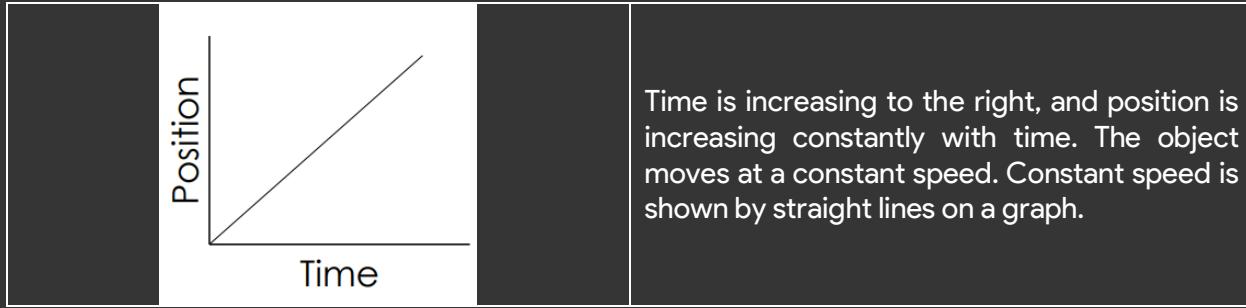
Plotting position against time can tell you a lot about motion. Let's look at the axes:



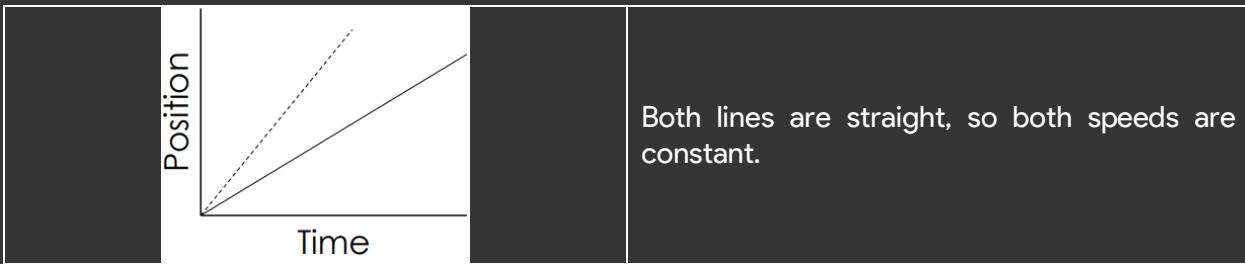
If an object is not moving, a horizontal line is shown on a position-time graph



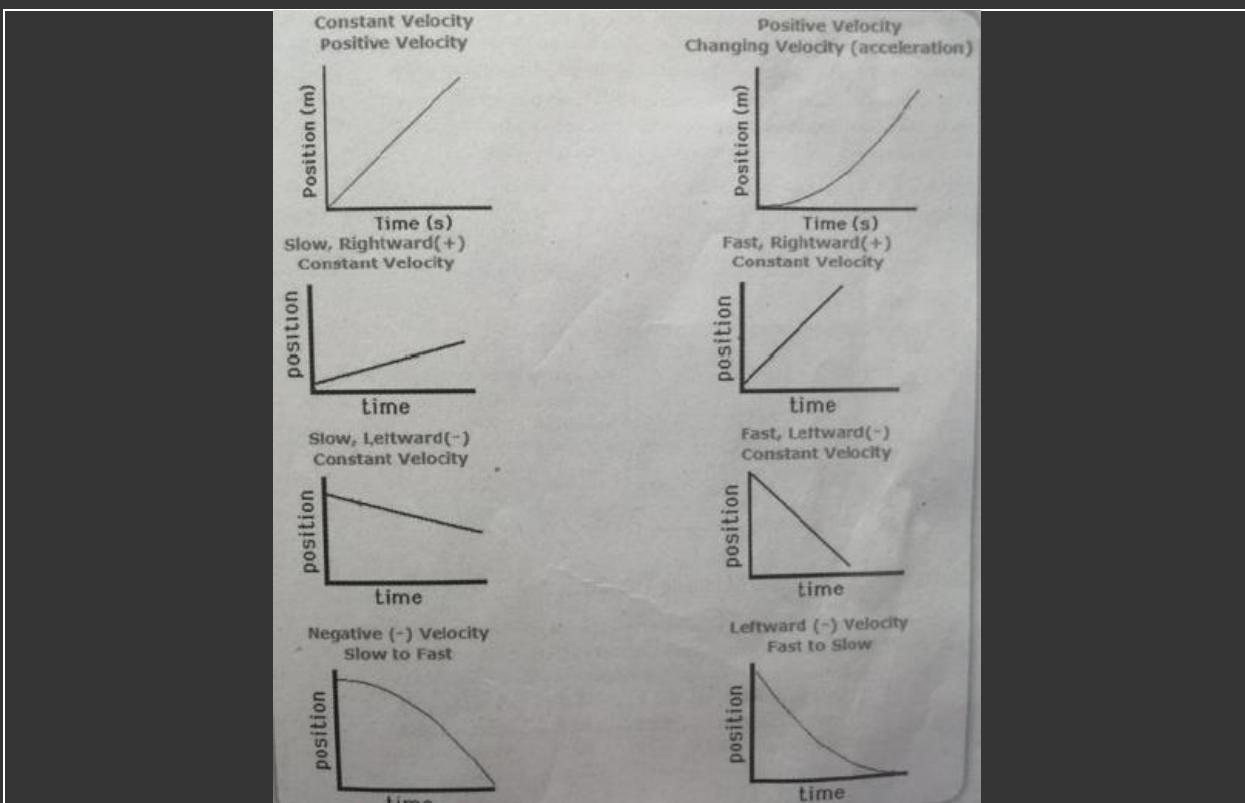
If an object is moving at a constant speed, it means it has the same increase in position in a given time



A steeper line indicates a larger distance moved in a given time. In other words, higher speed.



[Velocity vs. Time](#) | [Acceleration vs. Time Curves](#)



Constant velocity vs. Acceleration

To have a constant velocity, an object must have a constant speed in a constant direction.

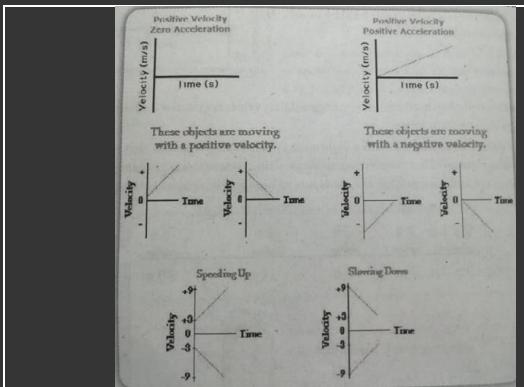
Constant direction constraints the object to motion in a straight path thus, a constant velocity means motion in a straight line at a constant speed.

Example

- A car moving at a constant 20 km per h in a circular path has a constant speed, but does not have a constant velocity because its directions changes. Hence, the car is considered to be undergoing an acceleration.

Constant velocity vs. Changing Velocity

If the velocity is constant, then the slope is constant (i.e., a straight line). If the velocity is changing, then the slope is changing (i.e., a curved line). If the velocity is positive, then the slope is positive (i.e., moving upwards and to the right)



A straight line is a curve with constant slope. Since slope is acceleration on a velocity time graph, each of the objects represented on this graph is moving with a constant acceleration. Were the graphs curved, the acceleration would not have been constant.

Can objects have the same speed but different velocities? Yes, one of the objects can be going east while the other is heading west.

Velocity-time graph & acceleration-time graph

Velocity-time graph

- Slope equals acceleration
- The “y” intercept equals the initial velocity
- When two curves coincide, the two objects have the same velocity at that time
- Straight lines imply uniform acceleration
- Curved lines imply non-uniform acceleration
- An object undergoing constant acceleration traces a straight
- Positive slope implies an increase in velocity in the positive direction
- Negative slope implies an increase in velocity in the negative direction
- Zero slope implies motion with constant velocity

Acceleration

- The rate of change of velocity with time. Transforming a velocity time graph to an acceleration-time graph means calculating the slope of a line tangent to the curve at any point
- In calculus, this is called finding the derivative. The reverse process entails calculating the cumulative area under the curve. In calculus, this is called finding the integral.
- This number is then the change of value on a velocity-time graph.

Acceleration-time graph

- Slope is meaningless
- The “y” intercept equals the initial acceleration
- When two curves coincide, the two objects have the same acceleration at that time
- An object undergoing constant acceleration traces a horizontal line
- Zero slope implies motion with constant acceleration

Free falling bodies

Free fall is the motion of a body where its weight is the only force acting on an object

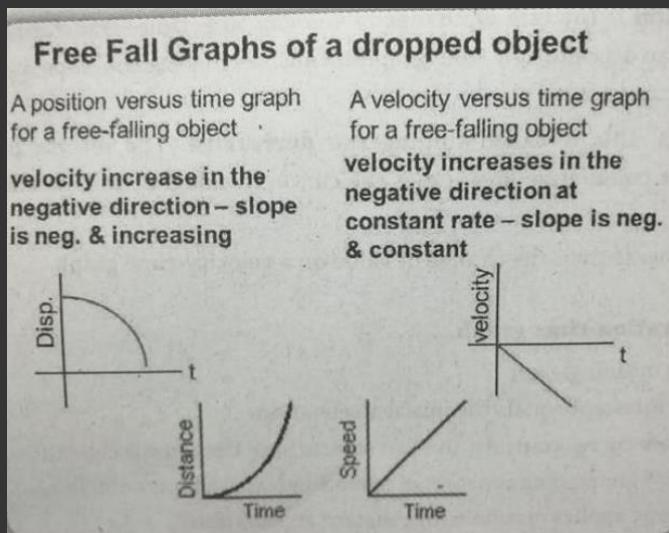
Free falling object is an object that is falling under the sole influence of gravity

The acceleration of freefalling objects is called the acceleration due to gravity, since objects are pulled towards the center of the earth.

The acceleration due to gravity is constant on the surface of the Earth and has the value of 9.80 m/s²

Formula for free falling bodies	
$d = V_i t + \frac{1}{2} a t^2$	t = elapsed time d = displacement from the origin of time
$V_f = V_i + at$	V_i = initial velocity V_f = final velocity
$V_f^2 = V_i^2 + 2ad$	a = uniform rate of acceleration
Initial velocity is neglected due to air resistance	

Free fall graphs of a dropped object



Example 1

- You're standing at the edge of a cliff and drop a ball. It takes 10 s to hit the ground. How high up are you?

$d = V_i t + \frac{1}{2} a t^2$	Since we're looking for the distance, we'll use this formula.
$d = V_i t + \frac{1}{2} a t^2$	Remove initial velocity because of air resistance
$d = \frac{1}{2} a t^2$	We'll use this formula now.
$d = \frac{1}{2} (9.80 \text{m/s}^2)(10\text{s})^2$	Substitute values. Since this is free fall, the value for acceleration is ALWAYS 9.80 m/s ² .
$d = \frac{1}{2} (9.80 \text{m/s}^2)(100\text{s}^2)$	10^2 is 100, unit s will become s ²
$d = \frac{1}{2} (9.80 \text{m/s}^2)(100\text{s}^2)$	Cancel s ²
$d = \frac{1}{2} (9.80 \text{m})(100)$	Multiply 9.80 to 100

$d = \frac{1}{2} 980$	Divide 980 by $\frac{1}{2}$ (0.5)
$d = 490m$	Final distance is 490 meters.

Example 2

- A ball dropped from a height.

- Find acceleration.

$a = 9.8 m/s^2$	Since it is free falling, the acceleration will be $9.80 m/s^2$.
-----------------	---

- Find distance after 3s.

$d = \frac{1}{2} at^2$	We'll use this formula (initial velocity already discarded due to air resistance)
$d = \frac{1}{2} (9.80m/s^2)(3s)^2$	Substitute values.
$d = \frac{1}{2} (9.80m/s^2)(9s^2)$	3^2 is 9, unit s will become s^2
$d = \frac{1}{2} (9.80m/s^2)(9s^2)$	Cancel s^2
$d = \frac{1}{2} (9.80m)(9)$	Multiply 9.80 to 9
$d = \frac{1}{2} 88.2$	Divide 88.2 by $\frac{1}{2}$ (0.5)
$d = 44.1m$	Final distance is 44.1 meters.

- Find the final velocity

$V_f^2 = V_i^2 + 2ad$	Since we're looking for the final velocity, we'll use this formula.
$V_f^2 = 2ad$	Remove the initial velocity from the formula. We'll use THIS formula.
$V_f^2 = 2(9.8m/s^2)(44.1m)$	Substitute values then multiply 9.8 and 44.1
$V_f^2 = 2(432.18m/s^2)$	Multiply by 2
$V_f^2 = 864.36m/s^2$	This is still not the final answer, as V_f has an exponent of 2. We need to remove it.
$\sqrt{V_f^2} = \sqrt{864.36m/s^2}$	To remove it, put both inside radicals and get their square roots.
$\sqrt{V_f} = \sqrt{864.36m/s}$	Thanks to the invisible 2 on the left side of each radical, the exponent 2 gets removed from both sides. Get the square root of 864.36
$V_f = 29.4m/s$	Final velocity is 29.4 m/s.

E. Motion in two and three dimensions

Displacement, velocity, acceleration

Case 1: Projectile motion

Case 2: Circular motion

The position is represented by vector d.

Velocity will still be represented by v.

Acceleration by a.

To understand motion in 2 and 3 dimensions, distance, velocity, and acceleration needs to be divided into 3 directions: x, y, and z.

	x	y	z
d	d_x	d_y	d_z

Projectile motion (2-D)

Projectile motion is the motion of an object under the influence of gravity.

A projectile is any body given an initial velocity that then follows a path determined by the effects of gravity and air resistance.

Equations involving horizontal and vertical components		
X-component	Y-component	
$d_x = V_x t$	$d_y = \frac{1}{2} g t^2$	D_x = horizontal distance (m) D_y = vertical distance (m)
$V_x = \frac{d_x}{t}$	$V_y = g t$	V_x = horizontal velocity (m/s) V_y = vertical velocity (m/s)
$t = \frac{d_x}{V_x}$	$t = \sqrt{\frac{2d_y}{g}}$	G = gravity (9.8m/s ²) T = time (sec)

Example 1

- A ball rolls off a desk at a speed of 3.0 m/s and lands 0.40 seconds later.
 - How far from the base of the desk does the ball land?

$d_x = V_x t$	Since we're finding how far from the base of the desk the ball lands, we will be looking for the horizontal distance or d_x .
$d_x = (3\text{m/s})(0.4\text{s})$	Substitute values. Because this is horizontal distance, the velocity will be horizontal as well.
$d_x = (3\text{m/s})(0.4\text{s})$	Cancel s.
$d_x = (3\text{m})(0.4)$	Multiply 3 and 0.4.
$d_x = 1.2\text{m}$	Final horizontal distance is 1.2 meters.

- How high is the desk?

$d_y = \frac{1}{2} g t^2$	Since we're finding how high the desk is, we'll be looking for the vertical distance or d_y .
$d_y = \frac{1}{2} (9.8\text{m/s}^2)(0.4\text{s})^2$	Substitute values.

$d_y = \frac{1}{2}(9.8m/s^2)(0.16s^2)$	0.4 ² is 0.16, s unit becomes s ²
$d_y = \frac{1}{2}(9.8m/s^2)(0.16s^2)$	Cancel s ²
$d_y = \frac{1}{2}(9.8m)(0.16)$	Multiply 9.8 and 0.16 then divide by ½
$d_y = 0.78m$	Final vertical distance is 0.78 meters.

Example 2

- A slingshot is used to launch a stone horizontally from the top of a 20-meter cliff. The stone lands 36.0 meters away.

- At what speed was the stone launched?

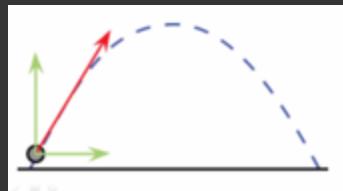
$V_x = \frac{d_x}{t}$	Since we're looking for the horizontal velocity, we'll use this formula.
$t = \sqrt{\frac{2d_y}{g}}$	We don't have a value for time, so we need to use this formula to get it.
$t = \sqrt{\frac{2(20)}{9.8}}$	Substitute values. Then simplify.
$t = \sqrt{4.08}$	$(2)(20) = 40/9.8 = 4.08$ Get the square root
$t = 2.02s$	Value for t is 2.02s
$V_x = \frac{d_x}{t}$	Now that we have the value for t, we can go back and solve this one.
$V_x = \frac{36}{2.02}$	Substitute values then divide.
$V_x = 17.82m/s$	Final horizontal velocity is 17.82m/s

Object launched at an angle

Formula for initial velocity x and y	
X $V_{ix} = V_0 \cos\theta$	Y $V_{iy} = V_0 \sin\theta$

Example 1

- A cannon ball is fired with an initial velocity of 100m/s at an angle of 45 degrees above the horizontal.



- Given

$V_0 = 100 \text{ m/s}$	$\theta = 45^\circ$
-------------------------	---------------------
- Before we continue, we need to turn V_o to V_{ix} and V_{iy}

$V_{ix} = V_0 \cos \theta$	$V_{iy} = V_0 \sin \theta$
$V_{ix} = 100 \cos 45$	$V_{iy} = 100 \sin 45$
$V_{ix} = 70.71 \text{ m/s}$	$V_{iy} = 70.71 \text{ m/s}$
- What maximum height will it reach?

$d_y = \frac{1}{2} g t^2$ $t = \frac{V_f - V_i}{g}$ $t = \frac{0 - 70.71}{-9.8}$ $t = 7.22 \text{ s}$ $d_y = \frac{1}{2} (9.8)(7.22 \text{ s})^2$ $d_y = 255.43 \text{ m}$	To get the vertical height/distance, we'll use this formula. We don't have the value of time, so we'll use this formula to get the time first. Substitute values. Initial velocity will be 70.71, the value we obtained earlier. Final velocity will be 0, and gravity will be -9.8 (since it's going down) Value of time Substitute values then solve Final vertical distance is 255.43 meters.
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- How far will it fly horizontally?

$d_x = V_x t$ $d_x = (70.71)(14.44)$ $d_x = 1021.05 \text{ m}$	Since we're looking for the horizontal distance, we'll use this formula. Substitute values (7.22 x 2) then solve Final horizontal distance is 1021.05 meters.
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Example 2

- Suppose a cannon ball is fired downward from a 50m high cliff at an angle of 45 degrees with an initial velocity of 80 m/s. How far horizontally will it land from the base of the cliff?

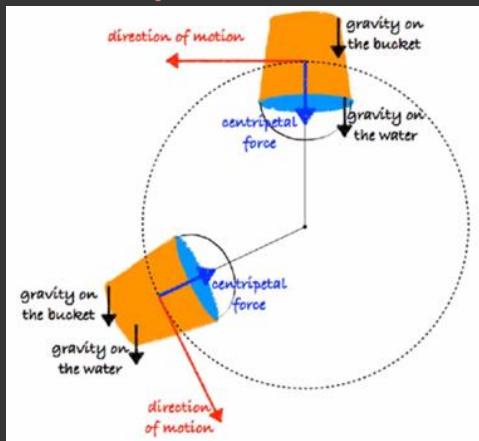
Given		
$d_y = 50 \text{ m}$	$\theta = 45^\circ$	$V_o = 80 \text{ m/s}$

Let's get the both initial velocities first.

$V_{ix} = V_0 \cos \theta$	$V_{iy} = V_0 \sin \theta$
$V_{ix} = 80 \cos 45$	$V_{iy} = 80 \sin 45$
$V_{ix} = 56.57 \text{ m/s}$	$V_{iy} = 56.57 \text{ m/s}$

	<i>*Explanation may not be accurate</i>
$d_y = \frac{1}{2}gt^2$	We'll use this formula
$d_y = V_{iy}t + \frac{1}{2}gt^2$	However, since initial velocity is involved, we'll add $V_{iy}t$
$50 = 56.57t + \frac{1}{2}(9.8)t^2$ $50 = 56.57t + 4.9t^2$ $4.9t^2 + 56.57t - 50 = 0$	Substitute values. We'll deal with the missing time value later.
$t = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$ and $t = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$ $t = \frac{-56.57 + \sqrt{56.57^2 - 4(4.9)(-50)}}{9.8}$ and $t = \frac{-56.57 - \sqrt{56.57^2 - 4(4.9)(-50)}}{9.8}$	This can be rearranged into a quadratic equation. 4.9 being a, 56.57 as b, and -50 as c. To get the time, we'll use the following formula, with the values from the quadratic equation above.
$t = 0.82s$ and $t = -12.39s$	Substitute values then solve.
$d_x = V_x t$	We'll use 0.82 as our value for time because time can't be negative.
$d_x = (56.57)(0.82)$ $d_x = 46.39m$	To get the horizontal distance, we'll use this formula. Substitute values then solve. Final horizontal distance is 46.39 meters.

F. Centripetal Force



What's going on with the bucket?

- The water stays in the bucket because of inertia
- This is the same effect you feel when you go around a tight corner in the car and get squished against the door. An object will remain stationary or will move in the same direction at a constant speed, unless the forces acting on it are not balanced.

This will cause an acceleration in the direction of the stronger force. This can make an object slow down or speed up, or it can cause it to change direction.

Force causing circular motion

Any object that moves in a circle must be accelerating towards the center of that circle. What causes this?

Formula	$F = m \times a$
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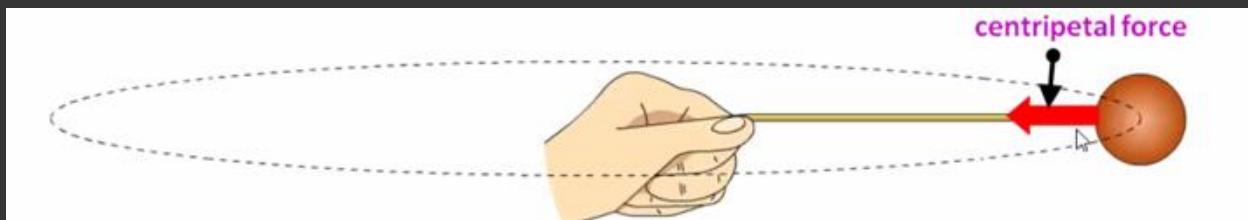
Force and acceleration are both vector quantities, unlike mass, so according to this equation, their directions must be equal.

All circular motion must therefore be caused by a force acting towards the center of the circle. This type of force is known as centripetal force.

Centrifugal or centripetal force

Swing a mass around in a circle on the end of a string. Do you feel a force pulling your hand outwards? This is often called a "centrifugal force".

Consider what is happening in this case. The mass on the end of the string is the object that is performing circular motion, so it is the forces on this object that are important



Centripetal force formula

$$F_c = mr\omega^2$$

F_c = Centripetal force (N)

m = Mass (kg)

r = Radius (m)

ω^2 = Centripetal acceleration (m/s^2)

When the distinction between the tangential speed and angular speed is applied, the equation can be written as

$F_c = \frac{mv^2}{r}$ or $F_c = mr\omega^2$	V = Tangential speed (m/s) r = Radius (m) ω = Angular speed (rad/s)	
$r = \frac{mv^2}{F_c}$	$m = \frac{F_c r}{v^2}$	$v = \sqrt{\frac{F_c r}{m}}$

The centripetal force is the force that maintains the circular path of the object.

If the centripetal force is zero, the object will move in a straight line.

Example 1

- What is the centripetal force of an 8,000 kg train whose speed is 27.8 m/s, rounding a curve whose radius of curvature is 150 m?

$m = 8000\text{kg}$ $v = 27.8 \text{ m/s}$ $r = 150\text{m}$	Given
$F_c = \frac{mv^2}{r}$	Since we're looking for the centripetal formula, we can use this formula.
$F_c = \frac{(8000)(27.8)^2}{150}$	Substitute values.
$F_c = \frac{(8000)(772.84)}{150}$	$27.8^2 = 772.84$

$F_c = \frac{6182720}{150}$	Multiply the numerators then simplify.
$F_c = 41,218.13N$	Final answer is 41,218.13 Newtons

Example 2

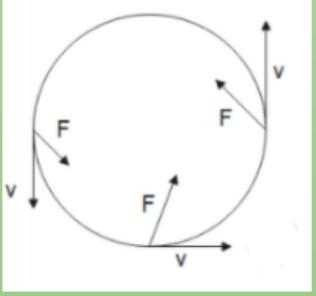
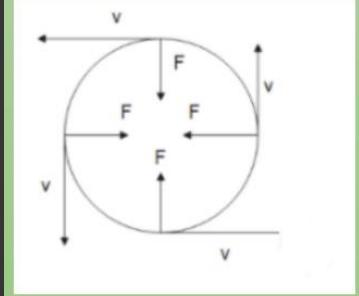
- Calculate the centripetal force exerted on a 900kg car that negotiates a 500 m radius curve at 25.0 m/s

$m = 900\text{kg}$ $v = 25.0 \text{ m/s}$ $r = 500\text{m}$	Given
$F_c = \frac{mv^2}{r}$	Since we're looking for the centripetal formula, we can use this formula.
$F_c = \frac{(900)(25)^2}{500}$	Substitute values.
$F_c = \frac{(900)(625)}{500}$	$25^2 = 625$
$F_c = \frac{562,500}{500}$	Multiply the numerators then simplify.
$F_c = 1,125\text{N}$	Final answer is 1,125 Newtons

G. Circular motion

It is defined as the movement of an object along the circumference of a circle or rotation along a circular path

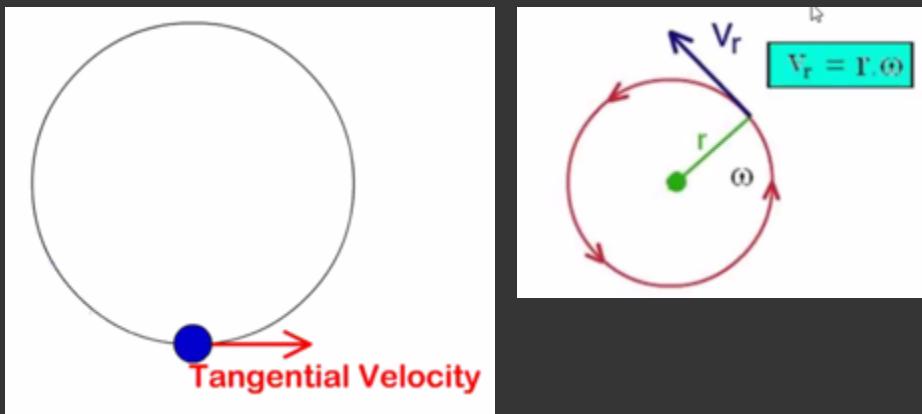
- A circular motion can be uniform if the angular rate of rotation and speed are constant
- The motion can be non-uniform if the angular rate of rotation is varying with time

Non-uniform circular motion	Uniform circular motion
Non-uniform circular motion implies the movement of an object along a circular path with variable speed	Uniform circular motion implies the movement of an object along a circular path with constant speed
Angular and tangential acceleration are non-zero	Angular and tangential acceleration are zero
Linear speed and angular speed of the particle vary with time	Linear speed and angular velocity of the particle remains constant
	
The net linear acceleration of the particle is not radial	The net linear acceleration of the particle is radially inwards
The magnitude of centripetal force is not constant	The magnitude of centripetal force is constant

The magnitude of centripetal acceleration in a non-uniform circular motion is not constant	The magnitude of centripetal acceleration in a uniform circular motion is constant
Example: Motion of the earth around the sun; second, minute, and hour hands of a watch; motion of cyclist on a circular track, etc.	Example: Motion of a body on vertical circle; vertical circle with a string and bob; roller coaster, etc.

Tangential velocity

A linear speed of any object moving along a circular path



Tangential velocity	
$V_r = r\omega$	$r = \frac{V_r}{\omega}$
V_r = Tangential velocity r = Radius of the circular path ω = Angular velocity	

Example 1

- If the angular velocity of a wheel is 40 rad/s, and the wheel diameter is 60cm, calculate the tangential velocity

$\omega = 40\text{rad/s}$ $d (\text{diameter}) = 60\text{cm}$ $V_r = ?$	Given
$r = \frac{60\text{cm}}{2} = 30\text{cm}$	Since the given is diameter, we must convert it into a radius, by dividing the diameter by 2
$r = 0.3\text{m}$	We must convert the radius from cm to m
$V_r = r\omega$	We will be using this formula
$V_r = (0.3)(40)$	Substitute values then multiply
$V_r = 12\text{m/s}$	Final answer is 12m/s

Example 2

- If a wheel moves at 10m/s, and its angular velocity is 5 rad/s, calculate the radius of the wheel

$\omega = 5\text{rad/s}$ $V_r = 10\text{m/s}$	Given
$r = \frac{V_r}{\omega}$	Since we're looking for the radius, we'll use this formula

$r = \frac{10}{5}$	Substitute values
$r = 2\text{m}$	Final answer is 2m

Centripetal acceleration

The acceleration of a body traversing a circular path

The acceleration is directed radially toward the center of the circle

Centripetal acceleration
$a_c = \frac{v^2}{r}$

a_c = Centripetal acceleration
 v = Velocity
 r = Radius

Example 1

- What is the magnitude of the centripetal acceleration of a car following a curve of radius 500 m at a speed of 25.0 m/s (about 90km/h)?

$v = 25$ $r = 500$	Given
$a_c = \frac{v^2}{r}$	We'll use this formula
$a_c = \frac{(25)^2}{500}$	Substitute values
$a_c = \frac{625}{500}$	$25^2 = 625$
$a_c = 1.25\text{m/s}^2$	Final answer is 1.25m/s ²

Tangential acceleration

A measure of how the tangential velocity of a point at a certain radius change with time

Tangential acceleration is just like linear equation, but it's specific to the tangential direction, which is relevant to circular motion

Tangential acceleration	
$a_T = r\alpha$	a_T = Tangential acceleration r = Radius of the object's rotation α = Angular acceleration with unit radians/s ² (rad/s ²)

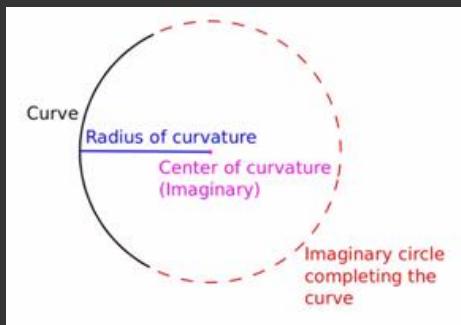
Example 1

- A car that has tires with radius 20.0 cm (0.200m) begins to accelerate forwards. The acceleration comes from the engine, which produces an angular acceleration of the tires $\alpha = 12.0 \text{ rad/s}^2$. What is the tangential acceleration of the tires?

$r = 0.200$	Given
$\alpha = 12$	
$a_T = r\alpha$	We'll use this formula
$a_T = (0.200)(12)$	Substitute values then solve
$a_T = 2.4 \text{ m/s}^2$	Final answer is 2.4 m/s^2

Radius of curvature

The distance from the vertex to the center of curvature



H. Newton's Laws of Inertia and Acceleration

Frames of reference

- It is a perspective that one uses to determine if an object is moving
 - For example, when you see a ball roll down a street, you can tell the ball is moving because the frame of reference is the streets, whatever may be on the side of the roads, or the earth

Inertial frames

- In which no accelerations are observed in the absence of external forces
- That is not accelerating
- Newton's laws hold in all inertial reference frames

Non-inertial frames

- That is accelerating with respect to an inertial reference frame
- Bodies have acceleration in the absence of applied forces

Galilean relativity

- The fundamental laws of physics are the same in all frames of reference moving with constant velocity with respect to one another
- Example
 - Newton's laws work in the physics lab, which is fixed to the Earth. Therefore, they also work in a train moving with constant velocity with respect to the Earth
 - i.e., if you set up your experiments in a train moving slowly, without turning, speeding up, slowing down, you will get the same results.

One could also state it this way

- If the laws of mechanics work in one frame of reference, then they also work in a frame of reference that moves with constant velocity with respect to the first frame
- i.e., if your first frame is inertial, the second frame is inertial. If you can juggle on the platform, you can juggle in the train, or even in a plane, even if a bystander sees you and the balls whizzing by at high speeds.

Newton's Laws of Motion

- Newton adhered to Galileo's relativity principle but believed in a frame of absolute rest
- Time is absolute: no difference of time in different reference frames
- Newton's three laws of motion (1687) dominated the scientific view of the physical universe for the next three centuries
- Newton demonstrated the consistency between his theory and Kepler's laws (1609, 1619) of planetary motion

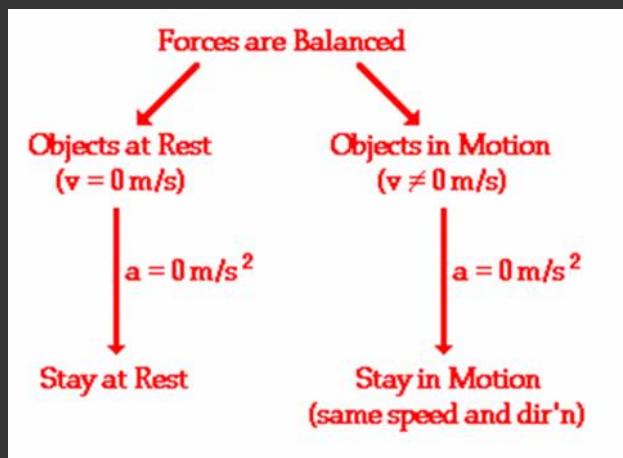
Law of Inertia

States that a body at rest will remain at rest and a body in motion will continue to move with constant velocity unless acted upon by an unbalanced external force

Inertia is the property of the body that tends to resist change in its state of motion

Mass is the measurement of inertia

The greater the inertia, the harder it is to change the state of motion of a body



Law of Acceleration

States that when a net force acts on a body, it will be accelerated in the direction of that force

The acceleration of the body is directly proportional to the net force acting upon it

Furthermore, the acceleration is inversely proportional to the mass of the body

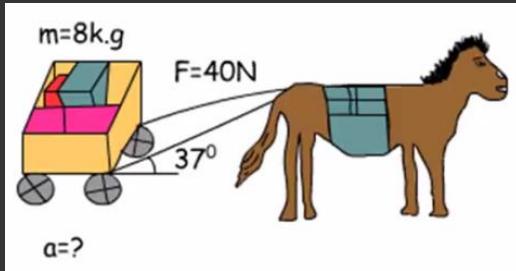
Law of Acceleration	
$a = \frac{F_{net}}{m}$	$F_{net} = ma$
a = Acceleration (m/s^2) F = Force (N) m = Mass (kg)	$m = \frac{f}{a}$

Relationships between acceleration, force, and mass

- If you apply more force to an object, it accelerates at a higher rate
- If the same force is applied to an object with a greater mass, the object accelerates at a slower rate because mass adds inertia

Example 1

- Given in the picture below, a horse is pulling the horsebox having 8kg mass in it with a force of 40N; if the applied force has an angle of 37 degrees to the horizontal; calculate the acceleration of the horsebox



-

$F = 40N$	$m = 8$	Given
$F_x = F\cos\theta$	$F_y = F\sin\theta$	We should find the x and y components of force first using these formulas
$F_x = 40\cos37$	$F_y = 40\sin37$	Substitute values. θ will be the angle which 37 degrees. Type the equation in the calculator.
$F_x = 31.95N$	$F_y = 24.07N$	We will be using 31.95 as the value for F because we're looking for the horizontal force
$a = \frac{F_{net}}{m}$		We now have all the values. We'll use this formula next
$a = \frac{31.95}{8}$		Substitute values and simplify
$a = 4 \text{ m/s}^2$		Final answer is 4 m/s^2

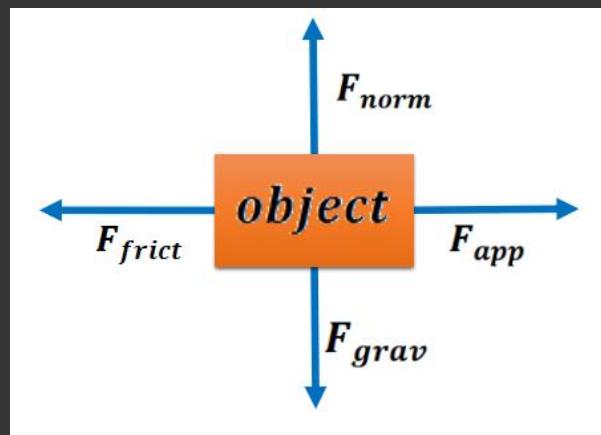
I. Free-body diagram

Diagrams used to show the relative magnitude and direction of all forces acting upon an object in a given situation

A free-body diagram is a special example of the vector diagrams

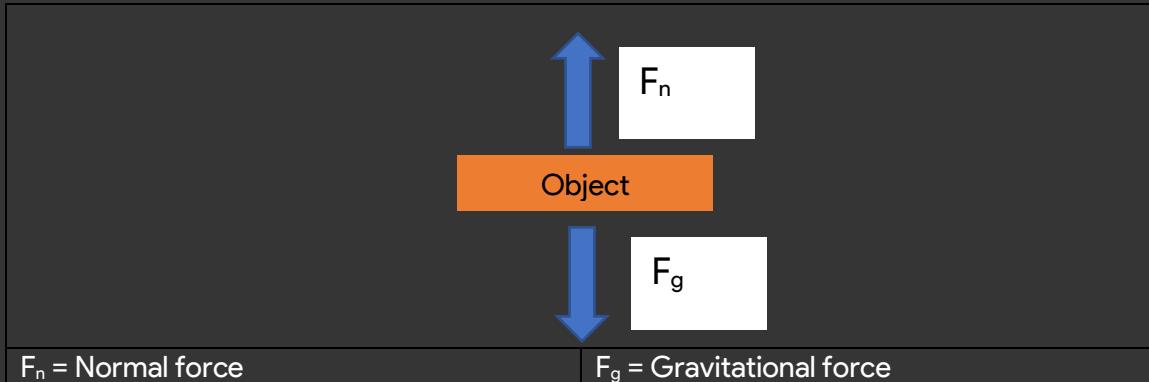
The direction of the arrows shows the direction that the force is acting

Example of a free-body diagram



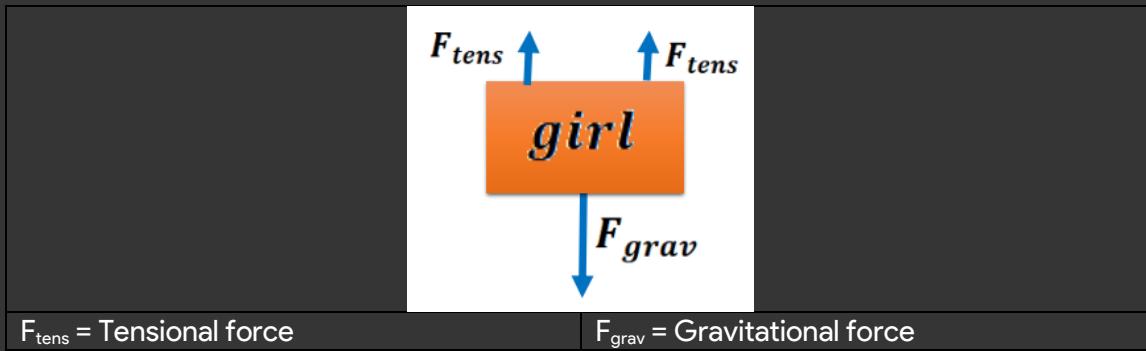
Example 1

- A book is resting on the table. Diagram the forces acting on the book.



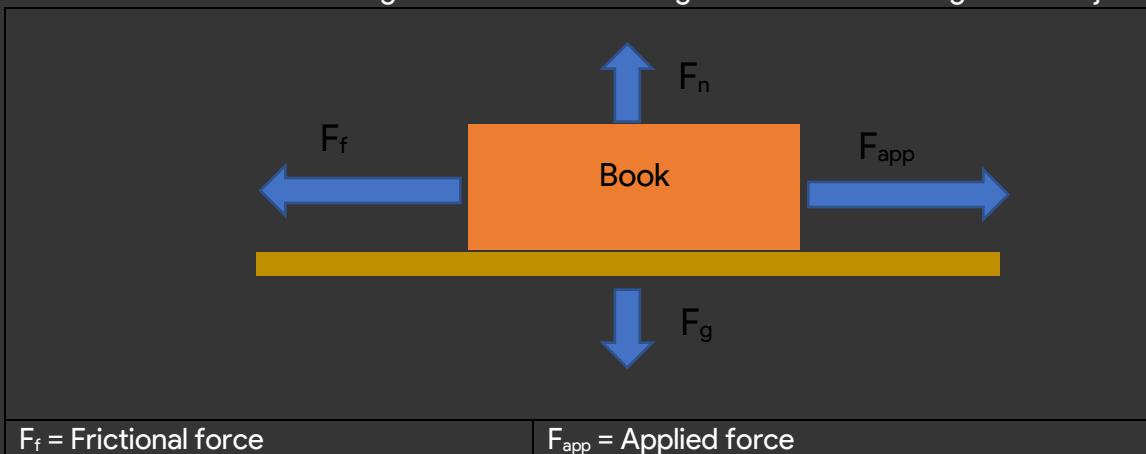
Example 2

- A girl is suspended motionless from the ceiling by two ropes. Diagram the forces acting on the girl



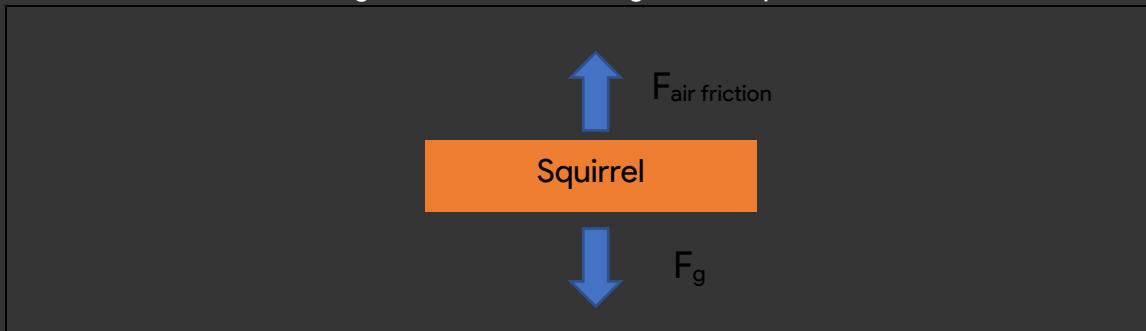
Example 3

- A rightward force is applied to a book in order to move it across a desk at a constant velocity. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the object.



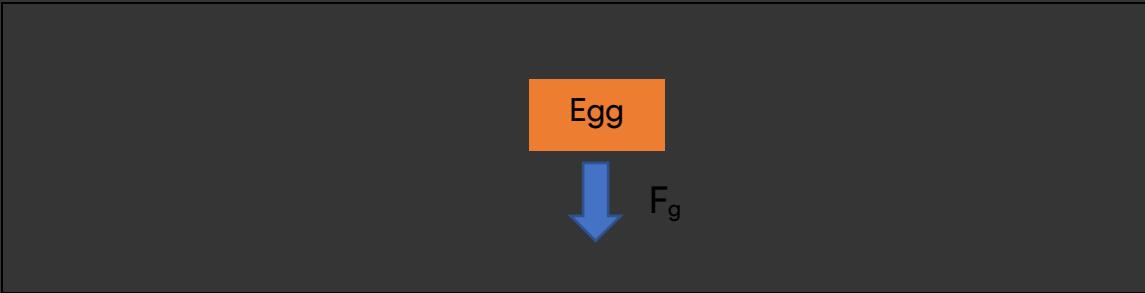
Example 4

- A flying squirrel is gliding (no wings flap) from a tree to the ground at a constant velocity. Consider air resistance. Diagram the forces acting on the squirrel.



Example 5

- An egg is free-falling from a nest in a tree. Neglect air resistance. Diagram the forces acting on the egg as it is falling.



Gravitational force

Gravitational force a.k.a. weight

$$F_g = mg$$

F_g = Gravitational force

m = Mass

g = Gravity (9.8)

Coefficient of friction

- Ratio of the frictional force resisting the motion of two surfaces in contact to the normal force pressing the two surfaces together.

Coefficient of friction

$$\mu = \frac{F_f}{F_N}$$

$$F_f = \mu F_N$$

May not be accurate →

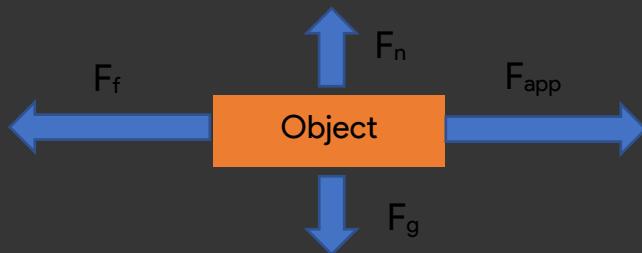
μ = Coefficient of friction

F_f = Frictional force

F_N = Normal force

Example 1

- A 5kg object is sliding to the right and encountering a friction force that slows it down. The coefficient of friction between the object and the surface is 0.1. Determine the force of gravity, the normal force, the force of friction, the net force, and the acceleration. Neglect air resistance.
- Let's draw a free-body diagram first



F_n = Normal force

F_g = Gravitational force

F_{app} = Applied force

F_f = Frictional force

$m = 5kg$

$\mu = 0.1$

Gravitational force

Given

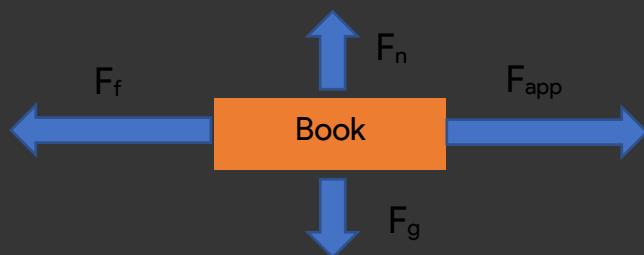
$$F_g = mg$$

We will use the formula of gravity first using this

$F_g = (5)(9.8)$	Substitute values (gravity is always 9.8 unless stated) then simplify
$F_g = 49N$	Gravitational force is 49 N
Normal force	
$F_g = F_n$	The value of the normal force will always be equals the gravitational force
$F_n = 49N$	Normal force is 49 N
Frictional force	
$F_f = \mu F_n$	To get the value of frictional force, we'll use this formula.
$F_f = (0.1)(49)$	Substitute values and simplify
$F_f = 4.9N$	Frictional force is 4.9 N
Net force	
F_{net}	
49 down (F_g)	The net force is obtainable by adding all of the forces that we obtained earlier. Since applied force doesn't have a given value, we not include it in the equation.
49 up (F_n)	
4.9 left (F_f)	
F_{net}	
49 down (F_g)	Opposite directions like up and down will subtract their values. In this case, 49 down and 49 up will subtract each other, cancelling it out.
49 up (F_n)	
4.9 left (F_f)	
F_{net}	
4.9 left (F_f)	Since 4.9 left is the remaining, this will be the net force.
$F_{net} = 4.9 \text{ left}$	Net force is 4.9 left
Because net force is a vector quantity, don't forget to add a direction.	
Acceleration	
$a = \frac{F_{net}}{m}$	To get the acceleration, we'll use this formula.
$a = \frac{4.9}{5}$	Substitute values then solve
$a = 0.98 \text{ m/s}^2$	Acceleration is 0.98 m/s²

Example 2

- Edwardo applies a 4.25N rightward force to a 0.765kg book to accelerate it across a tabletop. The coefficient of friction between the book and the tabletop is 0.410. Determine the acceleration of the book
- Let's draw a free-body diagram first



F_n = Normal force	F_g = Gravitational force	F_{app} = Applied force	F_f = Frictional force
$F_{app} = 4.25\text{ N}$ $m = 0.765\text{ kg}$ $\mu = 0.410$	Given		
We can't get the acceleration without getting the net force, which requires the sum of all forces, so we'll get each value first			
Gravitational force			
$F_g = mg$	We'll use this formula		
$F_g = (0.765)(9.8)$	Substitute values then solve		
$F_g = 7.5\text{ N}$	Gravitational force is 7.5 N		
Normal force			
$F_g = F_n$	The value of gravitational force will be the value of normal force		
$F_n = 7.5\text{ N}$	Normal force is 7.5 N		
Frictional force			
$F_f = \mu F_n$	To get the value of frictional force, we'll use this formula		
$F_f = (0.410)(7.5)$	Substitute values then simplify		
$F_f = 3.075\text{ N}$	Frictional force is 3.075 N		
Net force			
F_{net}	7.5 down (F_g) 7.5 up (F_n) 3.08 left (F_f) (rounded off) 4.25 right (F_{app})	We will add all of the forces to get the net force. Since applied force is given, we'll include it in the computation as well.	
F_{net}	7.5 down (F_g) 7.5 up (F_n) 3.08 left (F_f) (rounded off) 4.25 right (F_{app})	Subtract opposite forces, $7.5 - 7.5$ is 0, so we'll cancel it out.	
F_{net}	3.08 left (F_f) (rounded off) 4.25 right (F_{app})	Subtract 4.25 and 3.08, the final direction will be the direction of the highest value. $4.25 - 3.08 = 1.05\text{ N right}$	
$F_{net} = 1.05\text{ N right}$		Net force is 1.05 N right	
Acceleration			
$a = \frac{F_{net}}{m}$	To get the acceleration, we'll use this formula.		
$a = \frac{1.05}{0.765}$	Substitute values then solve		
$a = 1.37\text{ m/s}^2$	Acceleration is 1.37 m/s²		

J. Newton's Laws of Interaction

States that for every action, there is an equal but opposite reaction

Action and reaction forces are equal and magnitude but opposite in directions and are assigned arbitrarily

It also acts on two different bodies

Example 1

- What are the interacting forces?



The wings flap down, it's the acting force. The reaction is that the air keeps the bird up, that's the reaction force.

K. Forces

May simply defined as a push or a pull

It is a quantitative description of how two physical bodies interact

2 types of force

- Contact force
 - Forces that require physical contact between objects
 - Applied, normal, frictional, air resistance, tension, spring
- Noncontact force (action at a distance force)
 - Does not require physical contact to have any effect on the object
 - Gravitational, electrical, magnetic

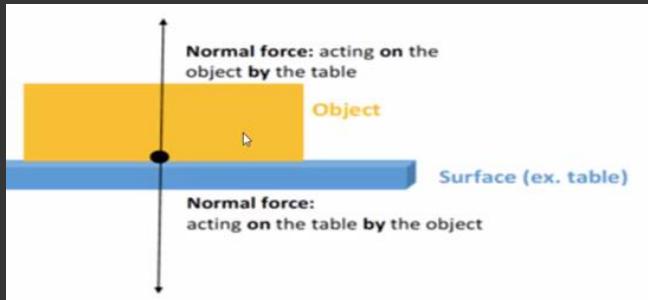
Contact forces

Applied force (F_{app})

- A force which is applied to an object by another object or by a person

Normal force (F_n)

- Support force exerted upon an object which is in contact with another stable object
- Sometimes referred to as the pressing force, since its action presses the surface together
- Normal force is always directed towards the object and acts perpendicularly

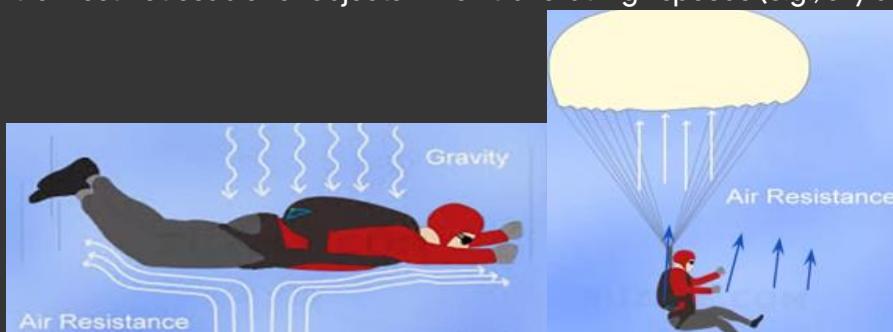


Frictional force (F_{frict})

- Force exerted by the surface as an object moves across it or makes an effort to move across it. The friction force opposes the motion of the object

Air resistance force

- It is a special type of force which acts upon objects as they travel through the air
- It is most noticeable for objects which travel at high speeds (e.g., sky diver or downhill skier)



Tensional force

- It is the force which is transmitted through a string, rope, or wire when it is pulled tight by forces acting at each end
- Tensional force is directed along the wire and pulls equally on the object on either end of the wire. The direction is always away from the object

Spring force

- It is the force exerted by a compressed or stretched spring upon any object which is attached to it

Noncontact forces

Force of gravity a.k.a. weight (F_g)

- The force with which the earth, moon, or other massive body attracts an object towards itself

Electrical force

- Force that exists between charges. It can either be attractive or repulsive force

Friction

Is essentially an electrostatic force between two surfaces

Never initiates motion; only responds to motion

Depends on the types of materials that are in contact (μ = coefficient of friction)

Depends on the net force normal pressing the two surfaces in contact

Acts parallel to the surfaces that are moving with respect to each other

Opposes the direction of motion

Is dependent of the area of the surfaces in contact

Types of friction

- Static friction
 - It is a force that keeps an object at rest
 - The force of friction is greater than the applied force

Static friction	
$F_s = F_n \times \mu_s$	F_s = Static friction μ_s = Coefficient of static friction F_n = Normal force
$\mu_s = \frac{F_s}{F_n}$	

Example 1

- A force of 200 N is exerted on a snack box of 5kg still on the floor. If the coefficient of friction is 0.3, calculate the static friction

$F_{app} = 200N$ $m = 5kg$ $\mu_s = 0.3$	Given
We don't have the value for normal force, so we'll get the gravitational force first to get it	
Gravitational force	
$f_g = mg$	We'll use this formula
$f_g = (5)(9.8)$	Substitute then solve
$f_g = 49N$	Gravitational force is 49 N. This will be the value for the normal force as well.
Static friction	
$F_s = F_n \times \mu_s$	We'll use this formula
$F_s = 49 \times 0.3$	Substitute then solve
$F_s = 14.7 N$	Static friction is 14.7 N

Example 2

- Amy is hauling a toy car of mass 4kg which was at rest earlier on the floor. If 50N is the value of the static frictional force, calculate the friction coefficient?

$m = 4kg$ $F_s = 50N$	Given
Gravitational force	

$f_g = mg$	We'll use this formula
$f_g = (4)(9.8)$	Substitute then solve
$f_g = 39.2N$	Gravitational force is 39.2 N. This will be the value for the normal force as well.
Coefficient of static friction	
$\mu_s = \frac{F_s}{F_n}$	We'll use this formula
$\mu_s = \frac{50}{39.2}$	Substitute then solve
$\mu_s = 1.28$	Coefficient of static friction is 1.28

- Kinetic friction
 - A force that acts between moving surfaces
-

Kinetic friction	
$F_k = F_n \times \mu_k$	F_k = Kinetic friction μ_k = Coefficient of kinetic friction F_N = Normal force

Example 1

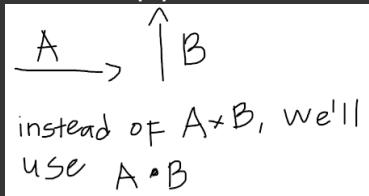
- A boy is playing volleyball then calculate the kinetic friction if the friction coefficient is 0.8 and thrown with the force of 200 N

$F_n = 200N$ $\mu_k = 0.8$	Given
$F_k = F_n \times \mu_k$	We'll use this formula
$F_k = 200 \times 0.8$	Substitute then solve
$F_k = 160N$	Kinetic friction is 160N

L. Dot Scalar and Scalar Product of Vectors

Dot product

- Also called the scalar product, of two vectors is a number (scalar quantity)
- Obtained by performing a specified operation on the vector components.
- The dot product has meaning only for pairs of vectors having the same number of dimensions.
- The symbol for dot product is a heavy dot.
- If we multiply two vectors,



Dot product of vector A and vector B

How to multiply two vectors

Example 1

- Find the product of P and Q

$P = [a, b, c]$ $Q = [x, y, z]$	Given
$P = [a, b, c]$ $Q = [x, y, z]$	P and Q must have the same number of dimensions. Since that is the case in this example, we can multiply each dimension of both vectors, a to x, b to y, and c to z.
$P \cdot Q = (ax) + (by) + (cz)$	This will be the equation. A dot is placed between P and Q to signify the multiplication of both vectors.

Example 2

- Find the product of A and B

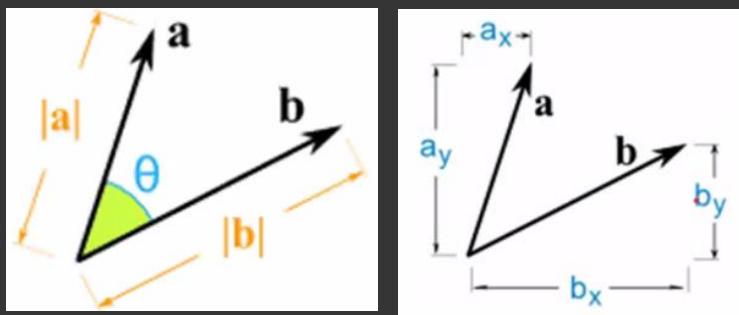
$A = 2i + 3j + 4k$ $B = 7i + 5j + k$	Given
$A = 2i + 3j + 4k$ $B = 7i + 5j + k$	We will only use the values. In this case, that will be 2, 3, 4 and 7, 5, 1.
$A \cdot B = 2 \cdot 7 + 3 \cdot 5 + 4 \cdot 1$	We'll multiply the values of each dimension on both vectors.
$A \cdot B = 14 + 15 + 4$	Multiply then add the products
$A \cdot B = 33$	Final answer

Angle between two vectors

Theorem of Dot Product

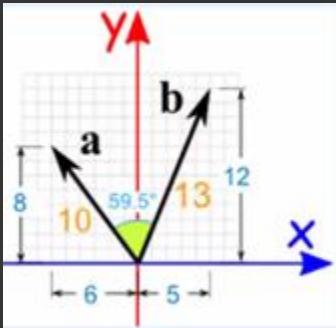
- Geometrically, the dot product of A and B equals the length of A times the length of B times the cosine of the angle between them.

Theorem of Dot Product	
$A \cdot B = A B \cos\theta$	$A = \text{Length of } A$ $B = \text{Length of } B$ $\theta = \text{Angle}$
$A \cdot B = a_x \cdot b_x + a_y \cdot b_y$	Other formula
$\cos\theta = \frac{A \cdot B}{ A B }$	Finding angle



Example 1

- Calculate the dot product of vectors A and B



- We'll use both formulas in this one.

$A \cdot B = A B \cos\theta$	
$A \cdot B = 10 \cdot 13 \cos 59.5$	Substitute values
$A \cdot B = 66$	Final answer
$A \cdot B = a_x \cdot b_x + a_y \cdot b_y$	
$A \cdot B = -6 \cdot 5 + 8 \cdot 12$	Substitute values
$A \cdot B = -30 + 96$	Multiply then add the products
$A \cdot B = 66$	Final answer

Example 2

- Find the angle between two vectors

$A = 2i - 2j + k$ & $B = 12i + 4j - 3k$	Given
$\cos\theta = \frac{A \cdot B}{ A B }$	We'll use this formula.
$A = 2i - 2j + k$ $B = 12i + 4j - 3k$	We'll use the same technique before and multiply the values of the dimensions of each vector to get A.B.
$A \cdot B = 2 \cdot 12 + (-2) \cdot 4 + 1 \cdot -3$	Simplify
$A \cdot B = 13$	Value of A.B.
$ A = \sqrt{2^2 + (-2)^2 + 1^2}$	To get the value of A , we'll use this formula. Get the values of the dimensions of A (2, -2, 1) and raise them to 2.

$ A = \sqrt{4 + 4 + 1}$	Simplify, add, then get its square root.
$ A = \sqrt{9}$	
$ A = 3$	Value for A .
$ B = \sqrt{12^2 + 4^2 + (-3)^2}$	Do the same procedure to get the value of B .
$ B = \sqrt{144 + 16 + 9}$	
$ B = \sqrt{169}$	
$ B = 13$	Value for B .
$\cos\theta = \frac{A \cdot B}{ A B }$	Now that we have all of the values, substitute them into the formula.
$\cos\theta = \frac{13}{3 \cdot 13}$	Substitute values then simplify.
$\cos\theta = \frac{1}{3}$	This is not the final answer. Move cos into the other side.
$\theta = \cos^{-1} \frac{1}{3}$	Type this into the calculator to get the final answer. The answer must be rounded off as a whole number.
$\theta = 71^\circ$	Final answer

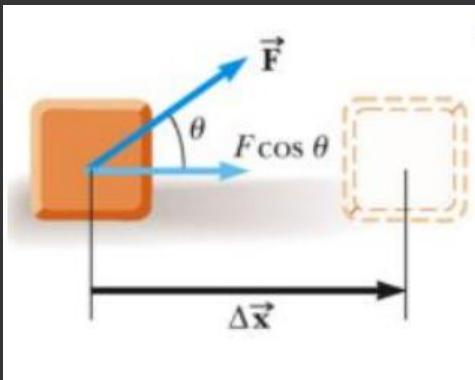
How would the two vectors look like according to its angle	
$\theta = 90^\circ$	Two vectors are perpendicular
$\theta = 0^\circ$	Two vectors are parallel
$\theta = 180^\circ$	Two vectors are anti parallel

M. Work, energy, and power

Definition of work (W)

- The work, W, done by a constant force on an object is defined as the product of the component of the force along the direction of displacement and the magnitude of the displacement.

Work	
$W = (F \cos\theta)\Delta x$	F = Magnitude of the force Δx = Magnitude of the object's displacement θ = Angle between F and D
$W = FD \cos\theta$	



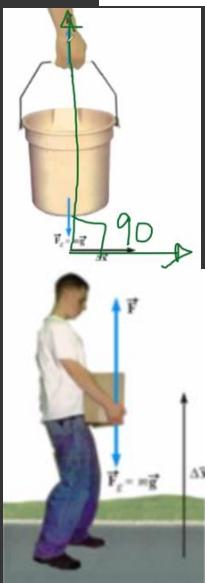
Work unit

- This gives no information about
 - The time it took for the displacement to occur
 - The velocity or acceleration of the object
- Work is a scalar quantity
- SI unit
 - $\text{Newton} \cdot \text{meter} = \text{Joule}$
 - $\text{N} \cdot \text{m} = \text{J}$
 - $\text{J} = \text{kg} \cdot \text{m}^2/\text{s}^2 = (\text{kg} \cdot \text{m}/\text{s}^2) \cdot \text{m}$

Work: + or - ?

- Work can be positive, negative, or zero. The sign of work depends on the direction of the force relative to the displacement.

Work positive:	$W > 0$ if $90^\circ > \theta > 0^\circ$
Work negative:	$W < 0$ if $180^\circ > \theta > 90^\circ$
Work zero:	$W = 0$ if $\theta = 90^\circ$
Work maximum if	$\theta = 0^\circ$
Work minimum if	$\theta = 180^\circ$



Example: When work is zero

- A man carries a bucket of water horizontally at constant velocity.
- Force does no work on the bucket.
- Displacement is horizontal.
- Force is vertical.
- $\cos 90^\circ = 0$

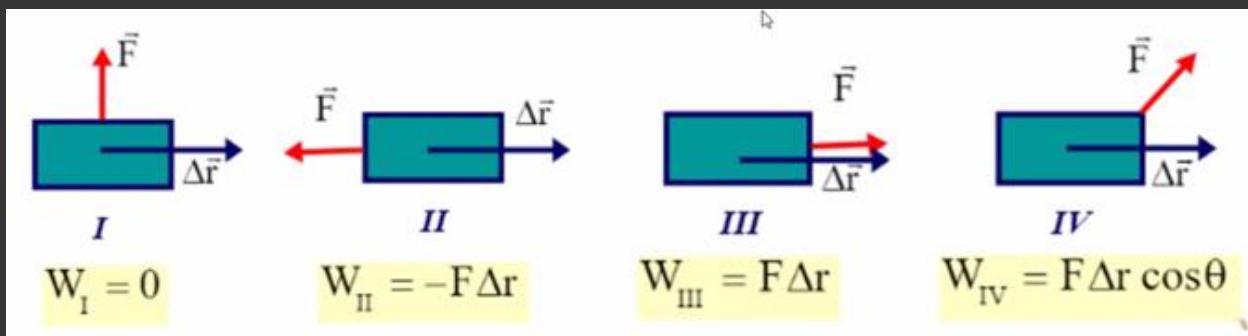
Example: Work can be positive or negative

- Work is positive when lifting the box.
- Work would be negative if lowering the box.
 - The force would still be upward, but the displacement would be downward.

Work done by a constant force

Work done by a constant force

$$W = FD \cos\theta$$

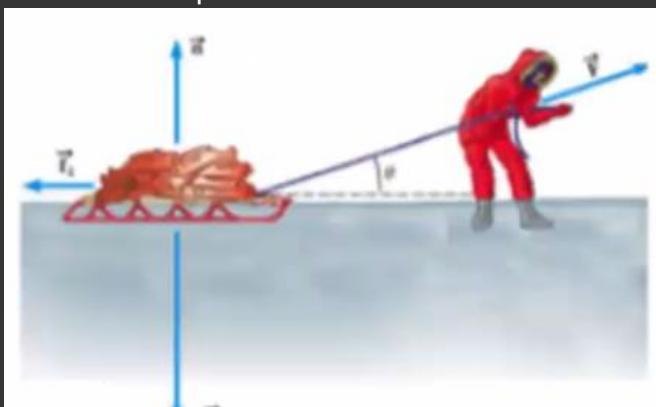


*replace r with d in the diagram

Work and force

Example 1

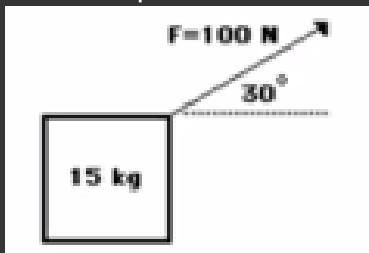
- An Eskimo pulls a sled as shown. The total mass of the sled is 50.0 kg, and he exerts a force of 1.20×10^2 N on the sled by pulling on the rope. How much work does he do on the sled if $\theta = 30^\circ$ and he pulls the sled 5.0m?



$W = FD \cos\theta$	We'll use this formula
$W = 120(5) \cos 30$	Substitute values then solve
$W = 520 J$	Final answer

Example 2

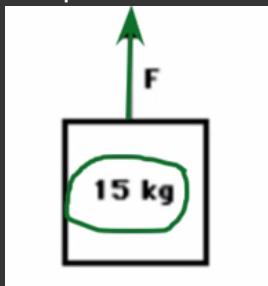
- A 100 N force is applied at an angle of 30° to the horizontal to move a 15kg object at a constant speed for a horizontal distance of 5m.



$W = FD \cos\theta$	We'll use this formula
$W = 100(5) \cos 30$	Substitute values then solve
$W = 433.01 J$	Final answer

Example 3

- An upward force is applied to lift a 15kg object to a height of 5 meters at constant speed



$W = FD$	We'll use this formula
$F_g = mg$	Since we don't have the value of force, we will have to find it using this formula with gravitational force
$F_g = 15(9.8)$	Substitute values then solve
$F_g = 147 \text{ N}$	Use this value in F.
$W = 147(5)$	Substitute values then solve
$W = 735 \text{ J}$	Final answer

Kinetic energy

Kinetic energy associated with the motion of an object

Scalar quantity with the same unit as work

Work is related to kinetic energy

Kinetic energy		
$K.E = \frac{1}{2}mv^2$	$\frac{1}{2}mv^2 - \frac{1}{2}mv^2 = F_{net}\Delta d$	$v = \sqrt{\frac{2KE}{m}}$

Work-kinetic energy theorem

- When the work done by a net force on an object and the only change in the object is its speed, the work done is equal to the change in the object's kinetic energy
 - Speed will increase if work is positive
 - Speed will decrease if work is negative

Work-kinetic energy theorem

$$W_{net} = \frac{1}{2}mv^2 - \frac{1}{2}mv^2$$

Example 1

- Calculate the kinetic energy of a 45 g golf ball travelling at (a) 20 m/s, (b) 40 m/s, and (c) 60 m/s

$KE = \frac{1}{2}mv^2$	We'll use this formula
$KE = \frac{1}{2}(0.045)(20^2)$	Substitute values. Convert 45 g to kg
$KE = 9 \text{ J}$	Final answer for a
$KE = 36 \text{ J}$	Final answer for b

When the speed of an object doubles, does its kinetic energy double? No, It will quadruple.

Example 2

- How fast must a 1000 kg car be moving to have a kinetic energy of (a) 2×10^3 , (b) 2×10^5 ?

$v = \sqrt{\frac{2KE}{m}}$	Since how fast is being asked, we'll use this formula (derived)
$v = \sqrt{\frac{2(2000)}{1000}}$	Substitute values then solve
$v = 2 \text{ m/s}$	Final answer for a
$v = 20 \text{ m/s}$	Final answer for b



CONTEMPORARY PHILIPPINE ARTS FROM THE REGIONS

CONTEMPORARY PHILIPPINE ARTS FROM THE REGIONS

A. Definition of Contemporary Arts

What is art

- Derived from the Latin word Ars meaning ability or skills
- Art is a tool of communication
- Art is a venue for one to convey or express thoughts, emotions, or aspirations
- Art offers us the chance to learn and understand artists and the regions where they belong through their works
- Art catches other people's attention, imagination, and admiration
- Plato (427-347 BC)
 - Art is only an imitation or copy of reality
 - Art is an illusion a collection of reflections
 - He stated that the true form was created by God and they are all perfect and therefore cannot be replicated.
- Leo Tolstoy
 - Art is the production of object or elements from the external environment that pleases the senses
- Eugene Veron

- Art is an external manifestation created and produced through lines, movements, sounds, colors, and emotions
- Leonardo Da Vinci
 - Art is the queen of all sciences communicating knowledge to all the generations of all the world
 - Art is a universal language that communicates feelings and ideas produced by human experiences

Modern and contemporary art

Modern art

- More recent than the renaissance or classical art periods, it is by no means current.

Contemporary art

- Describes current works of art. Usually, those still living and creating artworks or those who have only very recently died or retired.
- How do you know if the art is contemporary?
 - Produced during the late 20th and early 21st centuries
 - Defines art produced after the modern art movement to the present day
 - Contemporary art is a present art

B. Art in its different forms

Visual arts

- This is the art that appeals to the visual sense and may be constructed using varied mediums.
- It takes permanent form and allows appreciation by viewing the physical form of the artist's imagination and expression

Drawing

- It is a creation of an image, diagram or a form using drawing tools such as pen, ink, brush, marker, charcoal, and crayons.
- It is great in creating comics strip, animation, and visual illustration

Painting

- A creative expression using pigment or color on a surface for aesthetic value.
- Tools or implements are used to apply the coating through brush, and sponge.
- It can be naturalistic, photographic, representational, abstract, narrative, and political.

Ceramics

- The term "ceramic" came from the word "Keramikos" which is the Greek word meaning "Pottery"
- May take the form of pottery, sculpture, and figurines.
- It is the creation of object from inorganic, nonmetallic materials through the use of heat.

Photography

- This is art through photos taken by a photographer.
- This may be inspired by the people, objects, events, or the environment itself.

- It is an art produced images of varied objects through light and other forms of radiant energy.
- Several effects can now be used to produce images that projects illusions through the use of more advanced camera features

Music

- Art that involves the creative use of sound to express insights and emotions

Sculpture

- Uses carving, modelling from metals, ceramics, wood, or stone.
- A work of art which represents either a two or three-dimensional form using metal, wood, or plaster.

Performing Arts

- The art that involves creativity that is performed and delivered in front of spectators
- Several individuals who use their voices and bodies are required to participate in this art which definite roled and function to carry out.

Theatre/theater

- Originate from the ancient Greek "Theatron" which is a place where spectators gather to watch a performance or a show.
- It is collaborative art where performance act a real life or imagined story with their speech, dance, music, and movements.

Dance

- From the French term "Dancier" which is non-verbal form of expression performed in varied settings.
- This is an expression represented by sequenced body movements.

Why do people make art?

1. Seek personal enjoyment
2. Express personal thoughts and feelings
3. communicate with others
4. Create a more favorable environment
5. Make others see things more clearly.
6. Tell stories
7. Worship
8. Do something no one else can
9. Make the ordinary extraordinary
10. Increase our global understanding

C. Filipino Artists

People create art primarily as a tool for communication. But throughout history, we can see that artists create art for reasons other than communication.

Why do artists create art?

Recognition

- Some artists create art in hopes of gaining fame and fortune. Some artists use art as their means of livelihood, as seen with many visual artists, musicians, and television and movie stars.

Worship

- Not all artists crave for personal recognition; some do it to glorify their creator. This is evident in the many religious structures in the ancient world.

Impulse

- Some artists create art because they are driven by impulse. It is their passion and nothing makes them happier than doing their chosen art. These artists consider art as life and spent their time doing nothing but such.

Self-expression

- Artists without a doubt, create art for self-expression. They express ideas and emotions that might not be adequately conveyed through words. Each artwork is a reflection of each individual artist's personality and experience, making each artwork unique.

Why study art?

- Studying and creating art help develop our decision and problem-solving skills
- Studying and creating art helps us realize that there are many ways of dealing and solving an obstacle.
- It helps us appreciate that there is more than one correct solution to a problem.
- This is an important skill in the real world because it teaches us to look for creative ways to solve a difficulty
- It nurtures imagination and in turn, promotes originality and innovativeness

Art and the Filipino

- Filipinos are very social people and this is reflected in their art, more especially in their traditional art.
- Filipino art often gives more importance on how it affects the artist's society rather than its impacts on the individual.
- Filipino art often intends to unite the community and hopes to create cooperative action rather than individual change.

Chairman of the National Commission for Culture and the Arts (NCCA) – Felipe M. De Leon Jr.

Filipino Integral Art (Prof. Felipe M. De Leon Jr.)

- Art is ingrained with beauty and function
- Art is holistic in nature
- Art is part of our everyday life
- Everybody is an artist
- Freedom in the technique and the use of media gives flexibility and opportunity to join in the artistic expression
- Art makes use of the available resources

- The creative process is given more importance rather than the finished work

D. National Artists

The Order of National Artists

- This is the highest national honor and recognition conferred to a selected artist who has contributed much to the development and promotion of Philippine arts
- Whether in the fields of music, dance, theater, visual arts, literature, film and broadcast arts

The National Artist

- This is the distinguished Filipino artist who had made significant contributions to the cultural heritage of the country
- An artist who has dedicated his life and works to forge new paths and directions for future generations of Filipino artists (NCCA)

How to become a National Artist

- Orden ng mga Pambansang Alagad ng sining
- Presidential proclamation no. 1001 dated April 27, 1972
- The deserving individual should be recommended by the Cultural Center of the Philippines (CCP) as well as by the (NCCA)
- It shall also enlist the support and cooperation of private sector experts from the various <>
- The Grand collar made of silver gilt bronze showing circular links representing the arts
- A medallion is color red, white, and blue similar to the Philippine flag
- Eight-pointed conventionalized sunburst suspended from a sampaguita

Some Filipino National Artists

Fernando C. Amorsolo - Painting

- Born May 30, 1892, Paco Manila
- "The Grand old man of Philippine Art"
- He is also the first National Artist
- He developed the back lighting technique which became his trademark where figures or image aglow in canvas
- Masterpieces
 - El Ciego (1928/1929)
 - Dalagang Bukid (1936)
 - Planting Rice (1946)

Levi Celerio - Music

- Born April 30, 1910
- Died April 2, 2002
- He was included in the Guinness Book of World Records as the only person who made music through a leaf
- He was able to compose over 4000 songs

- Some of his songs became popular love songs
 - Saan ka man neroon?
 - Kahit konting pagtingin
 - Kapag puso'y sinugatan
 - Gaano ko ikaw kamahal
- Some of his folk songs
 - Tinikling
 - Ang pipit
 - Waray-waray
 - Pitong gatang
 - Dungawin mo hirang
 - Itik-itik
 - Tunay na tunay
- Nationalistic songs
 - Bagong pagsilang
 - Lumang pangarap
 - Tinig ng bayan
- Christmas songs
 - Pasko na naman
 - Maligayang pasko at manigong bagong taon
 - Misa de gallo

Alice Reyes - Dance

- She is the great contributor in the promotion and development of contemporary dance in the Philippines
- Her greatest contribution was the development of a uniquely Filipino modern dance using Filipino material ideas
- Classical ballet, folk dance, modern dance, jazz dance
- Masterpiece
 - The exemplars amada
 - Itim asu and other dances

Nestor Vicente Madali Gonzalez - Literature

- Born September 8, 1915, Romblon
- Died November 28, 1999
- He was the fictionist, essayist, poet, and teacher
- He asserted that the English language can be used to express and shape Filipino culture
- Highest academic recognition "creative genius in shaping the Philippine short story and novel"
- Major Literary Works
 - The wind of April

- Work on the Mountain
- The Bamboo Dancer
- Look Stranger

Juan Nakpil - Architecture

- Dean of all Architects in the Philippines
- He believed that there is a Philippine architecture that reflects Philippine tradition and culture
- Major works
 - Geronimo de los Reyes Building
 - Magsaysay bldg.
 - Rizal Theater
 - Capitol Theater
 - UP Administration
 - Quiapo Church Dome

Napoleon Abueva - Sculpture

- Born January 26, 1930
- Died February 16, 2018
- Father of Modern Filipino Sculpture
- Youngest National Artist at age 46
- He helped shape local sculpture in the contemporary form as his expertise is academic representational style or modern abstract
- He uses varied materials: hard wood which includes molave, jackfruit wood, acacia, ipil, metal, cement marble, bronze, and iron
- His works are found in multiple museums both in the Philippines and abroad
 - The sculpture - found at the UN headquarters in New York
 - Sandugo or blood compact made by Abueva represents the first international treaty of friendship between the Spaniards and the early Filipinos

E. Contemporary Literary Arts

Contemporary Arts

It is comprised by expressive art in several forms that are created and produced in the present specifically in the 21st century or roughly from 1960s to current period.

Contemporary Period in the Philippines

Many Filipino writers continued to create poetry, short stories, poems, novel and essay in different languages, during the Martial Law years around 1970s.

Literature as a form of art became a medium by which Filipino clamor for freedom of expression

- Society, gender equality, ethnicity

Contemporary Literary Arts

Mga Ibong Mandaragat (1960) by Amado V. Hernandez

- It is a novel and it's all about the struggle of the Filipino to uplift his life.
- The setting reflected Hernandez's life as a guerilla during the Japanese occupation.
- In this narrative the author clamored for change in the living condition of the Filipinos who suffered much under the government.

Barter in Panay (1961) by Ricaredo Demetillo

- He shows the declaration of martial law in 1972 stunted the reproduction of literature with the closing of many publications like the Philippines graphic and the Philippines Free Pres.

The Woman who had two Navels (1961) by Nick Joaquin

- Classic in Philippine literature.
- It tells the story of a Filipino elite woman who is hallucinating, and is preoccupied with the notion that she has two navels or belly buttons in order to be treated as an extraordinary person.
- The story about Connie Escobar who suffered a childhood trauma when she found out that her father was an abortionist. She thought that she had two navels which made her extraordinary. The novel is a journey to self-acceptance and social recognition.

Malilikha: Mga Piling Tula (1971-1967) by Rolando S. Tinio, Jose F. Lacaba, Bienvenido Lumbera, Fr. Edmundo Martinez, Antonio E. Samson

- Collated their poems against the commercialism of mainstream writing in popular magazines. They used concrete images and colloquial language to capture experience.
- The fusion of Tagalog and English was exemplified in "Valediction sa Hillcrest" which is a revolt against linguistic rules.

Woman Enough and Other Essays (1963) by Carmen Guerrero Nakpil

- Wrote her sentiment through her twenty-two informal essays about "Philippine Contemporary Culture, The Filipino Women and their Habits".
- Her work was a product of journalism after the war primarily focusing politics and Filipino life.

The Volcano (1965) by Bienvenido Santos

- Explored in this fiction the relationship between races and equates the Filipino with the volcano.
- "The Volcano" revolved around an American family who struggled to survive Japanese occupation of the Philippines and the prejudices of the Filipinos against the Americans after the war.

The Filipino in the Philippines (1966) by Renato Constantino

- A collection of essays by Renato Constantino, a historian and a nationalist whose most influential essay includes "The Miseducation of the Filipino". As a historian and nationalist, he saw "Colonial Mentality" as a result of Americanized or westernized education of the Filipinos.

- He criticized the ills of the society as a result of our orientation with the traditional and old school beliefs and practices which no longer respond to the society's needs.

Mula sa Parolang Ginto (1969) by Clodualdo del Mundo

- The first critical essay written in Tagalog. This collection of essays is equally alive in the different vernaculars published through "Liwayway".

Sigwa (1972) by Ricardo Lee, Fanny Garcia, Norma Miraflor, and Epifanio San Juan Jr.

- Young writers who were strongly influenced by Marxist literary theory as such ideology presented the problems of the working class and the abuses by the Capitalist.
- Marxism is concerned about the ways in which governments and businesses that control the means of production (factories, etc.) exert control over the working class and the abuses by the capitalist.
- Marxist Criticism is concerned with issues of class conflict, wealth, work, and the various ideologies that surround these things.
- An ideology is a group of ideals/values and ideas, especially one that forms the basis of a political and economic system.

Luha ng Buwaya (1972) by Amado V. Hernandez

- About the barrio peasant who was led by a local school teacher to fight oppression from the hands of the "buwaya" which connotes the powerful, greedy, and corrupt groups in the society.
- About the poor farmers to band together against the greediness of the family Grande. It discusses the ongoing harassment of the wealthy families to the poor and how to unite the poor to solve their problems and go against the mistreatment of the wealthy families to them.

Ginto ng Kayumangging Lupa (1975) by Dominador Mirasol

- About the character of "Moises Dipasupil" who fought the prevailing power in the government and society that caused much suffering on the people.

Mga Kagila-gilas na Pakikipagsapalaran ni Juan Dela Cruz (1979) by Jose Lacaba

- Used minimalist and objective style but in a political light.
- It was the martial law period that gave rise to the "literature of circumvention" purposed of exposing and criticizing the political ills without risking to the writers.

Doktrinang Anak Pawis (1979) by Virgilio S. Almario (a.k.a. Rio Alma)

- Provided a collection of poems focusing on the journey of an individual from the self to the wider social reality.
- He acknowledged the value of the common man in this literary work as they fell victims to the suppression of basic rights and freedom during those years of struggle in the hands of the Marcos regime.

Spy in my own country (1981) by Sylvia Mayuga

- Narrated her experiences during the Martial Law years in these 11 essays. They struggled and they need to survive the tyrannical government and its agencies.

Utos ng Hari at iba pang Kuwento (1981) by Jun Cruz Reyes

- Focuses on the life of a student Jojo who desires so much but is so suppressed by institutional expectations. This relationship between the dominant power and the oppressed who is pressured to submit.

Versus (1983-1986) Panitikan ng Protesta by Alfredo Navarro Salanga

- Inspired by the assassination of Benigno Aquino Jr. in 1983 to the time when his wife Corazon Cojuangco Aquino became the first woman President of the Republic of the Philippines.

History of the Burgis (1987) by Mariel N. Francisco and Fe Maria C. Arriola

- Explored the defects of the prevailing social class. The privileges and gains these people availed through their social status.

Rizal with the Overcoat (1990) by Ambeth Ocampo

- From the Ateneo de Manila. It contains essays about Rizal's writings and experiences as well as trivia about the National hero which are not known to many
- "It is ironic that many Filipinos learn to love the Philippines while abroad, not home"

F. Contemporary Visual and Performing Arts

Art is the tangible output of creative expression. It is a product of human creativity and skill to express oneself. It is represented through its different forms.

Contemporary Visual Arts

It is a term used to describe a wide array of artistic disciplines that are appreciated primarily through sight. Visual arts include fine arts, decorative arts, and contemporary arts

In the 1960s reflected dynamism in styles and trends. A bulk of the artistic works reflected a society confronted with social, economic, and political issues that proliferate during the Marcos Regime more especially during the declaration of the Martial Law.

Sculpture, paintings, photography

Sculpture

Is he the man (1960) by Jeremias Elizalde Navarro

- His point of interest is on mask and tribal forms which capture aboriginal art using expressionist vein.
- A proficient painter and sculptor devoting to the visual arts for 40 years through drawing, printmaking, painting, and sculpting
- He actually used various media in his sculptures such as found materials, hardwood, metal and created mixed media works

Our Lady Queen of Peace (1986) by Virginia Ty-Navarro

- Known for her iconic sculpture in Ortigas, EDSA
- She was commissioned and was able to complete the statue of Our Lady Queen of Peace in 16 months after the 1986 People Power Revolution.
- Her rendition of Our Lady, Queen of Peace with distinctly Asian features was questioned by some critics who expected the Lady to be the usual “Western” and “Mestiza” image.
- Navarro's sculpture was allegedly disproportionate with the short body, flat faced, and oversized hands.

Tikbalang Series (1971) by Solomon Saprid

- Was known for his art works made of bronze. He created works by welding scraps of metal with jagged effects
- Famous sculpture was the Tikbalang Series created in 1971

Pacquia Statue (2010) by Manuel and Fred Baldemor

- The Baldemors from Paete, Laguna are leading contemporary figures in sculpture. Derives inspiration from the color forms as well as the way of life of the people from Paete.

Dama De Boche (2008) by Jose Tence Ruiz

- This sculptor explored on new techniques and sculptural forms. His work is a reflection of the bizarre and artistic uniqueness.
- He focused on Jeepney culture such as the Dama de Noche which signifies varied personalities.
- He used indigenous materials reveals his sociopolitical awakening and desire to achieve the democratization of art in the contemporary consciousness

Stone Idol (1959) by Francisco Verano

- A sculpture and a painter who used old wood materials from dilapidated hundred old houses to manifest the human condition by creating sculpture of human figures with evident movement while performing rural occupations.
- Their works reveals the inner and the dark impulses that manifest one's hidden motivations and drives. Such use of surrealism symbolizes the economic, political, and social suppressions that are never allowed in the open.

Paintings

Thinking Man (1979) by Ang Kiukok

- Focuses on the human condition
- Pertains to the poverty that afflicts the Filipinos and his society

Sarimanok (2012) by Dr. Abdulmari Imao

- Draws inspiration from the Tausug and Maranao artistry
- It has four distinct and interrelated themes: Islamic calligraphy, sarimanok (mythical bird with fish sari mosque), sari-okir

Sabel (1965) by Benedicto Cabrera (a.k.a. Bencab)

- Sabel is a sad symbol of dislocation, despair and isolation of the Filipino victimized by life cruelties and the imminent social injustices.

Photography

Became a contemporary form of artistic expression. Journalists have utilized the camera as an instrument and a tool to record major events and even personalities.

Photography became a significant and powerful form of artistic expression.

Honesto Vitug

- He covered generally major Presidential activities from the administration of Emilio Aguinaldo to the rise of Corazon Cojuangco Aquino
- He took on the heavyweights including Gen. Douglas Mc Arthur, Mohammad Ali, Joe Louis and he became known as “The Man who caught them all on film”

Pinatubo Eruption (1991) by Albert Garcia

- Albert Garcia's award-winning photographs of the Pinatubo eruption
- The driver of a pick-up truck tried to overrun a cloud of ash from the eruption in 1991
- Alberto Garcia, former chief photographer of tempo of the Manila Bulletin

Tanulong, Sagada by Eduardo Masferre

- He was self-taught photographer. He returned to his hometown he became preoccupied with taking photos of everything significant according to his perception from the surroundings of the Cordillera
- Most of these photographs are the native Igorots.

Comics

Mang Ambo (1960) by Larry Alcala

- Records: 500 cartoon characters, 20 comic strips, six movies, 2 murals and 15000 published pages for 56 years being engaged in cartoon creation.
- He created Mang Ambo from Barrio Bugabog to represent the Filipino in the midst and weaknesses of urban life

Mars Ravelo

- The King of Komiks
- Produced over a hundred comic works at Ace publications
- Buhay Pilipino, Darna, Jack and Jill, Captain Barbell, Maruja, Lastikman, Bondying, Roberta

Dyesebel by Elpidio Torres

- Torres together with Mars Ravelo created Dyesebel which was a popular Filipino mermaid story

Ang Panday (1970) by Steve Gan

- A novel by Carlo J. Caparas, was illustrated by Steve Gan
- Character: Flavio an adventurous hero who saved the common people from the wickedness of Lizardo, his archenemy.

Contemporary Performing Arts

Contemporary Theater

Paraisong Parisukat (1974) by Orlando Nadres

- Story about a young girl decide to choose to sacrifice love as well as idealism for a stockroom assistant's life.

Bayan-bayanan (1975) by Bienvenido Noriega Jr.

- The story revealed the hopes and frustration of Filipino expatriates living in Switzerland a foreign country.
- Conflicts surrounding Filipino identity as a product of institution. His plays elaborate on social problems and traditional practices as well as the identity of the Filipinos as a people

Contemporary Dance

This form of art from the 60s became very dynamic as several schools begin to establish folk dance troupes such as FEU, PWU, PNU, UP, MSU

Filipino also excelled in the area of Ballet. The dance theater Philippines produced famous and highly talented ballerinas.

Contemporary Music

Original Pilipino Music/OPM referred largely to Philippine pop or popular songs specifically ballads. The same became prominent after the defunct Manila Sound in the 1970s.

Some OPM artists are: Nora Aunor, Victor Wood, Pilita Corrales, Dulce, Pops Fernandez, Ryan Cayabyab, Basil Valdez, Rey Valera, Freddie Aguilar, Imelda Papin, Regine Velasquez, Ogie Alcasid.

G. Contemporary Visual Arts

The Philippines is home to many contemporary arts. Its arts are rich and as diverse as its culture. It would be difficult to categorize all the different art forms.

Contemporary artists, or any artists for that matter, are influenced by many factors such as religion, education, and the environment.

Fine Arts

Most contemporary visual artists in the Philippines produced works that fall into the fine arts category. The majority of the contemporary art produced in the Philippines are paintings, sculptures, and drawings.

Paintings

- May be defined as a two-dimensional form of art that showcases artistic expression created on a flat surface
- Images are made by applying pigment on a prepared surface using typically one or a combination of the following tools: brush, palette, knife, spray, finger, etc.
- There are a number of mediums used for painting and other two-dimensional work. These include oil, acrylic, watercolor, poster color, pastel, ink, etc. These media are applied in a surface such as canvas, paper, wood, cardboard, etc.

- Painting themes
 - Religious themes
 - Historical themes
 - Historical paintings usually depict a moment in a narrative story, rather than a specific and static subject, as in a portrait. The term is derived from the wider senses of the word *historia* in Latin and Italian, meaning "story" or "narrative", and essentially means "story painting".
 - Portraiture
 - Images
 - Landscape - a landscape painting or drawing refers to an artwork whose primary focus is natural scenery, such as mountains, forests, cliffs, trees, rivers, valleys, etc.
 - Still life
 - A work of art depicting inanimate, typically commonplace objects that are either natural (food, flowers or game) or man-made (glasses, books, vases, and other collectibles) – conveys little about the rich associations inherent to this genre
 - Nude
 - Reflects a person's insecurities and also indicate a person's innate fears of revealing his weaknesses
 - Genres
 - Painting of scenes from everyday life, of ordinary people in work or recreation, depicted in a generally realistic manner. Genre art contrasts with that of landscape, portraiture, still life, religious themes, historic events, or any kind of traditionally idealized subject matter.

Sculpture

- Are made by either adding or subtracting materials.
- Subtraction is used in carving, while addition is seen in sculpting techniques like molding, casting, and welding.

Decorative arts and craft

Decorative arts and crafts of the contemporary times stem from the traditional indigenous crafts found throughout the country. Some of you might wonder why these traditional and indigenous products and processes are included in a discussion about contemporary art.

Pottery

- Art and craft of making pots and other wares using clay. Potter tradition in the country has survived for centuries. Early pottery artifacts have shown the skills and artistry of our pottery makers.

Carving

- It is the art of manipulating and creating objects by subtracting and shaping solid materials as wood and stone. Filipinos are excellent carvers. This is perhaps due to our long history with the art. Many traditional arts and crafts in the country are products of carving.

Weaving

- It is the art of interlacing threads or fibers to create textile fabric, or other similar products. Philippine textiles are often made from indigenous plants such as pina, abaca, maguey, and cotton.

Metal work

- The art of creating and manipulating metal to create various items such as jewelry, weapons, etc. Based on archaeological record and recovered artifacts, the Filipinos were skilled metalworkers. Many amazing jewelries and ornaments discovered from different sites prove the early Filipino's talent.

H. Gawad sa Manlilikha ng Bayan (GAMABA)

The search for the excellent traditional artists in country was carried out by the

- NCCA (National Commission for Culture and the Arts)
- GAMABA (Gawad sa Manlilikha ng Bayan)
- through Republic Act No. 7355

This program promotes the transfer of the unique skills of the living treasure to others to further the appreciation and to show pride about the masters of these craft in the person of our Manlilikha ng Bayan.

The Pambansang Alagad ng Sining ng Pilipinas or the National Artist of the Philippines is the highest recognition the Philippine government can give to a person of the arts.

The award was created through Presidential Proclamation No. 1001, s. 1972 to give recognition and respect to the citizens who have given outstanding contribution to Philippine arts.

How to become a GAMABA Awardee

The criteria for selecting a national artist include Filipino citizenship, contribution of their works to nation-building, impact of their distinctive and pioneering works or styles on succeeding generations of artists, excellence in the practice of their art form which enriches artistic expression or style, and prestigious national and international recognitions.

How to become a GAMABA Awardee

- Criteria to be qualified as a manlilikha ng bayan
 - He/she is an inhabitant of an indigenous/traditional cultural community anywhere in the Philippines that has preserved indigenous customs, beliefs, rituals, and traditions and/or has syncretized whatever external elements that have influenced it.
 - He/she must have in a folk-art tradition that has been in existence and documented for at least 50 years
 - He/she must have consistently performed or produced over a significant period, works of superior and distinctive quality
 - He/she must possess a mastery of tools and materials needed by the art, and must have an established reputation in the art as master and maker of works of extraordinary technical quality
 - He/she must have passed on and/or will pass on to other members of the community their skills in the folk art for which the community is traditionally known
- Categories

- The Manlilikha ng bayan award of provided for the following categories but with consideration to geographical base and the balance of other artistic categories
 - Folk architecture
 - Weaving carving
 - Performing arts
 - Literature
 - Graphic and plastic arts
 - Ornaments
 - Textile or fiber art
 - Pottery
 - Other artistic expression of traditional culture
- The reward of being a manlilikha ng bayan
 - The awardee receives a specially designed gold medallion
 - An initial grand of 100,000
 - 10,000 monthly stipend for life
 - Additional personal allowance of 14,000 if there is a need
 - 750,000 medical and hospitalization annual benefits
 - Funeral assistance and tribute fit for a national living treasure
- The process of selecting the manlilikha ng bayan awardee
 - An Ad Hoc panel of experts shall be employed in the different regions to conduct a thorough search and selection of candidates in the varied traditional folk art category
 - Documentation of candidate-nominees for the GAMABA
 - Guided by the criteria and qualification for becoming a Manlilikha ng Bayan set by the rules and regulations in the law the final list of nominees will be submitted to the Ad Hoc panel of experts
 - The Ad Hoc screening committee shall recommend nominees for the award to an Ad Hoc panel of reviewers
 - The Ad Hoc panel of reviewers shall evaluate qualifications of the nominees. The documentation submitted by the Ad Hoc search committees shall be considered in the evaluation process
 - The Gawad sa Manlilikha ng Bayan Committee shall then submit to the NCCA the recommendations of the Ad Hoc Panel of reviewers for appropriate action
 - The names of the GAMABA awardees approved by the NCCA Board shall be submitted to the President of the Philippines for proclamation

I. GAMABA Awardees

Ginaw Bilog

- Born in January 3, 1953 is a Hanunoo Mangyan from Mansalay, Mindoro
- Preserving Mangyan poetry
- Master of Ambahan Poetry
- Ambahan
 - In Baybayin is a pre-colonial script which is a poetic literary form engraved in bamboos and the like with the use of stylus or knives usually to guide travelers along forest trails.



- His dedication to the preservation of the same for the same understanding of indigenous people will continue as Ginaw had established the School of Living Tradition (SLT) where a living master imparts through teaching of the art to a group of younger people
- On June 3, 2003 at the age of 50, Ginaw died due to an illness.

Masino Intaray

- April 10, 1943 – November 30, 2013
- A gifted poet, epic chanter story teller and musician from Makagwa Valley, Palawan
- Basal – offering to the Lord
- Kulilal – a lyric poem about love
- Bagit – instrumental music reflecting the sound and movement of nature

Samaon Sulaiman

- The most honored Kutyapi master and teacher in Maganoy, Mindanao at the age of 35
- Apart from playing the kutyapi, he also plays the kulintang and agong
- He is also an Imam who has achieved the highest degree of excellence in Kutyapi playing
- His exemplary artistry and dedication to his chosen instrument and his unwavering commitment to the music of the kutyapi is worthy of emulation and provision of highest honors

Lang Dulay

- August 3, 1928 – April 30, 2015
- A master of textile weaving from T'boli, Lake Sebu, South Cotabato
- Some of her designs
 - Bulinglangit or clouds
 - Abangi or butterfly
 - Bangkiring or hair bangs
- She is only 12 years old when she first learned how to weave using abaca fibers
- It was her dream to teach younger people of her community her talent and skills in weaving
- She established a school where women in her community can learn her art and master the skills that make her people uniquely perfect in the art of weaving

Salinta Monon

- December 12, 1920 – June 4, 2009
- She is a Bagobo born in December 12, 1920 at Bansalan, Davao Del Sur
- She developed a keen eye for the traditional design and at the age of 65 she can still identify a design at a glance
- She looks forward to teaching young wives in the Bagobo community the art of weaving as many are still interested in learning the craft
- Weaving is an intricate and difficult process as it involves stripping of the abaca plant to get the fiber for textile, drying the threads and trying each strand by hand and setting the strands on the bamboo frame
- Also known as the "Last Bagobo Weaver"
- Married and have 6 children
- At the age of 12, she already learned how to use a weaving loom.
- She wears her traditional made cloths only for special occasions
- The Binuwaya (Crocodile) was her favorite design, and it was the most difficult to weave.
- She used to wear the traditional handwoven tube of the Bagobo, of which the sinukla and bandira were two of the most common type.
- Salinta has built a solid reputation for the quality of her work and the intricacies of her designs
- Fully demonstrated the creative and expressive aspect of the Bagobo abaca Ikat weaving called Inabal at a time when such art was threatened with extinction
- She was awarded as GAMABA awardee in 1998

Alonzo Saclag

- Born August 4, 1942
- He is from Lubuagan, Kalinga. He is devoted on preserving the artifacts such as the Kalinga gong or the Gangsa to revive these dying treasures.
- He is a master of dance and performing arts who has mastered the use of the Kalinga musical instrument as well as the dance patterns and movements reflecting the Kalinga people rituals
- Established the Kalinga Budong Dance Troupe
- Did not receive any formal education in performing arts but still has mastered the choreography and musical instruments of Kalinga just by observation and practice

Federico Caballero

- Born December 25, 1938
- He's an epic chanter from Kalinog, Iloilo and from the mountains of Central Panay who worked for the documentation of the epics and oral literature of his people
- He worked together with artists, scholars, and advocates of culture to explore on the elements of Panay's oral traditions worked for its preservation
- He is considered a Bantugan or a person who has attained distinction in his community

Uwang Ahadas

- Born February 15, 1945

- He's a yakan from Lamitan, Basilan who values much musical instruments because he was nearly blind
- He became a teacher to young people who have interest with the kwintangan, kayu, tuntungan
- Observes older people who are familiar with the instrument
- Gabbang
 - A bamboo xylophone his skills progressed to the playing of the agung
- Kwintangan Kayu
 - A complex instrument
- At the age of 20, he mastered the kwintangan
- He became a teacher outside of Lamitan to young people who also became very interested with the playing of these varied traditional musical instrument
- He teaches hands on and his method is learning by doing which became very effective to transfer his knowledge to these younger people of Basilan

Darhata Sawabi

- She is a weaver of Pis Syabit - which is the traditional cloth tapestry worn as a head cover by the Tausug of Jolo, Sulu
- Pis-syabit
 - A handwoven cloth made of silk or cotton and square in form with geometric patterns
- Her dedication to this art has preserved and promoted generations of traditional Tausug design for contemporary appreciation and possible enriching studies
- This became a source of livelihood for the young women of Parang specifically on how to make a living from their woven fabrics

Eduardo Mutuc

- He is from Apalit, Pampanga
- He is an artist who has dedicated his life in creating religious and secular art in silver, bronze, and wood
- His intricately detailed retablos, mirrors, altars, and carosas are in churches and private collection
- Tools
 - The proper use of chisel and hammer is very necessary to perfect the art
- He teaches his students to consider the quality of their product rather than the materials rewards that they will derive from their art

Haja Amina Appi

- June 25, 1925 – April 2, 2013
- Born on June 25, 1925 in Ungos Matata, Tandubas, Tawi-tawi
- She is recognized as the master mat weaver among the Sama indigenous community
- She developed her own modern design
- It is with the visualization and execution of the design that makes her weaving difficult
- Tools

- Her colorful mats with their complex geometric patterns exhibited her precise proportion, symmetry, sense of design

Teofilo Garcia

- Born March 27, 1941 in San Quintin, Abra
- He is known for making the all-weather headgear the "tabungaw" which if properly handled can last up to 3 to 4 generations
- Tabungaw
 - It is a functional headpiece uniquely created to shield a user from any type of weather
- Tools
 - Made of the native gourd which is hollowed out polished and varnished to a bright orange for weather resistance
 - The lining is finely woven rattan matting while the brim has a bamboo wave
- The procedure in making the tabungaw involves planting and harvesting the Upo, refining the uway of rattan which would serve as the lining of the tabungaw and finally weaving the bamboo which would serve the accent for the work

Magdalena Gamayo

- From Pinili, Ilocos Norte
- She is a master weaver who creates "Inabel" which is an Ilokano handwoven cloth
- Weavers agree that weaving is a very complex task and the slightest miscalculation can misalign the whole design
- Tools
 - Made of the native gourd which is a hollowed out polished and varnished to a bright orange for weather resistance. The lining is finely woven rattan matting.
- Kusikos
 - Spiral forms similar to oranges
- Binakol/inuritan
 - Geometric design
- Sinan-sabong
 - Flower which is a challenging pattern

J. Contemporary Art Techniques and Practices

Skills

- The ability to do something well that comes from knowledge, practice, and aptitude.
- It is acquired through training or experience.

Technique

- It is a way of carrying out a particular task especially the execution or performance of an artistic work.

Production

- It is the action of making or manufacturing from components of raw materials, or the process of being so manufactured.

Traditional techniques

Minimalism

- One of the most important and influential art styles of the 1960s
- Works of art most often compromised of geometric shapes in simple arrangement
- Minimalism is trying to take away the unnecessary and retaining the best features
- It is a movement in various forms of art and design especially visual art and music
- Take away what's unnecessary and leaving only what's essential

Found objects

- Natural materials, like sand, stones, shells, pieces of wood. Found objects include
- Manmade item such as, newspaper cuttings, photographs, pieces of glass, pieces of textile fabrics, etc.
- Those are considered useless and are just pieces of junk can actually put a twist in your creation
- It renders the art work distinctly unique and genuine

Large scale art

- Artist have produced works that play with scale
- Juan Luna's Spolarium is displayed in the National Museum
- Carlos Botong Francisco - Through time displayed in the National Museum is an example

Digital application

- It comes with augmented reality technology and transforms Filipino digital artworks into immersive experiences

Local materials used in creating art traditional techniques

The distinctive character or nature of the mediums determines the technique. For example: stone-chiseled, wood-carved, clay-molding

Techniques and performance practices

Collage

- It is made by adhering flat elements such as newspaper, magazine, cut-outs, printed text, illustration, photograph, etc.
- It is sometimes called relief sculpture

Decalcomania

- It is a process of applying gouache to paper or glass then transfer in a reversal of that image into canvass or other flat materials
- Gouache - It is a technique in painting that use watercolor

Decoupage

- It is done by adhering cut-outs of paper and then coating these with one or more coats or transparent coating of varnish

Print making

- It is a process of making artworks by painting normally in the paper. Prints are created by transforming ink from a matrix or though a prepared screen to a sheet of paper or other material

Mixed media

- Refers to artwork in making of which more than one medium has been employed
- It refers to a work of visual art that combines various traditionally distinct visual art media
- Combines: paint, ink, and collage

K. Art promotion and preservation

Why is it important that we promote and preserve the artworks of our country?

- Art is a national heritage that is essential in building the nation and ensuring democracy
- Art forms reminds people of the origin, histories, and struggles of the nation

Institutions or organizations

		<p>NCCA (National Commission for Culture and the Arts)</p> <ul style="list-style-type: none"> • NCCA is the country's overall policy making body coordinating and grants giving agency for the preservation, development, and promotion of Philippine arts and culture
		<p>CCP (Cultural Center of the Philippines)</p> <ul style="list-style-type: none"> • Derived from the baybayin "ka" and styled based on a "katipunan" • For almost 50 years CCP has been serving as the premier venue in the Philippines for culture and the arts • It has hosted numerous shows and exhibition in both performance and visual arts

	<p>National Historical Commission of the Philippines</p> <ul style="list-style-type: none"> The logo of the National Historical Commission of the Philippines includes "Ka" and "Pi" which stand for "Kasaysayan ng Pilipinas" Promotes Philippines history and cultural heritage through research, dissemination, and conservation Considered as identification and restoration of historical sites around the different regions of the country
	<p>National Museum of the Philippines</p> <ul style="list-style-type: none"> National Museum's logo is a stylized baybayin (Philippine script) of "pa" the first syllable of pamana (heritage) It is the country's repository of archaeological artifacts, national treasures, and rare specimens found and produced in the country Its main task is to solicit a document, exhibit and/or preserve them, and promote the natural and artificial wonders of the Philippines
	<p>National Library of the Philippines</p> <ul style="list-style-type: none"> It is a home to rare books and documents such as the "Acta De La Proclamacion De La Independencia Del Pueblo Filipino or the Proclamation of Independence" and the manuscript of the trial of Andres Bonifacio Mandate of serving as a repository of the printed and recorded cultural heritage of the country and other intellectual literary and information sources
	<p>National Archives of the Philippines</p> <ul style="list-style-type: none"> It is the primary records management agency, tasked to articulate and implement the records schedule and vial records protection programs for the government It is the guardian to over 400 documents from the Spanish era dating 1552-1900 and various records form the American period to the republic



Komisyon sa Wikang Filipino

- Created via Republic Act No. 7104: "Congress shall establish a national language commission composed of representatives of various regions and disciplines which shall undertake, coordinate, and promote researches for the development, propagation, and preservation of Filipino and other Philippine languages"



ENGLISH FOR ACADEMIC AND PROFESSIONAL PURPOSES

ENGLISH FOR ACADEMIC AND PROFESSIONAL PURPOSES

A. Outlining

Outline

- A document that briefly summarizes the information that will be included in a paper, book, speech, or similar documents.

Types of outlines

Alphanumeric outline

- The most common type of outline. It is recognizable to most people.
- Format:

- I. Roman Numerals
 - A. Capitalized Letters
 - 1. Arabic Numerals
 - a. Lowercase Letters

- Tip: You can use either phrases or sentences, but remember to be consistent.

Topic outline

- Summarizes the main topics and subtopics in words and phrases
- Main topic: main idea, broadest idea; subtopic: supporting point for a topic
- Example:

- I. Economical effects (Main idea)
 - A. Alcohol (Sub-idea)

- | |
|---|
| <ol style="list-style-type: none"> 1. Cost of alcohol purchases (Detail of A) 2. Cost of DUIs (Detail of A) <p>B. Drugs (Sub-point)</p> <ol style="list-style-type: none"> 1. Cost of drug purchases (Detail of B) 2. Cost of drug arrest (Detail of B) |
|---|

Sentence outline

- Uses complete sentences for each topic and subtopic as it is more informative compared to topic outlines.
- Example:

<ol style="list-style-type: none"> I. Alcohol and drug abuse can affect one economically. <ol style="list-style-type: none"> A. The cost of alcohol abuse is high and is getting higher. <ol style="list-style-type: none"> 1. The costs of DUIs can be enormous. 2. Alcohol costs are always rising because of rising production costs. B. The cost of drug abuse can be high. <ol style="list-style-type: none"> 1. Even the arrest for the possession of a minute amount of drugs can result in high bail and court cost. 2. The cost of drugs fluctuates drastically according to the type of drug, its availability, and the amount.
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Decimal outline

- A system of decimal notation that clearly shows how every level relates to a larger whole.

B. APA 7th Edition In-text Citation

Why do we need in-text citations?

In academic writing, we will always use sources from other authors by directly quoting and paraphrasing.

In-text citation is what sets apart your own ideas from the ideas of other people.

What would happen if we don't cite properly?

We will commit plagiarism, even though we are not aware of it.

Plagiarism is the practice of taking someone else's work or ideas and passing them off as one's own (Google Dictionary)

What exactly is an in-text citation?

It is a shortened citation that you put together with the retrieved text and will guide the readers to your full citation located at the reference page of your paper.

General format of APA 7th edition in-text citation

(author, date) – Ex. (Johnson, 2020)

(author, date, locator) – Ex. (Johnson, 2020, p.212)

Locator

Books indicate the page(s)

- (Rowling, 1999, p. 225) (Rowling, 1999, pp. 225–230)
- Single page: p.; multiple pages: pp.

Videos/audio books indicate the timestamp(s)

- (Seburn, 2020, 1:35) (Seburn, 2020, 1:35:47)
- M:S or H:M:S

PowerPoint presentations indicate the slide number(s)

- (Thompson, 2019, Slide 3) (Thompson, 2019, Slide 3-5)

Webpages indicate the paragraph(s) or relevant heading

- (World Health Organization, 2020, para 7) (World Health Organization, 2020, paras 7-9)
- Paragraph: para; multiple paragraphs: paras

Narrative and Parenthetical in-text citation

Parenthetical in-text citation

- A time turner is a magical device that allows wizards to travel back through time (Rowling, 1999).
- (Rowling, 1999), (Rowling, 1999, p.212), (Rowling, 1999, pp.212-214)

Narrative in-text citation

- Seburn (2020) demonstrates an example of a reference list entry for a webpage (p.212).
- In the video tutorial, Seburn (2020) demonstrates an example of a reference list entry for a webpage (p.212).

Special cases

Two authors

- Parenthetical
 - (Soto & John, 2017)
- Narrative
 - Soto and John (2017) suggest that...
- Rule: The order is how it was listed down in the reference.

Three or more authors

- Parenthetical
 - (Deitz et al., 2017)
- Narrative
 - Deitz et al., (2017) argue that...
- Et al. means “et alium” (and others)

The author is an organization

- Parenthetical
 - (World Health Organization [WHO], 2017)

- Narrative
 - World Health Organization (WHO, 2017) describes...
- In titles, words that are 3 letters or below are not capitalized.

Unknown author

- Parenthetical
 - (*APA Citation Guidelines*, 2019)
- Narrative
 - As demonstrated by *APA Citation Guidelines* (2020) describes...
- Titles should be italicized

Things to clear up

1. You should include an in-text citation every time you paraphrase or quote from a source
2. It always contains two things. The last name of the author and the year of publication. (Kersten, 1997)
3. If you are citing a specific part of a book, video, slide, or paragraph, you should use a locator
 - (Kersten, 1997, p.134)
 - (Kersten, 1997, 00:34)
 - (Kersten, 1997, para. 2) (Kersten, 1997, paras. 2-3)
 - (Kersten, 1997, Slide 7) S is always capital (Kersten, 1997, Slides 7-10)
4. If it is a direct quotation – use a locator. If it is paraphrased – do not
5. Parenthetical citation
 - There is a positive correlation between social media usage and anxiety symptoms in teenagers (Parker, 2019).
 - Citation is at the last part
6. Narrative citation
 - Parker (2019) found a positive correlation between social media usage and anxiety symptoms in teenagers.
 - Citation is at the start
7. No date
 - Replace the year of publication with n.d.

Direct quotes, block quotes, and paraphrased

Direct quotes

- Parenthetical
 - Studies on happiness determined that “good relationships happier and healthier” (Waldinger, 2016, 6:22).
- Narrative
 - In her TED talk video, Brown (2012) states that “adaptability change is all about vulnerability” (6:24)

Block quotes

- Narrative
 - Researchers have studied how people talk to themselves:

Inner speech is a paradoxical phenomenon. It is an experience central to many people's everyday lives, and yet it presents constant challenges to any effort to study it scientifically. Nevertheless, the range of methodologies and approaches have combined to the subjective experience of inner speech and its cognitive and underpinnings. (Alderson-Day & Fernyhough, 2015, p. 957).

- Parenthetical
 - Flores et al. (2018) described how they addressed potential researchers on working with an intersectional community of transgender people of color.
Everyone on the research team belonged to a stigmatized group privileged identity. Throughout the research process, we attended to which our privileged and oppressed identities may have influenced the process, findings, and presentation of results. (p. 311)

C. Paraphrasing

Paraphrasing is a process which a writer restates the insights found in a reference using his or her own words.

After gathering the materials, you are going to use in your writing, you will have to paraphrase them so that you can integrate what they say into your own prose.

Tip: When reading a text, you wish to paraphrase, first, capture its main idea and then identify the details that will substantiate it.

Process

1. Repeatedly read the passage to be paraphrased until you have completely understood what it says. Doing so will help you arrive at an accurate understanding of the text at hand and prevent yourself from misquoting the message.
2. Do not look at the passage order while you are writing your paraphrase. Doing so might influence your choice of words in your paraphrase. If it does, then your paraphrase may bear a lot of resemblance with the original passage, and this constitutes plagiarism, or using another person's ideas without proper attribution.
3. After writing your paraphrase, read the original passage once again to check if you were able to accurately capture its meaning. By doing this, you will avoid misquoting your source.
4. Check whether your paraphrase has errors or grammars in mechanics: always assume that your academic paper will be read by an international audience and, as such, your paraphrases should more or less be free of errors in grammar and mechanics so that your readers will not have a hard time deciphering your ideas.

5 easy steps to paraphrasing

1. Read the passage several times to fully understand the meaning
2. Note down the key concepts
3. Write your version of the text without looking at the original

4. Compare your paraphrase text with the original one and if you find phrases too similar, make changes
5. Cite the source of the text. No need for quotation marks

4 tips for easier paraphrasing

1. Start your first sentence at a different point from the original source.
2. Use synonyms. Make use of the thesaurus if you can't think of any synonyms
3. Change the sentence structure. Change the voice of the verb if you can
4. Break long sentences or combine shorter ones

Types of Plagiarism

Word for word (verbatim) plagiarism

- This is also known as cut and paste plagiarism. This happens when a researcher copies the work of another writer word-for-word or verbatim and claims it as their own.

Word order plagiarism

- This happens when a writer changes some of the words of another author to make the work look as if it were his or her own.

Idea plagiarism

- This happens when a writer paraphrases a work and includes it into his or her own article without proper attribution. Thus, it is important to cite the sources of all the borrowed ideas found in a paper.

Example

Original quote

- The student requested that the professor excuse her absence, but the professor refused.

Paraphrased quote

- The professor refused the student's excuse for her absence.

D. Film Review

What is a review

A review (noun) is a critical appraisal of a book, play, movie, exhibition, etc. published in a newspaper or magazine

To review (verb) is to examine or assess (something) formally with the possibility or intention of instituting change if necessary

Reasons for making a review

You are called to pass judgment on a certain food, film, restaurant, product, or almost anything that can be procured.

So that the readers would be able to make more informed decisions as consumers.

An effective review

Put oneself in the shoes of the consumer: "am I going to enjoy this product, movie, or experience").

For a review to be credible, its writer should be able to come up with criteria for evaluating what is being reviewed. By doing this, you will be able to present your claims in a clearer and a more objective manner.

The main impression espoused by a review should be based on accurate observation. Otherwise, readers might think that the claims presented are simply arbitrary; they may not be necessarily true for everyone.

Outline of a film review

A witty title once more opens the selection to capture the readers' attention

Paragraph 1

- A synopsis of the film is found in the first paragraph to give the readers an idea on what it is about. Be careful not to divulge the ending so as not to spoil your reader's viewing experience.

Paragraph 2

- The author's general impression is found in the second paragraph. Before this is introduced, transitional ideas are provided to ensure the coherence of the piece

Paragraphs 3 to 5

- The first two paragraphs are about the strengths of the film. The last paragraph is about the weak point of the film

Paragraph 6

The author presents her overall evaluation of the film at the last paragraph. At times, a recommendation may also be given. Its purpose is to inform the readers of the kind of audience who are more likely to enjoy the film.

E. Summarizing a text

A summary is a brief statement that presents the most important points of an original material

- Helps retell a story using few statements
- A summary is usually short and easy to comprehend
- A good summary focuses on the big picture and does not focus to minor details
- Main goal is to present essential ideas
- Paraphrasing and summarizing are two closely related concepts but they are done using different techniques
- Paraphrasing is restating someone else's work or idea in your own words at roughly the same level of details
- Summarizing involves putting the main ideas of a certain work into your own words, including only the big picture or the main ideas

When summarizing it is important to know the following things

- Main idea
 - Refers to the central point that the author is trying to communicate in his or her work. A given text has one or more essential ideas usually found at the beginning. Details are provided to support the main idea.

- Key information
 - Important pieces of evidence, reasons, examples, and explanations that support the main idea
- Supporting details

Important guidelines when writing a summary

1. A summary should be based on the original piece. While you have to use words, it doesn't mean that you should analyze and interpret the material using your own understanding. You can still make your summary sound like an independent piece without including misinterpretations of some sort.
2. A summary should be kept short and simple. A good summary is usually a lot shorter than the original text. This is because you only cite the central ideas that present the original text in a nutshell.
3. Use your own words to retell the most important ideas in a given text. Using one's words make the summary easier to read and understand.
4. Known the main ideas or the key information in what you are summarizing. When summarizing, it pays to know which details are important and which information may be omitted without altering the source material.
5. Keep the objectivity. When summarizing a given material, one must remember to be as objective as possible. Do not include personal ideas or opinion on the original text.
6. A summary must be comprehensive. This means as a writer, you should be able to identify all the important ideas form the original material to keep the meaning complete in the shorter version that you will be writing
7. A summary needs to be concise. You should avoid repetition of ideas while writing.
8. Coherence is a key feature of a good summary. Your summary still needs to be united and organized. It should not sound as disjointed.

F. Academic Texts

What is a text?

- Text (linguistics): a stretch of language which is perceived as a purposeful connected whole
- A text may be spoken or written, produced by one person or more
- Some linguists use the term text interchangeably with discourse
- Written or spoken communication or debate
- Texts come in many forms, such as a lesson, play, essay, a two-line proverb, or a TV commercial
- A text is not a grammatical unit but "a product of communication or piece of language whose shape is motivated by its semantic purposes and pragmatic roles"
- Semantic: relating to meaning; Pragmatic: realistic

What is an academic text?

An academic text, therefore, is a product of communication or piece of language used for academic purposes or in relation to academic courses (subjects)

Structures of academic text

- Academic texts may come in the form of minor grammatical units such as words, phrases, clauses, and sentences

- They may come in the form of major grammatical units such as paragraphs and compositions
- A paragraph is a set of related sentences having only one idea embodied in a topic sentence. It consists of a topic sentence and a supporting sentence

Topic and supporting sentence

Topic sentence

- It is the sentence that contains the thesis or main idea of a paragraph

Supporting sentence

- The sentence that develops or supports the thesis or main idea of a paragraph

Patterns of paragraph developmental

Deductive pattern

- A paragraph whose topic sentence is stated in the beginning

Inductive pattern

- Topic sentence at the end

Deductive-inductive pattern

- A paragraph whose topic sentence and restated at the end

Hinted pattern

- Topic sentence is not stated but implied

Classification of paragraph

Independent paragraph

- A paragraph that stands on its own; it usually serves as a composition per se having a thesis statement of its own

Introductory paragraph

- A paragraph that introduces the thesis (main idea) of the entire composition; it is also called first, opening, starting, or beginning paragraph

Developmental paragraph

- A paragraph that develops/supports the thesis of the entire composition; it is also called developing or supporting paragraph; in the body text of the composition

Transitional paragraph

- A paragraph that connects two or more paragraphs; it is also called connecting, linking, or joining paragraph

Concluding paragraph

- A paragraph that serves as the end of the entire composition; it is also called the closing, ending, finishing, or last paragraph.

Language used in academic text

Medicalese

- Language of doctors, used in the field of medicine

- Osteoporosis, scoliosis, leukemia, dysmenorrhea, peptic ulcer, insomnia, vasectomy, etc.

Legalese

- Used terms in law, language of lawyers
- Criminologist, penology, habeas corpus, corpus delicto, jus soli, defendant, lawsuit

Journalese

- Language of journalists; terms used in the field of journalism/newspaper advertising
- Yellow journalism, payola, blue penciling, lead, beat, headline, banner, streamer, byline, editorial

Commercialese/mercantilese

- Language of businessmen; terms used in the field of commerce and industry
- Expenditure, revenue, purchasing power, merchandising, ultimate consumer, bad order, ceiling price, accrual, liabilities

Technicalese

- Language of technocrats; terms used in the field of science and technology
- Halogen, kinetic energy, centrifugal force, aerodynamics, barometer, solar energy, acceleration, altitude

Thesis statements and forms of discourse

Every composition has a controlling idea in the form of a declarative sentence. Such idea is called a thesis statement. More often than not, a thesis statement is conceptualized and written before a discourse is spoken or written.

Discourse is defined in linguistics as "any stretch of language larger than a sentence, whether spoken or written, and having a logically consistent unified structure."

Forms of discourse

- Exposition
 - A form of discourse that serves to explain or inform; it appeals to the intellect
- Description
 - A form of discourse that serves to describe or state the qualities or characteristics of something/someone it appeals to the senses
- Narration
 - A form of discourse that serves to narrate or tell a story; it appeals to the emotions.
- Argumentation
 - A form of discourse that serves to argue (to cite reason for or against a proposition or to persuade the audience to change his mind)

G. Facts, opinions, and claims

Facts and opinions

- A reader is bombarded with ideas as he reads an article or a text
- A good reader can classify ideas encountered through reading into facts and opinions
- A fact is a truth, a reality, or a thing that exists or existed

- An opinion is a person's view, appraisal, or judgment about a certain thing
- A fact or truth is not relative, it is universal.
 - Example: If you say that the earth is round while in the Philippines, that is the truth. If you go to other countries the fact that the earth is round will always be the truth.
- An opinion is relative, it changes depending on the person's views. Opinion is not true for all; it can be right for some and wrong for others.
 - Example: If your opinion about death penalty is that it's immoral, other people may have other opinion about the matter that differs from you. Some may think that death penalty is justifiable.
- Fact and opinion are not opposites. The opposite of fact is lie. If a statement is an opinion, it does not mean that it is a lie.
 - Example: "The earth is flat" is an obvious lie, while the statement "The earth is the best planet in the whole solar system because it can sustain life" is just an opinion, but it's not necessarily a fact or lie.

Criticism

- Another task of a reader is to criticize what he watches or reads
- To criticize is to analyze and evaluate, to judge the merits and the demerits of the reading material
- Thus, a critical reader formulates evaluative statements after he has carefully and thoroughly read the material

Evaluative statements

- Claims or assertions about the content and properties of a text read.
 - These textual properties include statements about the length and complexity of the text, its structure, and organization, etc.
- Meaningful counterclaims in response to claims made in a text
 - These include the reader's claims (fact, policy, value) that counteract the claims made by the author in his text

Claims

What is a claim

- Anything that you state to be true or anything that you assert
- Assert - to make a statement with full confidence of its truth and factuality

Example of claims

- She is the most beautiful girl in the world
- Spaghetti is better than carbonara

- I went to Paris last November
- Drinking too much coffee may lead to anxiety
- You should vote wisely

Claims of fact

- Statements that report, describes, predict, make causal claims
- Examples
 - I cooked spaghetti last night (report)
 - She has a slender figure (describe)
 - It will rain tomorrow (predict)
 - The Earth's ozone layer was destroyed because of the industrial revolution (causal claim)

Claims of value

- Statements that state judgments that morality (right and wrong), beauty (pleasant and unpleasant), merit (good or bad), wisdom (good decision or bad decision)
- Examples
 - The right course of action is to let virologists and not generals decide what to do in this pandemic (wisdom)
 - Death penalty will always be wrong (morality)
 - The iPhone 10 is sleeker than its predecessor (beauty)
 - Cinnamon tastes the worst (merit)

Difference between claim of fact and claim of value

- “She has a slender figure” is a claim of fact, as you’re only describing what she looks like.
- “She had a slender figure and she looks hideous” is a claim of value, as you are including judgment.

Claims of policy

- Statements that urge an action to be taken or an action to be discontinued or stopped
- Examples
 - We should vote for President Cruz because he will make this country great (action to be taken)
 - You must stop getting mad with those people who have different perspectives from you (action to be discontinued)

Other key points

- A claim and an argument are the same.
- To assert is “to make a statement with full confidence of its truth or actuality”
- Example: “Jose Rizal is the bravest Filipino hero of all.”
 - It is not a fact.
 - It is an opinion.
 - It is a claim because it is debatable.
 - It is also an assertion because you are saying it with full confidence that it is true but it does not mean that it is true.
- A claim is not always the truth, it’s just an argument.

- All claims are arguments and assertions, all claims are debatable, but not all claims are always true.

H. Argumentative Essay

What is an argument?

- “A reason or set of reasons given with the aim of persuading others that an idea is right or wrong” – Google Dictionary
- “A statement or series of statements for or against something” – Merriam-Webster Dictionary

Examples of an argument

- You should buy an Android phone because it is affordable.
- The best thing to do is to still wear a face mask even the Delta surge is done.
- She is not the right woman for you.
- I totally disagree with the idea of a communist government

What is an argumentative essay?

- “An essay that presents two or more sides also known as opinions or arguments about a particular issue, usually in a balanced manner, to convey a complete picture to the reader” – essaypro.com
- “A piece of writing that takes stance on an issue. In a good argumentative essay, a writer attempts to persuade readers to understand and support their point of view about a topic by stating their reasoning and providing evidence to back it up” – masterclass.com
- An essay that takes on a particular stance about an issue and proves that stance by providing supporting claims and refuting counterclaims
- Persuasive essay: show the points that agree with your argument; persuade the readers to believe you
- 3 ways to persuade people according to Aristotle
 - Logos - data, research, evidence
 - Pathos - emotion
 - Ethos - credibility

Parts of an argumentative essay

Introduction

- It should be punchy and attention grabbing (startling statement, rhetorical question, historical background, and anecdote) [anecdote - narration related to the topic]
- Should flow naturally into the main body of the text to maintain the reader's interest (using transitional devices)
- Introduction should also contain background information about the topic
- It should contain the most important sentence in the entire essay - the thesis statement
- Hook statement - grab the reader's interest/attention, you can use a relevant quotation from someone

Thesis statement

- Found at the introductory paragraph
- The most important part of the essay

- It is your opinion on the subject matter
- Side that you take in an argument
- It is a one-sentence statement that lets the reader know your interpretation of the subject being discussed
- Thesis statement must be specific

Dos and don'ts of a thesis statement

Dos	Don'ts
<ul style="list-style-type: none"> • Be specific • Answer the question being asked in the essay • Use active voice 	<ul style="list-style-type: none"> • Don't write vague unspecific sentence • Don't use passive voice

- Example

Bad thesis statement	Good thesis statement
The lives of many people worldwide have seen a great improvement due to the internet	The advent of the internet heralded a new era of worldwide cohesion, enabling instant, real-time communication with anyone, almost anywhere on the planet

Body paragraph

- There is no convention as to how many paragraphs will there be
- Simple issues may require three to four paragraphs
- Use body paragraphs to provide data and evidence that will support your thesis statement
- Use it also to introduce other people's opinion that is against your own argument

Dos and don'ts of body paragraphs

Dos	Don'ts
<ul style="list-style-type: none"> • Expand on the views hinted at during the introduction • Introduce other people's views or opinions • Write a counter-argument to refute these views, using well-researched facts and examples 	<ul style="list-style-type: none"> • Don't write rambling paragraphs that go off-topic. Keep it to the point

Conclusion

- Use it to refute any idea that the readers might have to contradict your own
- This will close the essay nicely and make it resonate

Outline of an argumentative essay

Paragraph 1	Introductory paragraph <ul style="list-style-type: none"> • Hook statement • Background information about the subject matter • Thesis statement 	Introductory paragraph
Paragraph 2	Arguments that support your thesis statement (2)	Body

Paragraph 3		
Paragraph 4	Arguments that oppose your thesis statement (2)	
Paragraph 5		
Paragraph 6	Rebuttal	
Paragraph 7	Conclusion <ul style="list-style-type: none"> • Summarize your body paragraph • Erase and refute any doubts that might be left on your readers 	Conclusion

I. Passive and active voice

What is voice (grammar)?

- The relationship between the subject and the verb
- The verb has two voices: active and passive

Active voice

- The verb is in the active voice when the subject of the sentence is the one performing the action
- Sentences in the active voice have a strong and direct tone
- Examples
 - Monkeys adore bananas.
 - The cashier counted the money.
 - The dog chased the squirrel.

Passive voice

- It is when the subject is acted upon by the verb
- The passive voice is always constructed with a conjugated form "to be" plus the verb's past participle
- Using this usually generates a preposition usually "by"
- Past tense of a verb (verb-past tense-past participle)
 - Regular (d or ed)
 - Walk-walked-walked
 - Watch-watched-watched
 - Irregular (it changes in form)
 - Blow-blew-blown
 - Grow-grew-grown
 - Write-wrote-written
- Verbs in the form of "be"

Reason to use	form/tense	"to be" verb
Turning a "to be" verb into a noun for imaginary or unreal situations	infinitive	to be
Turning a "to be" verb into a noun for fixed or real situations	gerund	being
Things that happen time to time or habits	present	am, is, are
Describing the subject at a time before now	past	was, were
Happening now	present progressive	being
Describing the subject at a later time	future	be
To describe experiences when the time is not important	past participle	been
Giving suggestions	present subjunctive	be
Imaginary or hypothetical situations	past subjunctive	were
Giving commands	imperative	be

○ Changing passive into active voice

Passive	Active
You are being loved so much by me	I love you

Example: The book is being read by most of the class ← Passive

- Identify the tense of the verb (present progressive)
- The noun in the by phrase should be the subject (Most of the class)
- Rewrite the entire sentence considering the tense of the verb
- Final answer: Most of the class is reading the book ← Active

Passive	Active
The book is being read by most of the class	Most of the class is reading the book
The letter will be mailed by Marilyn on Sunday	Marilyn will mail the letter on Sunday
At each concert, at least one tune from a well-known opera was sung by the soprano	At each concert, the soprano sang at least one tune from a well-known opera

VERB TENSE CHART			
ENGLISH VERB TENSE	PAST	PRESENT	FUTURE
SIMPLE	I walked to the store.	I walk to the store.	I will walk to the store.
PROGRESSIVE	I was walking to the store.	I am walking to the store.	I will be walking to the store.
PERFECT	I had walked to the store.	I have walked to the store.	I will have walked to the store.
PERFECT PROGRESSIVE	I had been walking to the store.	I have been walking to the store.	I will have been walking to the store.

Active	Passive
Simple Present	Simple Present
She plays the guitar.	The guitar is played by her.
Simple Past	Simple Past
She played the guitar.	The guitar was played by her.
Simple Future	Simple Future
She will play the guitar.	The guitar will be played by her.
Present Progressive	Present Progressive/Continuous
She is playing the guitar.	The guitar is being played by her.
Past Progressive	Past Progressive/Continuous
She was playing the guitar yesterday when I saw her.	The guitar was being played by her when I saw her.
Future Progressive	Future Progressive/Continuous
She will be playing the guitar after the first performance.	The guitar will be being played by her after the first performance.
Present Perfect (actions which happened in the past, but have an effect in the present)	Present Perfect
She has played the guitar since she was twelve.	The guitar has been played by her since she was twelve.
Past Perfect (show the order of two past events)	Past Perfect
She had played the guitar after the power went down.	The guitar had been played by her after the power went off.
Future Perfect (something that will be completed before a specific time in the future)	Future Perfect
She will have played the guitar after the 20-minute mark of the concert.	The guitar will have been played by her after the 20-minute mark of the concert.
Present Perfect Progressive (shows that something started in the past and is continuing at the present time.)	Present Perfect Progressive
She has been playing the guitar for over a year.	The guitar has been being played by her for over a year.
Past Perfect Progressive (an action that started in the past continued up until another time in the past.)	Past Perfect Progressive
She had been playing the guitar when she saw the love of her life.	The guitar had been being played by her when she saw the love of her life.
Future Perfect Progressive (describes actions that will continue up until a point in the future.)	Future Perfect Progressive
She will have been playing the guitar until next month.	The guitar will have been being played by her until next month.

J. Transitional Devices

What are transitional devices?

- Like bridges between parts of your paper
- Cues that help the reader to interpret ideas a paper develops
- Words or phrases that help carry a thought from one sentence to another, from one idea to another, or from one paragraph to another
- Link sentences and paragraphs together smoothly so that there are no abrupt jumps or breaks between ideas

Why are transitional devices important?

Without transitional device	With transitional device
I can attend to your party. I will be late because I have some errands to do.	I can attend to your party. However, I will be late because I have some errands to do.

Types of transitional devices according to meaning

Addition

- This type of transitional device is used to add an idea to your previous one
- Examples
 - Furthermore, in the same way, similarly, in addition
- Sentence example
 - The second surge of the Delta variant has finally approached its ending. The daily cases of infections have been dwindling. Many things are slowly returning back to normal. Furthermore, the government issued a mandate that face shields are now voluntary.

To emphasize

- This type of transitional device is used to highlight a critical point
- Examples
 - Certainly, with attention to, notable, to emphasize, in particular
- Sentence example
 - As citizens continue to be vaccinated, the COVID-19 cases became lower. Certainly, vaccination has a significant effect on the protection from the virus.

To give example

- This type of transitional device is intended for showing, giving, and enumerating examples.
- Examples
 - For example, for instance, such as, to enumerate, namely
- Sentence example
 - We can do many things to prevent being infected with this virus. We can wear face shields, for instance. According to the WHO, it prevents infection to as much as 99 percent.

To indicate effect, result, consequence

- This form of transitional device denotes an effect, an outcome, or consequences.
- Examples
 - As a result, henceforth, therefore, thus, hence, consequently
- Sentence example
 - Some countries have been holding festivals without utter disregard to the prediction of scientists that there will be a second wave of infections. As a result, cases have plummeted to millions.

To indicate contradiction, opposition, limitation, or contrast

- This form of transitional device denotes contrast, restraint, or conflict.
- Examples
 - However, even though, instead, whereas, while
- Sentence example
 - Some leaders have closed their borders and sent virologists to study the virus as early as possible. Whereas in some countries, they did not take the threat seriously.

To indicate cause, condition, or purpose

- These transition words are used to convey a cause, condition, or goal.

- Examples
 - Because of, due to, for fear that, in the hope that, unless, since
- Sentence example
 - Some countries have resorted to extreme ways to prevent people from going outside. This is for fear that cases of infection would continue to rise exponentially.

To indicate conclusion, summary, or restatement

- Transition words of this sort are used to signify conclusion, summary, or restatement.
- Examples
 - After all, given these points, in essence, to summarize, to sum up
- Sentence example
 - The cases of infection are becoming lower and lower each day. This is the result of our overall efforts in getting vaccinated and following the health protocols. It is challenging but not impossible. After all, it is us who must choose if we want to go back to normal.

To indicate time, chronology, or sequence

after	formerly	last	sooner or later	before	in a moment	once	until now
all of a sudden	forthwith	later	straightaway	by the time	in due time	presently	up to the present time
as long as	from time to time	meanwhile	suddenly	during	in the first place	prior to	when
as soon as	further	next	then	eventually	in the meantime	quickly	whenever
at the present time	hence	now	till	finally	in time	shortly	whenever
at the same time	henceforth	now that	to begin with	first, second	instantly	since	without delay
at this instant	immediately	occasionally	until				

To indicate space, location, or place

above	below	here and there	next
across	beneath ↳	in front of	on this side
adjacent to	beside	in the background	opposite to
alongside	between	in the center of	over
amid	beyond	in the distance	there
among	down	in the foreground	to the left/right
around	from	in the middle	under
before	further	near	where
behind	here	nearby	wherever

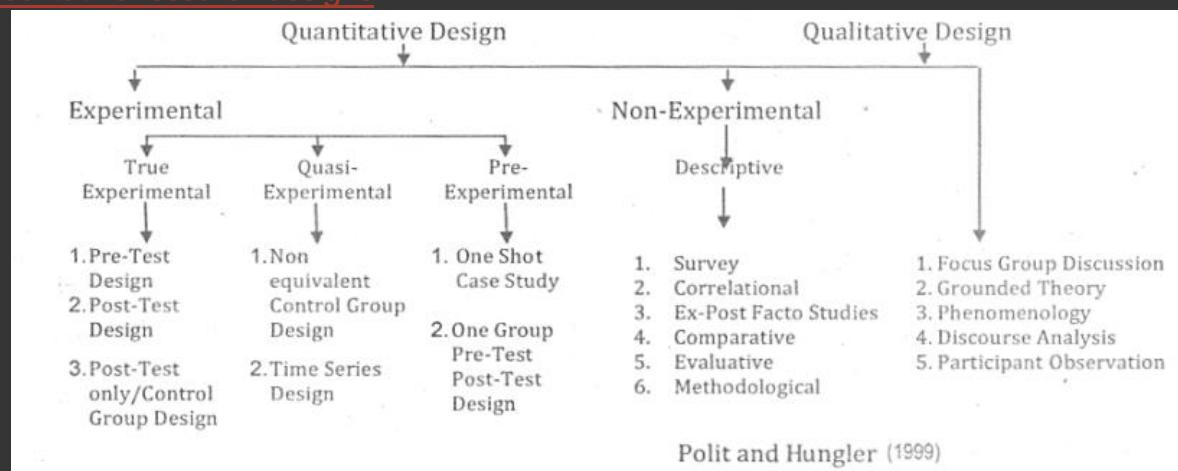


RESEARCH IN DAILY LIFE

RESEARCH IN DAILY LIFE

A. Types of research designs

Research design refers to the overall strategy that you choose in order to integrate the different components of the study in a coherent and logical way, thereby ensuring you will effectively address the research problem.



Experimental

- Experimental research design allows the researcher to control the situation. In so doing, it allows the researcher to answer the questions, "What causes something to occur?" This kind of research also allows the researcher to identify cause and effect relationships between variables and to distinguish placebo effects from treatment effects.
 - Classes of experimental research
 - True experimental design
 - A true experimental design controls for both time-related and group related threats. Two features mark true experiments - two or more differently treated groups and random assignment to these groups. These features require that the researchers have control over the experimental treatment and the power to place subjects in groups
 - Quasi-experimental design
 - In a quasi-experimental, the researcher can collect more data, either by scheduling more observations or finding more existing measure
 - Types of quasi-experimental designs
 - Non-equivalent control group design
 - Non-equivalent control group design refers to the chance failure of random assignment to equalize the conditions by converting a true experiment into this kind of design, for purposes of analysis
 - Interrupted time series design
 - Employs multiple measure before and after the experimental intervention. It differs from the single-group pre-experiment that has only one pretest and one posttest. Users of this

design assume that the time threats such as history or maturation appear as regular changes in the measures prior to the intervention

- Pre-experimental design
 - Pre-experimental research is a design with the least internal validity. One type of pre-experiment, the single group, pre-test-post-test design, measure the group two times, before and after the intervention.

Non-experimental

- External variables are introduced. In this research design, the variables are not deliberately manipulated nor is the setting controlled. Researchers collect data without making changes or introducing treatments.
- Types of non-experimental design
 - Descriptive design
 - Main purpose is to observe, describe and document aspects of a situation as it naturally occurs and sometimes to serve as a starting point for hypothesis generation or theory development.
 - Types of descriptive design
 - Survey
 - Used when the researcher intends to provide a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2003)
 - Correlational
 - Bivariate correlational studies
 - Obtain scores from two variables for each subject, then use them to calculate a correlation coefficient. The term bivariate implies that the two variables are correlated (variables are selected because they are believed to be related)
 - Prediction studies
 - Use correlation co-efficient to show how one variable (predictor variable) predicts another (criterion variable)
 - Example: which high school applicants should be admitted to college
 - Multiple regression prediction studies
 - Suppose the high school GPA is not the sole predictor of college GPA, what might be other good predictors? All of these variables can contribute to the over-all prediction in an equation that adds

together the predictive power of each identified variable.

- Ex-post factor research design
 - These are non-experimental designs that are used to investigate causal relationships. They examine whether one or more pre-existing conditions could possibly have caused subsequent differences in groups of subjects
 - Example: what is the effect of home schooling on the social skills of adolescents?
- Comparative design
 - Involves comparing and contrasting two or more samples of study subjects on one or more variables, often at a single point of time. Specifically, this design is used to compare two distinct groups on the basis of selected attributes such as knowledge level, perceptions, and attitudes, physical, or psychological symptoms
 - Example: A comparative study on the health problems among rural and urban older people from district Mehsana, Gujarat.
- Evaluative research
 - Seeks to assess or judge in some way providing information about something other than might be gleaned in mere observation or investigation of relationships
 - Example: where a test of children in school is used to assess the effectiveness of teaching or the deployment of a curriculum
- Methodological
 - In this approach, the implementation of a variety of methodologies forms a critical part of achieving the goal of developing a scale-matched approach, where data from different disciplines can be integrated.

B. Quantitative research across fields

Quantitative research and anthropology

- Many discoveries in this field like human behavior in the society, racial conflicts and human evolution have given enormous contributions to the improvement of human life

Quantitative research and communication

- Researchers are often interested in how an understanding of a particular communication phenomena might be generalized to a larger population.
- Example: what communicative behaviors are used to respond to co-workers displaying emotional stress

Quantitative research and medicine

- This tends to be predominantly observational research based on surveys or correlational studies. Experimental research designs may enhance the quality of medical education.

Quantitative research and behavioral science

- The output of this research focuses on how human behavior relates with another people and also the individual differences that may affect human relations.

Quantitative research in education and psychology

- Many educational principles in understanding human behavior are the offshoot of this research.

Quantitative research and social science

- The method employed in this type of quantitative social research are mostly typically the survey and the experiment.
- Example: the study of DSWD regarding 4P's

C. Kinds of variables and their uses

What is a variable?

It refers to a characteristics or attribute of an individual or an organization that can be measured or observed and that varies among people or organization being studied. The most common variables in social research are age, sex, gender, education, income, marital status and occupation.

Nature of variables and data

1. Nominal variables
 - Represents categories that cannot be ordered in any particular way. These are variables whose data are non-numeric labels that do not reflect quantitative information.
 - Example: gender, political affiliation, social status
2. Ordinal variables
 - Represents categories that can be ordered from smallest to greatest. It refers to variables where there is a meaningful order or categories but here is no measurable distance between categories.
 - Example: Grade level, sibling rank
3. Interval variables
 - Values that lie along an evenly dispersed range of numbers. It is a variable whose data values are ranged in a real interval and can be as large as from negative infinity to positive infinity.
 - Example: temperature, IQ level
4. Ratio variables
 - Have values that lie along an evenly dispersed range of numbers when there is an absolute zero.

Kind of variables

1. Independent variables
 - Those that probably cause influence or affect outcomes. They are invariably called treatment, manipulated, antecedent or predictor variables
2. Dependent variables

- Those that depend on the independent variables; they are the outcomes of the influence of the independent variable
3. Intervening or mediating variables
 - "Stand between" the independent and dependent variables and they show the effects of the independent variable on the dependent variable
 4. Control variables
 - Special type of independent variables that are measured in a study because they influence the dependent variable. Researchers use statistical procedures (analysis of covariance [ANCOVA]) to control these variables
 5. Cofounding variables
 - Those that are not actually measured or observed in a study. They exist but their influence cannot be directly detected in a study

Example of variables related to a phenomenon

Phenomenon: Climate change

Examples of variables related to climate change:

1. Sea level
2. Temperature
3. The amount of carbon emission
4. The amount of rainfall

D. Deciding on a research topic

The ability to develop a good research topic is an important skill. An instructor may assign you a specific topic, but most often instructors require you to select your own topic of interest. When deciding on a topic, there are a few things that you will need to do:

- Brainstorm for ideas
- Choose a topic that will enable you to read and understand the literature
- Ensure that the topic is manageable, and that material is available
- Make a list of key words
- Be flexible
- Define your topic as a focused research question
- Research and read more about your topic
- Formulate a thesis statement

Research topic

Be aware that selecting a good topic may not be easy. It must be narrow and focused enough to be interesting, yet broad enough to find adequate information. Before selecting your topic, make sure you know what your final project should look like. Each class or instructor will likely require a different format or style of research project.

Possible research topics related to daily life

- Poverty alleviation
- Unemployment
- Homelessness

- Gender equality
- Population aging
- Childcare
- All forms of violence
- Traffic situation
- Environmental protection
- Health care

E. Parts of Chapter 1

A research paper begins with the development of chapter 1 - the problem and its background, which includes

Introduction, background of the study, significance of the study, theoretical/conceptual framework, statement of the problem, hypothesis of the study, scope and delimitations, definition of terms

Introduction

Careful presentation of the importance and validity of the problem

Systematic and orderly presentation of background information with educational trends related to the problem, unsolved, issues, and social concerns

Writing the introduction (TIOC approach)

- Highlight the trend/s in the field
- Pinpoint the issues underlying the trend/s
- State the overall objective/intent of the paper in the light of the gap identified
- Discuss the possible contribution of the research attempt to advancing/improving disciplinal theory research, practice and policy (cross-reference to strengthen claims)

Background of the study

It is basically overview of the research study and explains why you, as a researcher, are doing the study. It provides information that is essential or important to understand the main body of the research investigation

The research investigation could be an offshoot of any of the following:

- Historical development
- Cultural developments
- Academic developments
- Scientific findings
- Debates or arguments and a host of others

These developments could give rise to your research questions. The background of the study locates or situates the study in the context of your specific field.

Significance of the study

Clear presentation of the significance of the study, its role in current contemporary/development

Orderly identification of probable users of the research, specific ways on how the findings could be used.

Theoretical and conceptual framework

Clear presentation of the theory which explains why the study exists.

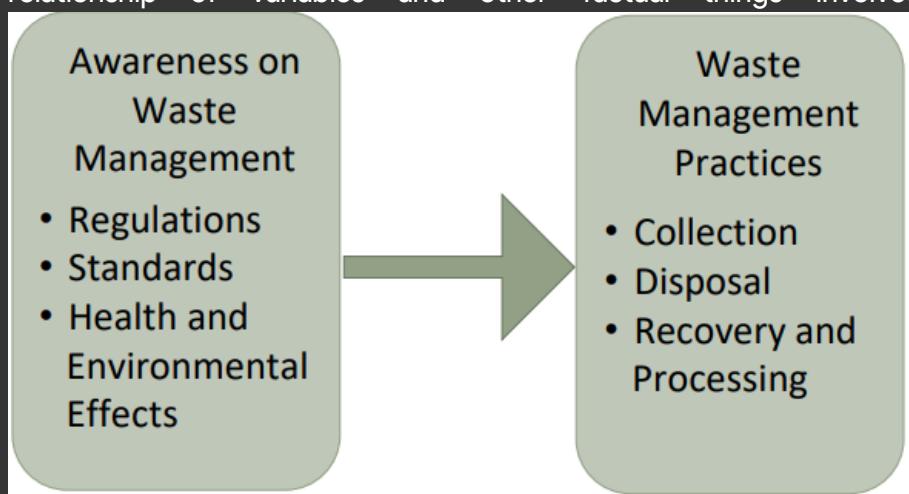
Appropriate development of conceptual frame with reference to the problems of the study.

Theoretical

- Enables the reader to understand the evidence-based truths, concept, speculations, and assumptions which serves as the basis or foundation of the research
- Rule 1: State the theory suggested sentence stems
 - The theoretical basis of this paper is
 - This study is theoretically anchored on
 - This paper is premised on
- Rule 2: Explain the theory
- Rule 3: Contextualize the theory

Conceptual

- Enables the readers to clearly see in their minds the basic structure of the research and the relationship of variables and other factual things involved in the study



Statement of the problem

Clear identification of the problem statement

Succinct, unambiguous statement of specific problems related to the major problem

Example

This study aims to determine the competency level of school heads among the PEAC certified schools under manila ecclesiastical province school system association (MaPSA) based on southeast Asian school heads' competencies standards.

More specifically, this study aims to answer the following questions:

- 1.What is the demographic profile of school heads in terms of:
 - a.Age
 - b.Educational Attainment
 - c.Years of managerial experience
- 2.What is the competencies standard level of the school heads in terms of;
 - a.Strategic thinking and innovations
 - b.Managerial Leadership
 - c.Instructional Leadership
 - d.Personal Excellence
 - e.Stakeholder Engagement
- 3.Is there a significant difference on competencies standard level of the school heads among the Catholic Schools under MaPSA were grouped according to:
 - a.Age
 - b.Educational Attainment
 - c.Years of managerial experience

Hypothesis of the study

Clear-cut statement of hypothesis/assumptions

Formulate the hypothesis

- Null hypothesis (H_0)
- Research/alternative hypothesis (H_1)

Example

- Null
 - There is no significant relationship between the waste management of students at Marcelo H. Del Pilar National High School and its effect on their waste management practices.
- Alternative
 - There is a significant relationship between the waste management of students at Marcelo H. Del Pilar National High School and its effect on their waste management practices.

Scope and limitation of the study

Sufficient delimitation of the problem area in terms of content, time, place, and subjects of the investigation

Example

The foremost scope of the study will be restricted to the Southeast Asian school heads competencies standards analysis among the PEAC certified schools under Manila Ecclesiastical Province School System Association (MaPSA).

The study involves the member schools of MaPSA in 9 Diocese respectively: Manila with 25 schools, Parañaque with 9 schools, Novaliches with 9 schools, Kalookan with 5 schools, Antipolo with 15 schools, Pasig with 11 schools and Cubao with 6 schools, Laog with 15 schools and Malolos with 22 schools.

The selected 99 schools out of 117 member schools will be determined using an 0.05 degree margin of error of the study. The selected school must be PEAC certified schools or PAASCU accredited schools.

Definition of terms

Use of operational and conceptual definitions of key variables

Example

The following terms were defined based on the concept and operational use in the study.

Accredited. School that passed the PAASCU accreditation.

Assessment. The integral part of instruction, as it determines whether or not the goals of education are being met (Eutopia,2010)

Curriculum. A curriculum is a collection of lessons, assessments, and other academic content that's taught in a school, program, or class by a teacher (Stauffer,2020)

Certified. School that passed the PEAC certification visit.

Competency Standard. The standard set for the school heads by SEAMEO INNOTECH.

Competency Level. The school heads competency level which can be interpreted as Very High, High, Medium and Low using the SEAMEO INNOTECH School heads competencies framework.

F. Background of the study

The background of the study is basically an overview of the research study and explains why you, as a researcher, are doing the study. It provides information essential to understand the main body of the research investigation, which could be an offshoot of any one of the following

- Historical development
- Cultural development

- Academic development
- Scientific findings
- Debates or arguments and a host of others

You can follow this format when you're writing your background of the study

- Begin by giving a general overview of your thesis topic and introduce the main ideas you will be making use of throughout your thesis
- Then, give the detailed and precise information about all the methodologies used in the research. This can take up to several paragraphs depending on the individual and research question or thesis topic.
- Cite your sources where necessary to avoid plagiarism
- Then you can introduce the experiment by describing your choice of methodology briefly, why you have decided to use this methodology instead of others and the objective of the methodology

G. Theoretical framework

It works as a map for the research

Identifying the network of relationships among the variables

Conceptual model of all the factors contributing to the problem

It helps to generate hypotheses

Components of theoretical framework

- Clearly defined relevant variables
- State how two or more variables are related (relationship)
- Indication of nature of relationship
- Clear explanation to expect relationship to exist
- Diagram of theoretical framework

H. Conceptual framework

Writing a conceptual framework research ethics are standardized rule that guide the design and conduct of research. The term ethics refers to questions of right and wrong. When researchers think about ethics, they must also ask themselves if it is right to conduct a particular study or carry out certain procedures.

Purposes of conceptual framework

- To clarify concepts and propose relationships among the concepts in a study
- To provide a context for interpreting the study findings
- To explain observations
- To encourage theory development that is useful and practical

Step-by-step guide on how to write the conceptual framework

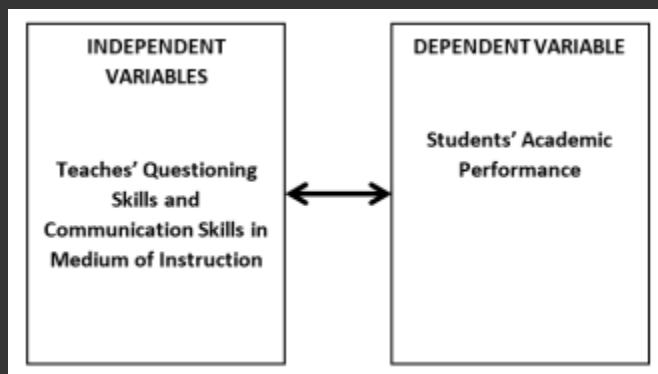
1. Choose your topic. Decide on what will be your research topic. It should be within the field of your specialization
2. Do a literature review. Go over a relevant and updates studies related to your own research. Use a reliable source of information and use appropriate documentations

3. Isolate the important variables. Identify the specific variables mentioned in the literature and show their interrelationships
4. Generate the conceptual framework. Build your conceptual framework using the variables studied in the scientific articles you have read. Your problem statement serves as a reference in constructing the conceptual framework in effect, your study will attempt to answer a question that other researchers have not explained yet

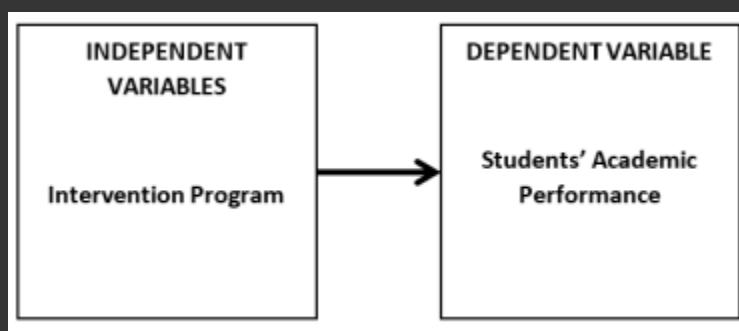
Conceptual paradigm

A diagram that visually represents and interprets the underlying theory; principles and concepts of research. A visual presentation of variables that interrelate with one another as perceived by the researcher before an actual investigation is done to prove its relationship

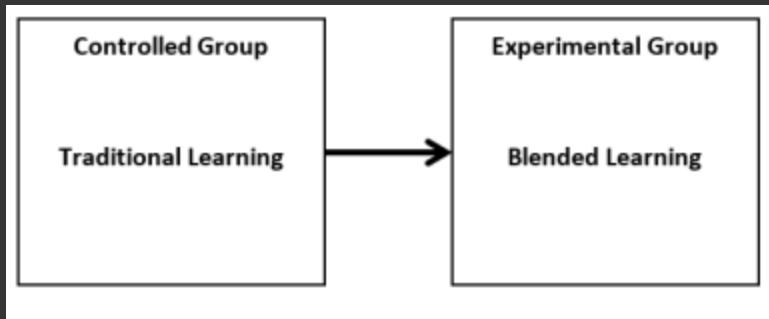
Conceptual framework for significant relationship



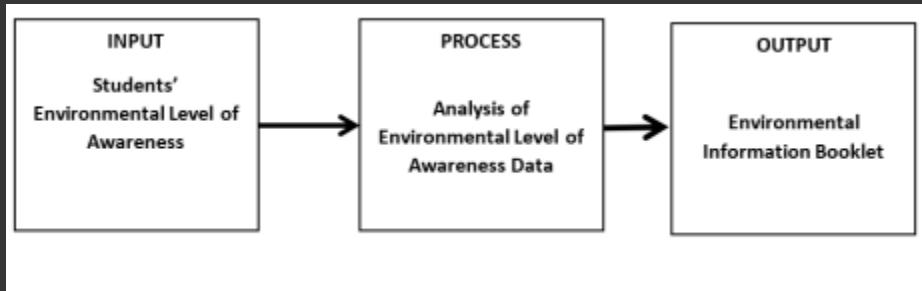
Conceptual framework for significant difference



Conceptual framework for experimental



- Conceptual framework for output/product



I. Theoretical framework

- It works as a map for the research
- Identifying the network of relationships among the variables
- Conceptual model of all the factors contributing to the problem
- It helps to generate hypotheses

Components of theoretical framework

- Clearly defined relevant variables
- State how two or more variables are related (relationship)
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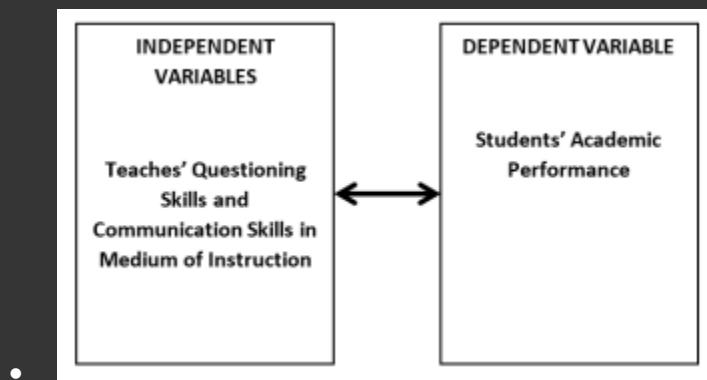
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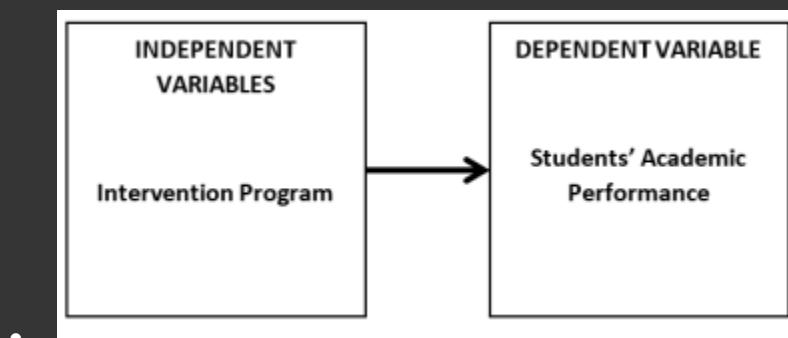
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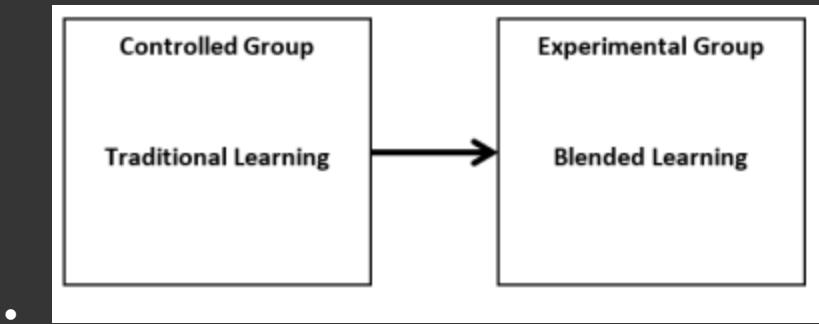
Conceptual framework for significant relationship



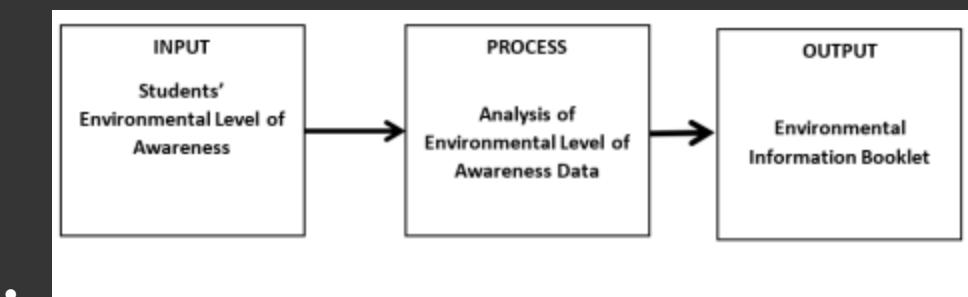
Conceptual framework for significant difference



Conceptual framework for experimental



Conceptual framework for output/product



K. Statement of the Problem

A good research question provides purpose to your research and clarifies the direction. It further helps your readers to understand what issue your research aims to explore and address, which gives you a clear focus

If you are unsure about how to write research questions, here are the attributes of a good research question

- The research question should contain only a single problem
- Primary and secondary data sources should serve the purpose of research
- Should be researchable within the time limit and other constraints
- Can attain in-depth and detailed results
- Relevant and applicable
- In line with your experience and/or field of study

How to write a research question

- Choose a topic with a wide range of published researches
- Read and skim relevant articles to find out different problems and issues
- Specify a theoretical or practical research problem that your research question will address
- Narrow down the focus of your selected core niche

Common research question formulation

The following table shows the common research questions for the dissertation. However, it is important to note that these examples of dissertation research questions are straightforward, and the actual research questions may be more complicated than these examples.

Question type	Formulation
Descriptive approach	What will be the properties of A?
Comparative approach	What are the similarities and differences between A and B?
Correlational approach	How can you correlate the variables A and B?
Exploratory approach	Factors affecting the rate of C? Does A and B also influence C?
Explanatory approach	What are the causes of C? How B impacts A? What is causing D?
Evaluation approach	How useful and influential is C? What role does B play? What are the advantages and disadvantages of A?
Action research	How can we improve X with different interventions?

Statement of the problem example

Title: Questioning Level and Communication Skills in Medium of Instruction in Relationship to Students' Academic Performance

Statement of the Problem

This study identified the questioning level and communication skills in medium of instruction in relationship to students' academic performance. Specifically, this study answered the following questions:

1. What is the level of teachers' questioning skills?
2. What is the teachers' communication skills in medium of instruction?
3. What is the students' academic performance?
4. Is there any significant relationship between students' academic performance and the following:
 - a.teachers' questioning skills and
 - b.teachers' communication skills in medium of instruction?

L. Hypothesis

It is a specific proposition which is presented for testing through research. It is essentially a statement of what we believe to be factual. It is a prediction about the relationship between two or more variables. Hypotheses should be statements expressing the relation between two or more measurable variables

Purpose and importance of hypotheses in research

1. It provides a tentative explanation of phenomena and facilitates the extension of knowledge in the area
2. It provides the investigator with a relational statement that is directly testable in a research study
3. It provides a direction to the research. It provides a framework for reporting conclusion of the study
4. It could be considered as the working instrument of theory. It can be deduced from theory and from another hypothesis

5. It could be tested and shown to be probably supported, apart from one's own values and opinions

Characteristics of a hypothesis

1. Testable
2. Logical
3. Directly related to the research problem
4. Represents a simple unit or subject of the problem
5. Factually or theoretically based
6. States relationship between variables
7. Sets the limits of the study
8. Stated in such a form that it can be accepted or rejected

Classifications of hypothesis

Simple hypothesis

- Expresses an expected relationship between one independent variable and one dependent variable while a complex hypothesis, also referred to as multivariate hypothesis, is a prediction of a relationship between two or more independent variables and two or more dependent variables

Directional hypothesis

- One that specifies not only the existence but the expected direction of the relationship between variables, non-directional by contrast, does not stipulate the direction of the relationship

Research hypothesis

- Also referred as substantive, declarative, or scientific number of statements of expected relationship variables

Null hypothesis (H_0)

- A statement that there is no actual relationship between variables
- Example
 - There is no significant difference in the anxiety level of children of high IQ and those of low IQ

Alternative hypothesis (H_a)

- A statement that suggests a potential outcome that the researcher may expect. It is established only when a null hypothesis is rejected. It can be directional or non-directional.
- Example
 - Children with high IQ will exhibit more anxiety than children with low IQ
 - There is a difference in the anxiety level of the children of high IQ and those of low IQ

Hypothesis example

H_0 : There is no significant relationship between students' academic performance and teachers' questioning skills and teachers' communication skills in medium of instructions

H_a : There is a significant relationship between students' academic performance and teachers' questioning skills and teachers' communication skills in medium of instructions

M. Scope and Delimitation

The scope and delimitation of the study sets boundaries and parameters of the problem and narrows down the scope of the inquiry.

Scope of study section

The scope of study in the thesis or research paper it contains the explanation of what information or subject is being analyzed. It is followed by an explanation of the limitation of the research. Research usually limited in scope by sample size, time, and geographic area. While the delimitation of study is the description of the scope of the study. It will explain why definite aspects of a subject were chosen and why others were excluded. It also mentions the research method used as well as the certain theories that applied to the data.

N. Definition of Terms

Definition of key terms will help clarify the purpose and direction of the study being conducted.

Principles in writing definition of terms

1. Make sure that in the definition, you focus on what something is, not just what its effects it is used for.
2. Extend the definition so that it exactly covers what you want the reader to understand. This may mean that you will expand the dictionary definition.
3. It is helpful to supplement a definition, where appropriate, to clarify further the meaning of the term.
4. You are advised not to invent a definition for any term which has already a clear ad accepted definition in place. However, the term should be defined as used in the study or research or within the content being discussed.
5. Once you establish a definition, do not change its meaning in the middle of the article or the paper.

Understanding operational definitions

- Understanding operational definition refers to a specific definition of a concept in a research study.
- It defines a concept solely in terms of the operations used to produce and measure it.
- Operational definitions help researchers communicate about their concepts.
- Types of operational definitions
 - Experimental operational definition which describes how a term's reference is manipulated.
 - Example: Chocolate cake will be described based on the recipe to make it.
 - Measured operational definition which describes how referents of a term are measured.
 - Example: Chocolate cake will consist of the description of the flavor, texture, appearance, and other properties of the cake.

Advantages of operational definitions

- Make research methodology used clear to the reader
- Combine statement to things, either directly or indirectly, observable is empirical
- Help assure good communication by specifying how terms are used

O. Review of Related Literature and Studies

This is a written summary of journal articles, books, and other documents that describes the past and current state of information on the topic of your research study.

The review is not undertaken for its own sake. Its primary purpose is to establish the state of current knowledge, agreement about your research topic. It is not merely a chronicle of who wrote, what and when but an in-depth examination of texts to identify and investigate more critical elements where current understanding is unclear.

- Systematic presentation of literature and studies related to the problem
- Adequacy of presentation with reference to problem, research design, significant findings
- Presentation must be made in thematic
- Its objective is to identify, criticize, and synthesize

Goals of RRL

- To demonstrate familiarity
- To show the path of prior research
- To integrate and summarize; and
- To learn from others and stimulate new ideas

The ability to review and to report on relevant literature is a key academic skill. Doing a literature review situates your research focus within the context of the wider academic community

The literature review reports your critical review of the relevant literature; and identifies a gap within the literature that your research will attempt to address

Purposes of RRL

- To justify your choice of research question, theoretical or conceptual framework, and method
- To establish the importance of the topic
- To provide background information needed to understand the study
- To prove researchers' familiarity with significant and/or up-to-date research relevant to the topic
- To establish your study as one link in a chain of research that is developing knowledge in your field

How to evaluate articles

- Examine the title. A good title is specific, indicates the nature of the research without describing the results and avoids asking yes or no questions. It describes the topic and may mention, one or two major variables, and talks about the setting or participants/focus of the study
- Read the abstract. A good abstract summarizes critical information about a study. It gives the purpose of the study, identifies methods used and highlights major findings. It prepares you for examining the report in detail

- Read the article. Begin by skimming the material and quickly reading the conclusion. This will give you a picture of what the article is about. There are certain conditions that can affect or influence your reading:
 - The article is high-quality article with a well-defined purpose, showing clear writing and is smooth logical one
 - You are sharply focused on a particular issue or question.
 - You have a solid theoretical background

Sources of literature review

Sources refers to print, electronic, or visual materials necessary for your research.

Primary sources

- Letters, correspondences, diaries, memoirs, autobiographies, official or research topics, patents, designs, and empirical research articles

Secondary sources

- Academic journal articles (other than empirical research, articles, or reports), conference proceedings, books (mimeographs or chapters of books), or documentaries

Tertiary sources

- Encyclopedias, dictionaries, atlases, handbooks

Literature reviews use a combination of primary and secondary sources since the purpose is to document and analyze what has been published on any given topic through time

Secondary sources can be considered primary depending on context. In Science for example, an academic article reporting the findings of a major study can be considered primary

Writing the review

- Use the statement of the problem as guide to structure and sequence of topics
- Avoid copy/cut and paste; all literature cited must form a coherent whole
- Last part highlights gaps in literature specifically addressed by your study
- Use appropriate format for citations and references
- In-text citations should be congruent to bibliography entries

Referencing sources

Referencing appropriately is important for some reasons as stated below

- Adds authority to your work by supporting it with previous research
- Demonstrates reading and understanding of relevant literature
- Enables the reader to track down the original sources to check its quality, and have not misinterpreted it
- Ensures that you write in an ethical manner by giving credits to the original author

- Citing websites

Source	Example Citation
Web site with author	Kraizer, S. (2005). Safe child. Retrieved February 29, from http://www.safechild.org .
Web site with corporate author	Substance Abuse and Mental Health Services Administration (SAMSHA). (2008, February 15) Stop underage drinking. Retrieved February 29, 2008, from http://www.stopalcoholabuse.gov .
Web site with unknown author	Penn State Myths. (2006) Retrieved December 6, 2011, from http://www.psu.edu/ur/about/myths .
Page within a Web site (unknown author)	Global warming solutions. (2007, May 21). In union of Concerned Scientists. Retrieved February 29, 2008, from http://www.ucsusa.org/global_warming/solutions

- Citing books

Source	Example Citation
Book by a single author	Rollin, B.E (2006). Science and ethics. New York, NY: Cambridge University Press.
Book by two authors	Sherman, C., & Price, G. (2011). The invisible web: Uncovering information sources search engines can't see. Medford, NJ: Cyber Age Books.
Book by three or more authors	Goodpaster, K.E., Nash, L.L., & Betignies, H. (2006) Business ethics: Policies and person (3 rd ed.).
Book by a corporate author	American Medical Association. (2004) 'American Medical Association family medical guide (4 th ed).
Article or chapter within an edited book	Winnie, P.H. (2001) Self-regulated learning viewed from models of information processing. In B.J. Zimmerman & D.H. Schuk (Eds), self-regulated learning and academic achievement (2 nd ed, pp 160-192). Mahwah, N.J.: Lawrence Erlbaum Associates.

- Citing articles from print periodicals

Source	Example Citations
Article in monthly magazine (include volume number if given)	Swedin, E.G. (2006, May/June). Designing babies: A eugenics race with China? The Futurist.
Article in a weekly magazine (include volume number if given)	Will, G.G. (2004, July 5) Waging war on Wal-Mart. Newsweek.
Article in a daily newspaper	Dougherty, R. (2006, January 11). Jury convicts man in drunk driving death. Centre Daily Times, p 1A.
Article in a scholarly journal	Stock, C.D., & Fisher, P.A. (2006) Language delays among foster children: Implications for policy and practice. Child Welfare, 85 (3).
Book review	Rifkind, D. (2005, April 10). Breaking their vows. Review.

- Citing electronic books

Source	Example Citation
Electronic Book	McKernan, B. (2001). Digital cinema: the revolution in cinematography, postproduction distribution. New York, NY: McGraw Hill. Retrieved from www.netlibrary.com

- Citing an entry in an online reference work

Source	Example Citation
Entry from Gale Virtual Reference Library	Rey, G. (2006) Behaviorism. In D.M. Borchert (Ed.) Encyclopedia of Philosophy (2 nd ed). Retrieved from http://gogalegroup.com



ENTREPRENEURSHIP

ENTREPRENEURSHIP

A. Relevance of studying entrepreneurship

Entrepreneurship is the most catchword in the modern day of globalized economy. The richest people here in our country and in the world are mostly entrepreneurs.

Some people make a big deal out of many successful businesses founded by entrepreneurs who do not have college degree. Often cited are Apple founder Steve Jobs, Microsoft founder Bill Gates, Facebook co-founder Mark Zuckerberg and Uber co-founder Travis Kalanick

However, we must also remember that equally successful businesses were founded by college degree earner individuals such as Jollibee founder Tony Tan Caktiong, Lamoiyan Corporation founder Cecilio Pedro and ECHOstore founder Pacita Juan.

Entrepreneurship is a mindset that allows you to see opportunity everywhere. It could be a business idea, but it could also be seeing the possibilities in the people that can help you grow that business.

Entrepreneur comes from the French word *entreprendre* which means to undertake, they are individuals who initiated the establishment of a business

Entrepreneurship is important for it has the ability to improve standards of living and create wealth for the entrepreneurs and also for related businesses. Entrepreneurs also help drive change with innovation, where new and improved products enable new markets to be developed. Entrepreneurs also create jobs and contribute to a growing economy.

3 C's Key Factors to successful entrepreneurship

1. Commitment
2. Coordination

3. Competency

7 Competencies of an entrepreneur

An entrepreneur has to have certain qualities to be successful in business venture. It takes hard work and determination to become successful business people and achieve the aspired goal. There are 7 competencies that should be attained by an entrepreneur.

1. Be a risk taker
2. Adaptability
3. Customer focus
4. Sense making
5. Grit
6. Initiative
7. Influence

B. Core competencies in Entrepreneurship and Career opportunities

Entrepreneurship thinks and processes information differently. They are able to make sense of complex and ambiguous situations more quickly and more conventional approaches in decision making.

But it is observed that they also experience stronger levels of emotion and mood than other people do in relation to their work which influence their judgement.

There is no such thing as natural-born entrepreneur. Being an entrepreneur is a choice nowadays. These are individuals who are willing to take a huge risk using enormous amount of capital for in their business ventures.

Levels of competencies that an entrepreneur needs

1. Personal competencies
 - Creativity, determination, integrity, emotional balance and self-criticism
2. Interpersonal competencies
 - Communication, engagement/charisma, respect
3. Business competencies
 - Business vision, resource management, networking, negotiating skills

Career opportunities for entrepreneurship

There are unique opportunities present in the field of entrepreneurship. A career in entrepreneurship can be made depending on your interests. Since entrepreneurs can exist in any sector of the economy, there is a vast and almost never-ending list of paths to choose from.

C. Environment and Market

Environment

- The demographical profile of the place; the population like gender, age, employment by industry, religious affiliation, etc.
- To determine the profitability of your business plan

Market

- Place where exchange of goods or services take place between sellers and buyers
- Actual consumers or possibly clients

In identifying your market, you must acquire the basic information about them

- Location
- Buying power
- Lifestyle
- Educational background
- Beliefs and practices

This info help you manage your business well

1. Establish clear directions
2. Position your product or services
3. Project your income and expenses

D. 4 M's of Operations in Relation to the Business Opportunity

4 M's

- Traditional framework for viewing the resources available to a business, which can be useful when designing a business plan.
- Identifying the resource needs is generally considered in business, a task for those in management. Failure to supply the resources required by a business often results in organizational failure.

Method

- It represents the day-to-day operations of a business
- Production schedule timetable for the use of resources and process required by a business to produce goods and services
- The plant size production schedules are determined based on the projected demand
- A planning tool (forecasting) that helps management in its attempts to cope with the uncertainty of the future
- The sequence of operations should be clearly defined to ensure proper execution thus assuring the consistency of the quality of the product

Manpower

- Defined as the total number of individuals who are employed in a company or available for a particular project assignment or work.
- In organization the manpower needed for a particular work and in future is estimated and planned.
- Qualification standard in choosing a newly hired employee
 - Capabilities
 - Employee must have the ability and qualifications to do the job you are hiring that person to do.
 - What hands-on, actual experience does this person have? What has this person been educated and trained to do? And since every organization is different, you need to consider the learning curve that is involved.
 - Experience
 - The length of working experience in relation to the job criteria required as a worker, and also that a worker applied for.

- In most cases, the ideal candidate will have at least exposure and experience in the areas that the job entails. Sometimes it is difficult to find individuals with just the right experience, especially if your industry is specialized or relatively new.
- Educational requirements
 - Education requirements are as varied as the positions and the people that fill them
 - Some employers require at least a high school degree or an equivalency certificate as a starting point for jobs they fill
 - Some jobs require more advanced thought and responsibilities and, therefore, may require more advanced education.

Machine

- An apparatus using or applying mechanical power and having several parts, each with a definite function to perform a specific task
- The origin of machine whether local or imported and the country of origin should be known
- The specification of a manufactured product normally includes the general and technical descriptions.
- General description
 - States the basic description of the product and services
- Technical description
 - Includes the detailed information related to the design and construction of products

Materials

- Used in the manufacture of raw-materials into finished goods
- Include both direct and indirect or consumable materials
- The specifications, quantity needed, and schedule of delivery should be clearly stated.
- Direct materials
 - Raw materials that are made into finished products
- Indirect materials
 - Used in manufacturing processes which does not become an integral part of the product
 - Includes power, water, and sometimes gases and steam depending on the type of product or services
 - Waste disposal and waste treatment facilities necessary to protect the environment

E. Business Plan

Business name

- Name of the business

Type of business

- Main types of businesses
 - Service: Intangible products
 - Merchandising: Buy and sell goods
 - Manufacturing: Transforms raw materials into a new product

Goals

- Business goals are goals that a business anticipates accomplishing in a set period of time. You can set business goals for your company in general as well as for particular departments, employees, managers, and/or customers
- How to set short-term business goals
 - Identify your company's short term business goals for a set period of time
 - Break down each goal into actionable business objectives
 - Ensure your objectives are measurable
 - Assign goal-related tasks to employees
 - Measure progress regularly
- Examples of short-term business goals
 - Increase product prices by 3% over the next three months
 - Hire three new marketing employees over the next five months
 - Increase traffic on the company's blog
 - Implement monthly giveaways for customers on social media
 - Begin an "Employee of the Month" award program
 - Select a charity to begin sponsoring
 - Create a profile on a new social media channel
 - Increase social media posting to three times a week

Address

- Example
 - #1 Geronimo St., Guitnang Bayan II, San Mateo, Rizal
 - 143 Gen. Luna St., Guitnang Bayan 1, San Mateo, Rizal

Location

- Location of your business in a map

F. Marketing Mix & 4P's

Marketing Mix

Refers to the set of actions, or tactics, that a company uses to promote its product in the market

Importance of the marketing mix

- They make up the business plan for a company and handled right, can give it great success

4P's

Product

- It is an item that satisfies the consumer's needs or wants
- Products may be tangible (goods) or intangible (services, ideas, or experiences)
- Steps involved in the development of a new product
 - Strategy development
 - Before pondering on creating a new product, a company has to refer to its own strategy.
 - Firms do use various approaches.
 - In some cases, stockholders have to interfere with questions on the prudence of the investment in an effort to manage and reduce risks
 - Generation of ideas

- Ideas do not just come from internal parties or the higher-level management.
 - Ideas can come from different departments. It may come about as a response to the demand of the market
- Screening and evaluation
 - There are plenty of great ideas that may be thrown in but some are not feasible. Excellent ideas may also be discarded for the simple reason that it does not blend well with the company's core competencies
- Business analysis
 - After determining which ideas are consistent with the core competencies of the company and determining feasibility, further evaluation and analysis of how the product can help the company reach its business goals is necessary.
- Product development
 - Based on the identified features of the "best" product to meet the customers' needs, a team of experts should be able to come up with a product design
- Market testing
 - To ensure that the product will be well received by the company's target market, it is necessary to conduct market testing. As compared to the initial product tests conducted in laboratories or company premises, this test is conducted in a specific marketplace
- Commercialization
 - Depending on the result of market testing, a company may decide to widen its distribution and release the product to a broader market, either nationally or internationally.
- Differentiating your product from the competition
 - One of the challenges in this element of market mix is standing out among competitor brands. The consumer market is filled with numerous products under the same category fighting for customer attention

Price

- Refers to the amount a customer pays for a product.
- Price is the amount of money expected, required or given in payment for something
- Pricing strategy
 - Cost plus
 - It is taking the production cost and adding a certain profit percentage. The resulting amount will be the product's price
 - Value based
 - Instead of using the production cost as your basis, you consider the customer's perception of the product's value
 - Competitive
 - You take a survey of the pricing implemented by your competitors on a similar product that you are trying to market and then decide whether to

- price your product lower, the same, or higher. You should also monitor their prices and be able to respond to changes
- Competitive changes
 - Going rate
 - This pricing strategy is more common in selling environments where the companies have little to no control of the market price
 - Skimming
 - You introduce a high-quality product, price it high, and target affluent customers. When the market becomes saturated, you then lower the price accordingly.
 - Discount
 - Most commonly used for old product stocks or when you're clearing up your inventory.
 - Loss leader
 - You take the production cost and price the product even lower
 - Psychological
 - You may have noticed that you rarely see pricing rounded off to the nearest whole number

Place

- Refers to providing customer access
- Considers providing convenience for consumer
- Distribution strategy
 - Selling directly
 - Retail interface with the target customers if you want to sell directly. You can sell either electronically or in person
 - Selling through a reseller
 - If you want to have a wider distribution for your product, you can sell it through a third party, either a retailer or wholesaler, who will then resell the product to their customers
 - Market coverage
 - Refers to how wide or varied you want your products to be distributed. This applies either direct sales or through intermediaries
 - Three types of market coverage
 - Intensive distribution
 - This ensures the widest distribution possible for your product or service. You sell your products in as many locations or markets as possible. And oftentimes, you need to lower your prices.
 - Selective distribution
 - You may also want to sell only to a few select businesses or customers. This is called selective distribution and is the

strategy commonly used for selling upscale products and is sold by resellers who deal only with high-quality products

- Exclusive distribution
 - This strategy restricts your product distribution to only one reseller. The reseller will have exclusive rights to sell your product or service, and in return, you may also be the sole supplier.
- Other factors to consider
 - The products sales volumes and its characteristics will influence what inventories you should maintain and also how the products should be transported

Promotion

- Part of marketing where you advertise and market your product, also known as promotional strategy. Through it, you let potential customers know what you are selling.
- Types of promotions
 - Advertising
 - It's a key promotional strategy and can be done through TV, radio, print, etc.
 - Public relations (PR)
 - Public relations are usually focused on building a favorable image of your business
 - Personal selling
 - You can employ salespersons to promote and sell your products as part of the business communication plans. These salespersons play an important part in building customer relationships through tailored communication
 - Sales promotions
 - This promotional strategy is done through special offers with a plan to attract people to buy the product

G. Product Description

- The marketing copy used to describe a product's value proposition of potential customers.
- A compelling product description provides customers with details around features, problems it solves, and other benefits to help generate a sale.

Rules to write the product description

1. Know who your target audience
 - A breakdown of the characteristics of your potential customers.
 - Your buyer persona will help you understand which features will be most valuable to your customers.
 - As you are writing your product description, keep these questions in mind
 - How did this person arrive to your page?
 - What are his or her interests, generally?
 - How would this person describe the product to a friend?
 - What features or benefits would interest this person the most?
 - In this case, the potential buyer would likely be interested in learning about these remedies in the product description.

- Rather than focus on the decorative features of the lamp, like most other product descriptions for lamps, The Salt Lady focuses on the features that would appeal to her buyer persona the most.
2. Focus on the product benefits
 - A product feature is a factual statement about the product that provides technical information.
 - A product benefit, on the other hand, tells how the product can improve the buyer's life.
 3. Tell the full story
 - A good product description should give all relevant details, convince the buyer of its benefits, and pack an emotional punch.
 - It does this by focusing on the traditional spiritual benefits of amethyst.
 - It focuses especially on the ways in which it can be used, making it easy for the customer to imagine having this ring in his or her life.
 4. Don't be afraid to boast
 - Tell a better story in your short product description paragraph by including tidbits of detail that proves why your product is better than the rest. Don't be afraid to name drop, either.
 5. Get technical to win trust
 - Prove to your customer your brand's expertise in the industry by providing all possible details they'd need to know - before they ever even have to ask.
 6. Know when to show and not tell
 - Images carry weight and are better remembered by customers.
 - If possible, show off your product in a visual that explains exactly what it does.

H. Developing a brand name

Brand name

- It is a powerful source of identity and helps to protect the intended image of the product against the competition and in the process of positioning a brand

Importance of brand name

- It allows the brand to become part of everyday life.
- Can communicate overtly or subconsciously.
- Can become a valuable asset as it functions as a legal device.

Background in brand naming

- During the industrial revolution companies sought to inspire consumer confidence with names borrowed from their owner's family.
- Modern brand naming began in the years after the second World War.

Brand names and logo

- Australia became the world's first country to ban logos and branding cigarette packets "plain packaging".

Brand names and language differences

- The impact of language differences must be understood if a brand name is to be successfully transferred.

Strategy

- Do we need to hire someone?
- Develop a strategy to choose a great brand name.
- Generate plenty of potential names.
- Evaluate the list against your criteria.
- Test your name.
- Protect your brand name.
- After naming it:
 - Create logo
 - Corporate identity
 - Brand story
 - Brand messaging
 - Brand personality
 - Sales materials

I. SWOT Analysis

It is to validate if your business is profitable and viable

Profitable

- Capacity to generate income on top of your expenses

Viable

- Doable or if your plan is realistic considering the prevailing conditions of the environments.
- It guides you in deciding whether to push through with your business plan or not. It must be based on facts and not just personal opinion.

Correct

- There are approximately ten suppliers of banana leaves in the area

Faulty

- There are plenty of suppliers of banana leaves

SWOT Analysis

Strength

- Qualities or situations that will help you achieve your business goals.

Weaknesses

- Qualities or situations that you should improve or change because they prevent you from achieving your goals.

Opportunities

- Events or situations that you can explore in order to establish or expand your business.

Threats

- Events or situations that you should avoid to prevent future loss or closure.

Example

	Strength	Weaknesses	Opportunities	Threats
Resources	Adequate capital	Insufficient fund	The supply of raw materials is abundant within the area	The supply of raw materials is dependent on a lot factors like weather
Management	Reflective and proactive management	Passive and traditional management	The owner is experienced and knowledgeable in the field	The owner lacks of exposure or first-hand experience in the field
Location of your store	It is accessible and found in the business district	It is located in remote and far-flung areas	The area is not prone to flooding and is accessible to all types of transportation	The crime rate in the area discourages customers from visiting the store

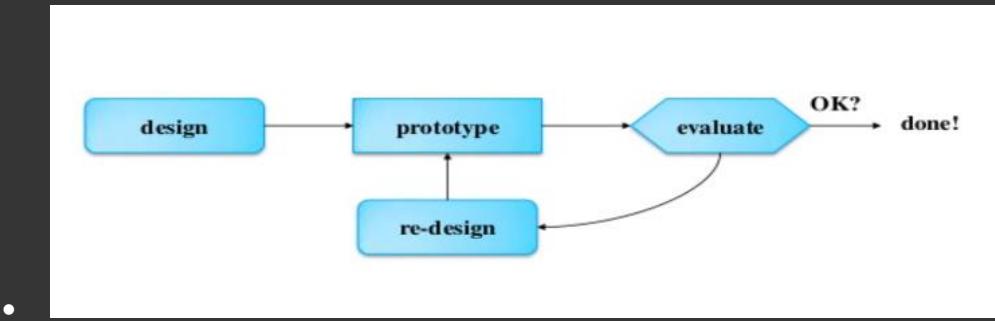
Identify of which aspect of your business you want to analyze

Makes your analysis easier

The accuracy and reliability of your SWOT analysis will depend on how specific your business plan is

J. Prototyping

- A limited representation of a design that allows users to interact with it and to explore its suitability
- Allows stakeholders to interact with the envisioned product, gain some experience of using and explore imagined uses
- Production of an intermediary product to be used as a basis for testing
- Aim is to save on time and money
- Aim is to have something that can be tested with real users
- You never get it right first time
- If at first you don't succeed...



What is a prototype

- In interaction design it can be any of the following
 - A series of screen sketches
 - A storyboard, i.e., a cartoon-like series of scenes
 - A PowerPoint slideshow
 - A video simulating the use of a system
 - A piece of software with limited functionality written in the target language or in another language

Pitfalls of prototyping

- Moving little by little
- Need a good start point
- Need to understand what is wrong

Goals of prototyping

- Prototyping enables evaluation, happens throughout
 - Exploring requirements: market analysis, participatory design
 - Choosing among alternatives: risky or critical features, go/no-go decisions
 - Empirical usability testing: may deliberately choose a malleable software platform, building software in incremental, iterative fashion

How to prototype

- Build a prototype of the basic functionality, especially the interface
- Test the prototype, which will uncover design errors
- Correct the errors
- Repeat until you have a clean design
- Prototyping is a major tool for improving usability; heavily used in industry

Why prototype

- Evaluation and feedback are central to interaction design
- Stakeholders can see, hold, interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- You can test out ideas for yourself

- It encourages reflection: very important aspect of design
- Prototypes answer questions, and support designers in choosing between alternatives

What is being prototyped

- Technical issues
- Work flow, task design
- Screen layouts and information display
- Difficult, critical areas

General features of prototyping

- Enables the designer to quickly build or create examples of
 - Data entry form
 - The menu structure and order
 - The dialogue styles
 - Error messages
- Should be inexpensive to develop - intention is to discard/modify it
- Should not require programming skills

Benefits of prototyping

- Can be used to test every detail of the final product before the product is built
- Results in higher user satisfaction
- Users are better at evaluating an existing (vs. described) system
- It brings the users into the process early

Disadvantages of prototyping

- Users may be unfamiliar with the technique
- Management may think that the project is nearly finished if the prototype is "too good" or that the prototype can be converted into the final product

Evaluation

- It is no good building a prototype if you do not evaluate it
- Evaluation is another key feature of user centered design



UNDERSTANDING CULTURE, SOCIETY, AND POLITICS

UNDERSTANDING CULTURE, SOCIETY, AND POLITICS

A. The Social Sciences: Three Faces of the Social

Society in its broader sense involves social, cultural, and political realities. As formal and systematic studies of society, these three facets are referred to as the social sciences also known in academia as disciplines.

These disciplines may be likened to a lens which changes the way the wearer sees things in terms of color, focus, and details. In other words, they change a person's perspective.

Culture, society and politics are concepts. They exist in the realm of ideas and thoughts. As such, they cannot be seen or touched and yet they influence the way we see and experience our individual and collective lives as social beings.

Concepts are created and have been used to have a firm grip of phenomenon. Pierce describes a concept as "The rational purport of a word or a conception". This simply suggests that to turn a phenomenon into a concept means, for one thing, to make it more rational.

What is interesting about concepts is that as conceptual tools, they allow us to form other concepts or relate concepts to each other, or even deconstruct old ones and replace them with something new. This is perhaps the reason why Weber admitted that concept is one of the great tools in scientific knowledge.

B. Sociology, Anthropology, Political Science

Sociology, anthropology, and political science are social sciences being taught in schools all over the world. In a way, each discipline provides unique ways of seeing and an equally unique way of zooming in on social details. Regardless of their distinctive angles of looking, they share a common goal: to understand the social and to explore how it drives the unfolding of society as we know it.

Despite their distinctive ways of looking, they share common foundational assumptions on how the social determines the dynamics of society in general and the nature of social action and social interactions in particular.

The study of social world: Sociology

Sociology is the study of society, social institutions and social relationships. Sociology is interested in describing and explaining human behavior, especially as it occurs within a social context. It is interested in individuals than in the group to which they are a part

Studying sociology is practical and useful. As social beings, we gain understanding of how the social world operates and of our place in it. Sociology also enables us to see the strange in the familiar. This means detaching ourselves from common explanations by taking a new look at society.

Origins of sociology

- Began in the late 19th century (1800s)
- 2 major world events kick it off
 - French revolution
 - Industrial revolution

Early thinkers and their ideas

August Comte

- Invented sociology by bringing together the Greek word *socius* or companion and the Latin words *logos* or study. He proposed that to understand society, it should be analyzed as it really was.
- French (1798 – 1857)
- Father of Sociology

- Main concern was the improvement of society
- Positivism
- Social statics
- Social dynamics

Harriet Martineau

- English (1802 – 1876)
- Translated Comte's book, "Positive Philosophy"
- Society in America
 - Pioneer in feminist theory
 - Link between slavery and the oppression of women

Karl Marx

- Forerunner of conflict theory. Marx a native of Germany wrote "The Communist Manifesto" with Friedrich Engels in 1847. This book focused on the misery of lower classes caused by the existing social order.
- German (1818 – 1883)
- Concern for the poverty and inequality of working class
- Societies will be composed of two classes
 - Bourgeoisie (capitalists) & Proletariat
 - Class conflict

Herbert Spencer

- Associated with the birth of sociology in his native England. He likened society to an organism, with a life and vitality of its own. He first used the phrase "Survival of the Fittest".
- English (1820 – 1903)
- Higher education was self-taught
- Society → Human body
 - Social Darwinism

Emile Durkheim

- First French sociology. Durkheim put forwards the idea that individuals are more the products rather than the creators of society; the society itself is external to the individual.
- French (1858 – 1917)
- Believes that society exists because of the broad agreement among members of society
 - Mechanical solidarity
 - Organic solidarity
 - Ex: People ↔ Bankers

Max Weber

- Of Germany is the most important proponent of interpretive sociology. Weber believed that a sympathetic understanding, verstehen, of the mind of others was essential to understanding the behavior of others.
- German (1864 – 1920)
- Single most important influence on the development of sociological theory

Jane Addams

- American (1860 – 1935)
- Used concerns of corruption & business practices that harmed workers to take action
- Hull House: service the provides help to those who needed it

W.E.B. DuBois

- American (1868 – 1963)
- Focused on racial issues in and out of the US
- Founder of NAACP

Holistic study of humanity: Anthropology

Anthropology is derived from the two Greek words, *anthropos* and *logos* which intensively studies humans and the respective cultures where they were born and actively belong to

Anthropology is considered as the father or even grandfather of all social and behavioral sciences like sociology, economics and psychology, to name a few. The discipline had its humble beginnings with early European explorers and their accounts

Historical Beginnings

The father of American Anthropology, Franz Boas, strongly believed that the same method and strategy could be applied in measuring culture and human behavior while conducting research among humans, including the uniqueness of their cultures.

Two early American anthropologists, Alfred Kroeber and William Henry Morgan, became prominent in the field since their specialization include championing of indigenous rights, like traditional cultural preservation and ancestral domain of the American Indian tribes they intensively studied.

Ruth Benedict who became a specialist in anthropology and folklore, and authored one of the three famous books utilized in the academic scene for reference purposes, known as Patterns of Culture.

Margaret Mead who was very much described in the academic circle as controversial for intensively studying the sexual practices among native populations.

Bronislaw Malinowski founded the strategy of participant observation, which is central to ethnography and ethnographic approach that involves unstructured interviews and surveys.

The Study of Politics: Political Science

In general, defining politics depends on one's perspective. A person's principle may affect his view on politics. But generally, politics is associated with how power is gained and employed to develop authority and influence in social affairs. It can also be used to promulgate guiding rules to govern the state. It is also a tactic for upholding collaboration among members of a community, whether from civil or political organizations.

Concept of Politics

Politics is allied with government which is considered as the ultimate authority. It is the primary role of the government to rule society by stipulating and transmitting the basic laws that will supervise the freedom of its people. Each form of government possesses power to attain order that should lead towards social justice.

Power	Order	Justice
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It is the ability to influence others, it gives authority to lead	It is attained through obedience on the rules set by leaders	It is felt in a society with order
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To understand the concept of politics is to recognize power, order, and justice. The process exercised by the government in the implementation of its duty is what we call politics. Furthermore, in studying politics, we systematically study the state and the government. This is known as political science.

C. Biological, cultural, and political evolution

Darwin's theory of evolution

The theory of evolution by natural selection was first formulated in Darwin's book "On the Origin of Species" in 1859.

The theory describes how organisms change over time as a result of changes in heritable physical or behavioral traits.

Changes that allow an organism to better adapt to its environment can help it survive and have more offspring.

This theory has two main points:

1. All life on Earth is connected and related to each other
2. This diversity of life came about because of modifications in populations that were driven by natural selection

Natural selection is often described as survival of the fittest, where fitness refers to the ability to survive and reproduce.

It can change a species in small ways, such as causing a population to change color or size over the course of generations. It is called microevolution. Given enough time and accumulated changes, natural selection can create entirely new species, known as macroevolution. It can turn dinosaurs into birds, amphibious mammals into whales and ancestors of apes into humans.

There is also a form of natural selection that depends on an organism's success at attracting a mate, a process known as sexual selection.

Darwin developed the theory of evolution before scientists knew about DNA. Now, scientists know that the physical and behavioral changes that make natural selection possible happen at the genetic level.

Such changes are called mutations, which can be caused by random errors in DNA replication or repair.

Origin of modern human

The origin of modern human can be explained by studying the biological, cultural, and political evolution. These developments were evident during the Neolithic Revolution, the rise of early human civilization, and the Industrial and Post-Industrial revolutions

Biological evolution explains the physical transformation of modern humans from hominids into homo sapiens sapiens. Modern humans also underwent social and cultural evolution. Humans

developed and modified their culture through time as response to threats and challenges posed by their environment. The cultural evolution of humans also included the social and political evolution of modern man.

Biological evolution

Refers to the changes, modifications and variations in the genetics and inherited traits of biological populations from one generation to another. In studying biological evolution, scientists study the changes in the physical body off humans, the changes in the shape and size of their bones, brain, dentition and fingers for instance.

It is based on the theory of evolution that was introduced by the famous English, naturalist, and geologist Charles Darwin, he introduced the concept of evolution to explain the origin of modern humans, his published works entitled "On the Origins of Species by Means of Natural Selection"

Evolution

- A gradual development of something

Biological evolution

- Refers to the changes, modifications, and variations in the genetics and inherited traits of biological populations from one generation to another
- Scientists study the changes in the physical body of humans, the changes in the shape and the size of their bones.

Cultural evolution

- Refers to the changes or development in cultures from a simple form to a more complex form of human culture.
- Culture: A way of life or design for living.

Hominid

- General term used to categorize the group of early humans and other humanlike creatures that can walk erect during the prehistoric period.
- *Sagelanthropus*
 - 6-7 million years ago
 - Had both apelike and humanlike characteristics
 - Has a skull similar to a modern human with a height almost similar with the chimpanzee. Has a brain size of 320-380 cc with small teeth and have the ability to walk upright
- *Ardipithecus*
 - “Ape of the ground”
 - Has a height of about 4 feet with a weight of about 120 pounds. Has a skull size similar to an ape with a small brain and lives in jungles and forests like the chimpanzees.
- *Australopithecus*
 - 5-1 million years ago, called the “southern ape”

- Has a brain size of 500 cc or almost 1/3 of the size of the modern human brain. They use tools but are not tool makers. Uses sticks and stones for digging, lived in a small social group and are food scavengers.
- Homo
 - Classified as humans but are not humanlike creatures because they had bigger brains and were bipedal.

Cultural evolution

Scientists study the cultural evolution of humans by analyzing the changes in the latter's way of life reflected in the different tools and other human-made objects that they have used.

Socio cultural and political evolution

Gerhard Lenski

- An American sociologist, argued that human society undergoes transformation and evolution and, in the process, develops technological advancements.

Macrosociology

- It is the study of society as a whole, not just small segments of society.

Socio-cultural evolution

- A process of change involving a society's level of innovation, transmission and technological advancement.

Lenski viewed that

- Through technology, societies will evolve, change, and survive.
- The more information (knowledge) a society has, the more advanced it will become.

Types of society

- Hunters and gatherers
- Horticultural
 - Began 12,000 years ago; semi-sedentary (semi-settled)
- Pastoral
 - Began 10,000 years ago; semi-sedentary (semi-settled); their livelihood is dependent upon the domestication of animals
- Agricultural
 - Started about 5,000 years ago; large populations; sedentary (completely settled) used improved technology (fertilizer, irrigation system)
- Industrial
 - Industrial Revolution (1780 – 1850)
 - Post-industrial
 - Began in the 1960s
 - A system based primarily on the processing and controlling of information
 - Post-modern
 - Began in the latter 1970's
 - A society preoccupied with consumer goods and media images

Political evolution and the development of early civilization

- Four major civilizations
 - Egypt, Mesopotamia, Harappan Civilization, China
- Political leaders of early civilizations were also tasked to do the following:
 - Craft laws, implement laws, impose justice and punishment, collect taxes, sometimes act as religious leaders as well.
- Social and political systems of the Sumerian, Egyptian, Indus valley, and Shang civilizations

Social class	Sumer	Egypt	Indus Valley	Shand
Political leader and highest social class	Priests and royalty	Pharaoh	Brahmin	King priest
Other social classes	Wealthy merchants and ordinary workers	Government officials, soldiers, scribes, merchants, craftsmen, peasants, slaves	Kshatriyas, vaisyas, sudras, pariah	Working class (farmers, craftsmen, soldiers)

Political evolution

A civilization develops because of a society's highly advanced level of culture, social organization, political developments, judicial system, arts and other forms of culture at a particular time.

Evolution of the Philippine Government

- Spanish Colonial Government
 - From 1565 to 1821, the Philippines was indirectly governed by the King of Spain through Mexico. From 1821 when Mexico obtained her independence from Spain to 1828, the Philippines was ruled directly from Spain.
 - With its goal of bringing the Catholic religion to the New World, Spain was also able to use the existing church governments for its own political uses. Today, religion and politics continue to mix in Latin America.
- Government in the Philippine unitary
 - The government which Spain established in the Philippines was centralized in structure and national in scope. The barangays were consolidated into town each headed by a gobernadorcillo, popularly called capitan, and the towns into provinces, each headed by a governor who represented the governor general in the province.
 - The Philippines is a republic with presidential form of government wherein power is equally divided among its three branches: executive, legislative, and judicial. Legislation belongs to Congress, execution to the Executive, and settlement of legal controversies to the Judiciary.

- Philippine revolutionary era
 - The Katipunan was a secret society that precipitated our glorious revolution on August 26, 1896. It was organized by Andres Bonifacio. The central government of the Katipunan was vested in a Supreme council. In each province there was a provincial council and, in each town, a popular council.
 - The Judicial Power was exercised by a judicial council. The Katipunan was replaced by another government whose officials headed by Gen. Emilio Aguinaldo as President, were elected in the Tajeros Convention held on March 22, 1897.
 - On November 1, 1897, a republic was established by Gen. Aguinaldo in Biak-na-bato (now San Miguel de Mayumo, Bulacan). It had a constitution which was to take effect for two years only.
 - It declared that the aim of the revolutions was the “separation of the Philippines from the Spanish monarchy and their formation into an independent state”. The Biak-na-bato republic lasted up to Dec. 15, 1897, with conclusion of the “Pact of biak-na-bato”.
 - Following the outbreak of the Spanish-American war on April 25, 1898, Gen. Aguinaldo in view of the chaotic conditions in the country, established the Dictatorial Government on May 24, 1898. The most important achievements of this government were the proclamation of the Philippine Independence in Kawit on June 12, 1898 and the reorganization of local governments.
 - In the administration of the Philippines, the Governor-General was assisted by many boards and officers, particularly the Board of Authorities and the Council of Administration. The decree-making such change stated the aim of the new government were “struggle for the independence of the Philippines, until all nations including Spain will expressly recognize it”.

A civilization develops because of a society's highly advanced level of culture, social organization, political developments, judicial system, arts, and other forms of culture at a particular time.

Political systems of civilizations have a highly centralized and well organized form of government whose leaders are powerful enough to order the building of massive infrastructure and implement new policies for citizens

D. Culture

What is culture

Culture is varied in its definition. It cannot be limited to one singular explanation

Definitions that capture the sociological understanding of the term.

It refers to the sum total of social life. It includes language, beliefs, customs, norms, food, dress, music etc. It is a set of normal by a group of people.

This group of people may live in the same geographical place; share nationality, ethnicity or beliefs.

Sir Edward Burnett Tylor

- “That complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities, and habits acquired by man as a member of society”.

To symbolic interactionists culture refers to “systems of human meaning”.

Culture also refers to the shared knowledge, beliefs, and values of members of society and may be passed on from generation to generation through the process of socialization.

Culture includes aspects of social life

- Food, dress, dance, language, music, customs & traditions, norms, ideas, beliefs.

Culture essentially speaks to a way of life shared by a group of people. Culture is dynamic. Lived reality differs over time.

Each island or geo-political territory, is characterized by its own unique, cultural practices, institutions, and belief systems. One may note that cultural similarities may be influenced by

- Political history – colonial or non-colonial domination
- Language
- Ethnic groupings
- Economic features
- Physical geo-spatial configuration of each territory.

Cultural practices influence people at the conscious and sub-conscious levels everyday.

- Subculture
 - A culture within a broader mainstream culture, people in this group have separate values, practices, beliefs, which differ from the popular culture.
 - Coexists peacefully within the larger popular culture of any given society.
- Counterculture
 - Involves beliefs, attitudes, and a way of life that opposes the general mainstream/popular culture
 - May not exist peacefully with the wider mainstream culture

Cultural studies give insight into modes of operation of people groups.

Culture is a people's way of life, a unique possession of man, a unique quality of man which separates him from the lower animals, includes all that man acquires in his social life, and is the handiwork of man and the medium which he achieves his ends.

Culture is an organized body of conventional understandings manifest in art which, persisting through tradition, characterizes a human group.

Culture is the body of thought and knowledge, both theoretical and practical, which only man can possess

Culture is that complex whole which includes knowledge, belief, art, morale, laws, customs and any other capabilities and habits as acquired by man as a member of society.

Culture and its characteristics

Aspects of culture

- Attitude, beliefs, language, customs, behavior, rituals, faith & religion, food, music, art, & drama

Culture is everything

- What the person has, does, and thinks, as part of society
- Material culture
 - Includes all tangible and visible parts of culture
- Non-material culture

Culture is learned

- It is a set of beliefs, attitudes, and practices, that an individual learns
- Enculturation: process of learning your own culture
- Acculturation: process of accommodating desirable traits from other cultures
- Deculturation: culture has been lost and even cultural traits itself is being forgotten

Culture is shared

- A behavior cannot be considered as culture if only one person practices it. Culture is shared intergenerational.

Culture varies from society to society

- Every society has a culture of its own that differs from other societies. Cultures are not uniform; the culture of every society is unique.

Culture is adaptive

- It is a tool for survival that humans use in response to the pressures of their environment

Culture is maladaptive

- Culture can also cause problems for the people who subscribe to it. These problems arise when environment is changed and culture has remained the same.

Culture is continuous and cumulative

- Culture is never static. This dynamism of culture is due to changing needs of humans as they interpret and survive in their environment.

Explicit culture

- Refers to similarities in words and actions which can be directly observed

Implicit culture

- Exists in abstract form which are not quite obvious

E. Ethnocentrism

Judging another culture based upon the values and standards set in one's own culture.

Your worldview is based on the beliefs, assumptions, expectations and values shaped by your culture's language, behavior, customs, values, religions, etc.

It is a form of bias; judging another culture as bad or wrong.

Advantages

- Develop love of the nation, culture, traditions, values, create feeling of belonging and unity

Disadvantages

- Blind faith in one's culture; disliking or making false judgments on other cultures; discrimination due to differences in beliefs.

Most of us are ethnocentric in some part of our lives. Some not even realizing that they are being ethnocentric at that moment.

Imperialism

- A policy or practice by which a country increases its power by gaining control over other areas of the world

Discriminatory towards minority communities can cause them to feel sidelined, targeted, or ignored in school. Focuses more on major developed countries & ignoring the underdeveloped ones.

When one religion or community believes that it is superior than another, it can lead to hate crimes and terrorism violence.

Definition of Ethnocentrism

- It is the practice of comparing other cultural practices with those of one's own and automatically finding those other cultural practices to be inferior.
- It is the belief that your native culture is the most natural or superior way of understanding the world
- It is a universal human reaction found in all groups and in practically all individuals
- It encourages the solidarity of the group
- It hinders the understanding or the cooperation between groups
- The conflict of course often leads to social change

Function of ethnocentrism

- Encourages the solidarity of the group
- Hinders the understanding or the cooperation between groups
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F. Cultural Relativism

View that beliefs, customs, and ethics are relative to an individual within its own social context.

Right and wrong are culture specific. What is considered moral in one society may be considered as immoral in another. No one has the right to judge another society's customs.

It is widely accepted in modern anthropology. Cultural relativists believe that all cultures are worthy in their own right and are of equal value. Diversity of cultures, even those with conflicting moral beliefs, is not to be considered in terms of right and wrong or good and bad. Today's anthropologists consider all cultures to be equally legitimate expressions of human existence.

Any society would call another society "evil" is anathema to the relativist.

It is the idea that all norms, beliefs, and values are dependent on their cultural context and should be treated as such.

G. Components of Culture

The shared products of human activity include nonmaterial and material attributes. Material culture refers to physical objects of culture, on the other hand, nonmaterial culture is made up of intangible things.

Categories of non-material culture

Symbols

- Anything that meaningfully represents something, it conveys a certain attitude toward what it represents

Language

- It is our important set of symbols, without language much of human thought would not be possible

Values

- An idea shared by the people in a society about what is good and bad, right and wrong, desirable and undesirable. Values are general abstract ideas that shape the ideas and goals of a society.

Norms

- Are expectations of how people are supposed to act, think, or feel in specific situations. Most norms are connected to social position and roles. Norms are either prescriptive or proscriptive.

Types of norms

1. Folkways
 - Have little strength and may, within broad limits, be easily broken
2. Mores
 - Norms that are strongly held, considered essential, therefore must be strictly observed. Some mores are enacted by the state and are referred to as laws
3. Taboos
 - Norms that are deeply held that even the thought of violating them upsets people

Sanctions

- A positive sanction is a reward for people who exhibit expected or desired behavior.
- A negative sanction is a form of punishment for violating important norms.
- Formal sanctions are applied by people with positions of formal authority.
- Informal sanctions are applied by common people.

Beliefs

- Beliefs consist of people's ideas about what is real and what is not. Hence, beliefs are what people consider as factual. What people judge as factual may not be scientific because our beliefs come from many sources: our parents, religious leaders and personal observation.

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Culture and counterculture

There are elements of culture that different societies share, these similar basic features, or cultural universal, arise because every human society lives within human and environmental limits.

Subculture

- An ethnic, regional, economic, or social group exhibiting characteristic patterns of behavior sufficient to distinguish it from others within an embracing culture or society.

Counterculture

- It is a culture with values and mores that run counter to those of established society.

Cultural integration occurs when cultural traits are logically consistent with one another or simply neutral to one another. Sociologists refer to a clash between what people believe and what they actually do, as a contrast, between ideal culture and real culture.

Common sources of cultural change include innovation, the production of new cultural trait; invention, the creation of new cultural products and cultural diffusion, the process by which cultural traits are transmitted from one group or society to another. Anthropologists call the process of cultural change that results from conflict with a foreign culture as acculturation.

Culture and Philippine values

Values are inherently positive, the reason a value has become a value is because it is important for the community. Values become negative when they are applied in the wrong context. What makes a value negative is not the nature of the value itself but how people apply it in particular situations.

- Respect for authority
- Strong family ties
- Bahala na mentality
- Strong desire to improve one's life
- Hiya/shame
- Getting along with others (pakikisama)
- Debt of gratitude (utang na loob)

I. Enculturation, acculturation, and socialization

The nature vs nurture debate has been going on for a long time as to which aspects of our behaviors are inherited and what are learned. Nature refers to the contribution of genetics to a given trait or condition of interest, while nurture refers to the environmental conditions and supports that influence our developments as members of society.

Socialization refers to a lifelong social experience by which people develop their human potential and learn culture. Although it is a general process, socialization always takes place in specific contexts. It is culturally specific: people in different cultures are socialized differently to hold different beliefs and values to behave in different ways.

Enculturation

The process by which a person adopts the behavior patterns of the culture he lives in.

The process by which people learn the requirements of their surrounding culture and acquire the values and behaviors appropriate or necessary in that culture. In this process, the influences that limit, direct, or shape the individual include parents, other adults, and peers.

Acculturation

One cultural group adopting the practices of another cultural group.

	Enculturation	Acculturation
Meaning	Reinforcing the basic values, norms of a culture	When the values and norms outside culture is acquired
	The 'en-' prefix means enclose, encircle	The 'ac-' prefix meaning accept, access, acclimate
Necessity	As soon as an individual is born, he/she begins to acquire the culture around him, with or without any influence	It is not an essential phenomenon in life but occurs when two cultures meet together
	It is an essential requirement for survival	It is not an essential requirement for survival

Goals of socialization

Socialization teaches impulse control and helps individuals develop a conscience

Socialization teaches individuals how to prepare for and perform certain roles

Socialization cultivates shared sources of meaning and values

Agents of socialization

Family

- The family is the single most significant agent of socialization in all societies and teaches us the basic values and norms that shape our identity

Peers

- When do peers become more important?
- We learn the role of others, from significant others to generalized others

Work, school, religion

- Social institutions that teach us how to act within our groups

Media

- The media influence the construction of the self

Roles

- The behaviors expected from a particular status
- Role conflict occurs when the roles associated with one status clash with the roles associated with a different status
- Role strain occurs when roles associated with a single status clash

J. Looking-glass-self theory and Mead's I and Me theory

Looking-glass-self theory

According to Cooley, the self is formed as a social product of the many encounters with the judgments of others.

According to the theory:

- Our understanding of how we look to others
- Our notion of the way other judge the image we think they perceive
- Our interpretation of the importance and meaning of the judgment of others

The Looking Glass Self

- First, we imagine how we appear to others
- Next, we imagine the reaction of others to our imagined appearance
- Finally, we evaluate ourselves according to how we imagine others having judged us
- So, for example, say we have a date. We decide to comb our hair a certain way. We sense that our day doesn't like our new hairdo. Therefore, we feel bad about ourselves

Charles Horton Cooley

Cooley was one of the first generation of American Sociologists, but an eccentric who differed from most of his peers. Whereas the majority of the pioneers were social Darwinists, Cooley was a less mechanical evolutionists: most were aiming to make a sociology a rigorously objective science, while Cooley was more concerned with introspection and imagination - one of the earliest of humanistic sociologists

Cooley sought to abolish the dualisms of society/individual and body/mind, emphasizing instead their interconnections and conceptualizing them as functional and organic wholes. The root problem of social science was the mutual interrelationship between the individual and social order. In his view, the concepts of the 'individual' and of 'society' could be defined only in relationship to each other, since human life was essentially a matter of social intercourse – of society shaping the individual and individuals shaping society. However, his critics did not see him as being successful in this enterprise, ultimately siding too much with the individual and idealism

George Herbert Mead

George Herbert Mead (1863-1931), American philosopher and social theorist, is often classed with William James, Charles Sanders Peirce, and John Dewey as one of the most significant figures in classical American pragmatism. Dewey referred to Mead as "a seminal mind of the very first order" (Dewey, 1932, xi). Yet by the middle of the twentieth-century, Mead's prestige was greatest outside of professional philosophical circles. He is considered by many to be the father of the school of Symbolic Interactionism in sociology and social manner on psychology, although he did not use this nomenclature. Perhaps Mead's principal influence in philosophical Perh circles occurred as a result of his friendship with John Dewey. There is little question that Mead and Dewey had an enduring influence on each other, with Mead contributing an original theory of the development self through communication. This theory has in recent years played a central role in the work of Jürgen Habermas. While Mead is best known for his work on the nature of the self and intersubjectivity, he also developed a theory of action, and a metaphysics or philosophy of nature that emphasizes emergence and temporality, in which the past and future are viewed through the lens of the

present. Although the extent of Mead's reach is considerable, he never published a monograph. His most famous work, *Mind, Self, and Society: From the Standpoint of a Social Behaviorist*, was published after his death and is a compilation of student notes and selections from unpublished manuscripts.

I and Me Theory

Mead developed a theory about how the social self develops over the course of childhood

Infants know only the "I", but through social interaction they learn about "me" and the "other"

They develop a concept of the "generalized other," which allows them to apply norms and behaviors learned in specific situations to new situations

According to Mead's theory, the self has two sides or phrases: 'me' and 'I'

The 'me' is considered the socialized aspect of the individual. The 'me' represents learned behaviors, attitudes, and expectations of others and of society.

The 'I', therefore, can be considered the present and future phase of the self. The 'I' represents the individual's identity based on response to the 'me'.

The 'me' and the 'I' have a didactic relationship

Two facets of self

- Mead made significant contribution to the development of the concept of social self in differentiating that the portion of the self that develops through the internalization of the attitudes of others from that portion which never becomes completely predictable.

Mead believed that the self is divided into two parts, the 'I' and 'me'.

According to Mead, self develops through social interactions - a set of situations where individuals learn to assume roles and meet the increasing level of complexity of each situation

Mead proposed a four-stage process of the development of the self, his proposal is unique in that he believed that the self is not something inborn rather the self-start to evolve at the moment of interaction

- Imitation
- Play
- Game
- Generalized others

K. Conformity and deviance

The meaning of a person's social existence, say business success, is not defined by the person himself or herself alone. Rather this set of goals is preset by society and through the various forms and mechanisms of socialization, becomes self-embraced goals.

Deviance

Defined by a behavior that violates significant social norms and is disapproved by majority of people. The sociology of deviance is concerned primarily with violation of behaviors that are

considered unacceptable or offensive behavior majority because society subjects all of us to control

It is a behavior perceived as violating some widely-known and shared moral value or norm of a society or group culture. As a product of society, deviance exists only in relation to cultural norms. One may deviate either by resisting social norms, or by observing them more fully than the average person.

Types of deviance

- Primary and secondary deviance
 - Primary deviance refers to a person's behavior which violates or does not conform to a prescribed norm of conduct but is tolerated or concealed by others.
 - Secondary deviance refers to the behavior of a lifetime conformist or the behavior of a branded criminal
- Individual and group deviance
 - Individual deviance refers to a violation against a group's norm or subculture. Group deviance refers to the act of members of a group to conform to the group's norms but which disagree with norms of the larger society.
 - Individual deviance examples: Eating or drinking something that is not allowed in your religion
 - Group deviance examples: street gangs and cults

Reasons for deviance

- There is different perspective for the causes of deviance. For biologists, deviance is caused by factors coming from within the individual. While sociologists say that factors outside the individual cause deviance. Finally, according to psychologists, deviance is caused by differences in their personalities.

Social control

- Refers to the techniques and strategies for regulating human behavior in any society

Types of sanctions

- Informal sanctions
 - Unofficial, often casual pressures to conform. Positive informal sanctions involve reward for conformity or compliance
- Formal sanctions
 - Official, institutionalized incentives to conform and penalties for deviance. Needed in large complex societies. Criminal justice system is the most important and visible institution of social control. They may take form of arrest, sentencing, or imprisonment.

Being a member of a society entails certain responsibilities or roles that must be accomplished. If these roles were not met, problems will start to come up. This is the reason why we have institutions or authorities that render punishment to the offenders.

Conformity

Conformity means following the acceptable patterns of human behavior. Some degree of conformity to group norms is necessary because the continuity of social life is safeguarded by formal and informal means of social control, censure, and punishment of those members who refuse to follow the acceptable patterns of behavior.

Robert Merton's Strain Theory

Sociologist Robert Merton agreed that deviance is an inherent part of a functioning society, but he expanded on Durkheim's ideas by developing strain theory, which notes that access to socially acceptable goals plays a part in determining whether a person conforms or deviates. From birth, we're encouraged to achieve the "American Dream" of financial success. A woman who attends business school, receives her MBA, and goes on to make a million-dollar income as CEO of a company is said to be a success. However, not everyone in our society stands on equal footing. A person may have the socially acceptable goal of financial success but lack a socially acceptable way to reach that goal. According to Merton's theory, an entrepreneur who can't afford to launch his own company may be tempted to embezzle from his employer for start-up funds.

Merton defined 5 ways people respond to this gap between having a socially accepted goal and having no socially accepted way to pursue it

- Conformity
 - Those who conform choose not to deviate. They pursue their goals to the extent that they can through socially accepted means
- Innovation
 - Those who innovate pursue goals they cannot reach through legitimate means by instead using criminal or deviant means
- Ritualism
 - People who ritualize lower their goals until they can reach them through socially and acceptable ways. These members of society focus on conformity rather than attaining a distant dream
- Retreatism
 - Others retreat and reject society's goals and means. Some beggars and street people have withdrawn from society's goal of financial success.
- Rebellion
 - A handful of people rebel and replace a society's goals and means with their own. Terrorists or freedom fighters look to overthrow a society's goals through socially unacceptable means.

Structural strain theory

- Merton offered a "side-by-side" formulation of conformity and deviance. He developed the structural strain theory that traces the origins of deviance to the tensions that are caused by the gap between cultural goals and the means people have available to achieve those goals

Forms of deviance in relation to goals and means

Modes of Adoption	Cultural Goals	Institutionalized Means
Conformity	+	+
Innovation	+	-
Ritualism	-	+
Retreatism	-	-
Rebellion	+/-	+/-

Labeling theory

Proposes that people come to identify and behave in ways that reflect how others label them.

Labeling theory is rooted in the idea if the social construction of reality.

In the 1960s, modern sociologist Howard Becker interpreted deviance as a process of symbolic interaction.

It begins with the assumption that no act is intrinsically criminal. Definitions of criminality are established by those in power through the formulation of laws and the interpretation of those laws by police, courts, and correctional institutions.

Central ideas in symbolic interactionism

- Collective action, meaning more than one person is involved; we should not focus on the deviant person alone, but rather the interaction between the supposed deviant, and the person labeling them as one
- Symbolic, the interaction between the supposed deviant and the conformist is governed by the meanings they attribute to each other's actions; how do people react to an act is much more important than the action itself

Who labels who?

- Typically, people with the power do the labelling
- It's been proven that rich or white people are able to label others as deviant. Thus, a poor black person is more likely to be arrested, prosecuted, or convicted as a criminal

- That's why today there is social groups like black lives matter, that are exposing such norms in the society

Consequences

- One of the drawbacks of this theory is that labeling theorists don't have concrete examples of consequences for the "labelers", the people who determine whether someone is deviant or not. However, they do for the labeled individual.
- Once people are labeled as deviant, they are likely to see themselves as deviant, which leads them to continue the deviant behavior
- Primary deviation: first act of deviance; another person determines that the action is deviant
- Secondary deviation: when the person commits the act again, and continues to; person now knows that they are being deviant in doing so
- Theorists believe that the consequences of the deviant person promote a better society
- People will look at this person and not want to end up where they are. They won't act the same way.
- Even though the theory is very popular in sociology, it is highly criticized as well.
- Many say that it doesn't explain what causes the action of deviance.
- Why do some commit the act while others don't?
- Why is the act considered deviant in some societies and not in others?

Social control theory

It is a type of functionalist theory that suggest that deviance occurs when a person's or group's attachment to social bonds is weakened. According to his view, people care about what others think of them and conform to social expectations because of their attachment to others and what others expect of them.

This theory was stated by Travis Hirschi.

- He was born in April 15 1935 in Rockville Utah
- He received a PhD in the University of California (Berkley) in 1968
- He is known for his social control perspective on juvenile delinquency and his self-controlled perspective
- In 1969 he came up with the theory called "causes of delinquency" defined the absence of social bonds.

The social bonds are based on the idea that everyone is born a criminal; yet, the question this theory sites from is "what makes individuals not criminals"

There are 4 major social bond elements

- Attachment
 - Children needs to be attached to someone with a positive attitude and a good life style, because technically what they see is what they learn to be
 - A good role model will teach the child about a healthy lifestyle and not a criminal life. He/she will teach the child to be a conformist and not rebellious
- Commitment
 - It is good for a child to set goals in life for him/her self. This will make the child committed to achieving his/her life goals

- Most often if a child is committed to a goal like going to college and acquiring a good career, they will achieve good in school and will keep away from trouble
- Involvement
 - Involvement is about giving children activities to learn from. In other words, this is having children occupied on something positive to keep them away from any criminal activity.
- Belief
 - Since you are a kid, morals are a great factor of being part of society. Believing in morals is important, because without morals an individual would think it is okay to commit crimes.

Social bonds

- When any of these bonds are broken the person becomes known as “a free individual”. They become free of the morals that prevent any of us from pursuing crime.

In 1990, with the contribution of Michael R. Gottfrezon, Hirschi stated “The General Theory of Crime”. This theory defines crime as “A pursuit of self-interest”

L. Social Groups

When individuals aggregate physically in a given space, they do not necessarily make a social group. They are just a collection of warm bodies who happened to be together in one space or who may happen to share a set of common characteristics.

Social aggregates

- Simple collection of people who happened to be together in a particular place but do not significantly interact or identify with one another.
- 3 forms
 - Crowd
 - Characterized by a group of individuals who share a common motive and are in the same physical space. A crowd can form spontaneously, without the need for prior communication from the subjects
 - Mass
 - It is a “virtual” grouping of individuals who, when inserted in the body of the masses, lose their individual characteristics. It is referred as a “virtual” grouping, as there is no physical contact or direct interaction between those who make up the mass.
 - Public
 - Characterized by being a group of people without a specific form, who respond to the same stimulus spontaneously. The main characteristic of this type of social aggregate is its capacity for interaction between the individuals that form the public and the source of the stimulus that originally aggregated them

Social categories

- People who share a common characteristic such as gender or occupation but do not necessarily interact or identify with one another.
- A collection of people that have certain characteristics or traits in common, but they tend not to interact with each other on a regular basis.
- One of the defining factors of a social category is that the individuals are connected by characteristics and traits, but they generally have no connection beyond that. This is important to note because it differentiates social categories from social groups, which are collections of people with shared characteristics that do interact and acknowledge their connections to each other.

Social interaction

- It is the building block of sociology. Sociology is the study of society, in order to understand society, sociologists have to observe the social interaction among individuals.
- It is the process through which individuals in the society act and react towards each other.
- In sociology, social interaction is a dynamic, changing sequence of social actions between individuals or groups.
- It is the fundamental factor and foundation of the social processes, social group, social structure, social order, and social function.
- 2 types of social interaction
 - Interaction focused
 - Interaction between a group of people who have a common goal. These people may have been familiar with each other in the past, or may have become familiar in the first moment of their focused interaction
 - Interaction not focused
 - It does not include any common goal or familiarity, even during the interaction process. In fact, people who interact may not be aware of their interaction
- 4 categories of social interaction
 - Exchange
 - It is the most basic type of social interaction. Whenever people interact, they make an effort to receive a reward or a return for their actions. This reward reflects that an exchange has occurred
 - It is a social process by which social behavior is exchanged for some kind of reward, for an equal or greater value
 - Competition
 - It is a process through which two or more people try to meet a goal that only one can achieve
 - It is a common feature of western societies, and the cornerstone of the capitalist economic system and the democratic form of government

- Most sociologists see competition as positive, as something that can motivate people to achieve goals
- Cooperation
 - It is the process in which people work together to achieve shared goals
 - It is a social process that leads to action; no group can complete its tasks or achieve its objectives without the cooperation of its members
- Conflict
 - A process by which people face physically or socially
 - One of the most obvious examples is war, but conflict can also be demonstrated in our daily interactions, such as legal disputes and arguments about religion and politics

Group and social interaction

Social interaction consists of acts of people perform toward one another and the responses they give in return. When people interact, two main things can be observed. The first is the status (ascribed and achieved status) of the people trying to interact and the role – expected behavior associated with a status.

Social groups

It can be defined as a collection of people who regularly interact with one another on the basis of shared expectations concerning behavior and who share a sense of common identity. With these qualifications as to what constitute a group, the categories of groups are described using some standards.

Primary group

- This is typically a small social group whose members share close, personal, and enduring relationships. Primary groups are marked by the member's concern for one another and shared activities and culture. The members of primary groups feel a strong personal identity with the group.

Secondary group

- These groups can be small or large and they are mostly interpersonal and usually short-term. These groups are typically found at work and school, although group members may have similar interests, the purpose of the group is about the task instead of their relationships.

Reference group

- This is a group to which we compare ourselves. Reference group, such as those of college freshmen, serve as standard against which behaviors and attitudes are measured. Reference groups may be classified as in-groups or out-groups.
- In group
 - Social groups to which an individual feels he or she belongs, one feels loyalty for these groups

- Out group
 - Social groups that an individual does not identify with, one feels antagonism and contempt for these groups

Voluntary group

- You belong to the group because you chose to join

Involuntary group

- You belong to the group because members were assigned

M. Kinship, marriage, and household

Kinship, marriage, and household are important key concepts in the study of society and culture. Anthropologists and sociologists examine these concepts across different cultures and societies.

Kinship

Kinship is a social institution that refers to relations formed between members of society. It explains the nature and reason for the formation of different types of bonds that exists within society. Societies develop kin relationship in different ways. It can be based on birth or blood relations, marriage or through the acceptance of rituals.

Kinship by blood

- Consanguineal Kinship or kinship based on blood is considered as the most basic and general form of relations. The relationship is achieved by birth or blood affinity. The relationship existing between parents and their children, between siblings, and between nephews and aunts/uncles are examples of this type of kinship.

Kinship by marriage

- Affinal kinship or kinship based on marriage refers to the type of relations developed when a marriage occurs. When marriage takes place, new forms of social relations are developed. Marriage is an important social institution wherein two persons, a man and a woman enter into family life.

Kinship by rituals

- Compadrazgo, literally translated as “godparenthood”, is a ritualized form of forging co-parenthood or family. Through the compadrazgo set-up, a relationship between the child’s biological parents, their children and person close to the parents but not related by blood become a family.

Kinship of politics

- Politics have also been influenced by kinship relations. In the Philippines, most politicians elected in public offices and government positions are relative. This is known in politics as political dynasties.

Fundamental concept of family

A family is founded in a single household, commonly united by ties of marriage and blood. Family is considered the basic unit of social organization, it is made of a group of individuals who are linked together by marriage, blood relations or adoption.

Types of families

- Nuclear family
 - Made up of a group of people who are united by social ties, usually made up of two adults and socially recognized children.
- Extended family
 - It is a type of family whose members go beyond the nuclear family; it can also be called as consanguineal family – expands as we grow through the family of procreation.
- Blended family
 - It is a type of family where the parents have a child or children from the previous marital relationships but all the members stay and congregate to form a new family unit.

Marriage

Marriage is an important social institution wherein two persons, a man and a woman enter into family life. During this process, the partners make a public, official and permanent declaration of their union as lifetime couples.

Marriage across cultures

- Endogamy
 - Compulsory marriage in their own village, community, ethnic, social or religious group
- Exogamy
 - Marriage custom where an individual is required by society's norms and rules to marry outside their own group, community or social classes.
- Monogamy
 - Marriage or sexual partnering custom or practice where an individual has only one male or female partner or mate
- Polygamy
 - Marriage custom or practice of having more than one partner or sexual mate. It can be polygyny or polyandry.
- Child marriage
 - Happens when parents arrange for the marriage of their child long before the marriage takes place
- Exchange marriage
 - Happens when there is a reciprocal exchange of spouses between two countries, tribes or groups
- Diplomatic marriage
 - Happens when an arranged marriage has been established between two royal or political families
- Modern arranged marriage
 - Happens when the child's parent with consent of the child, choose from several possible mates.

Post marital residency rules

Patrilocal rule of residence

- Occurs when married couples stay in the house of the husband's relatives or near the husband's kin.

Matrilocal rule of residence

- It happens when the couples live with the wife's relatives or near the wife's kin.

Biolocal residence

- It happens when the newlywed couple stay with the husband relatives and the wife's kin alternately.



PHYSICAL EDUCATION 3

PHYSICAL EDUCATION 3

A. Introduction to dance

What is dance

Dance differs from athletics or other daily activities because it focuses primarily on an aesthetic or even entertaining experience.

Benefits of dance and creative movement

Physical

- Develops cardiovascular and muscular endurance
- Improves coordination, balance, flexibility, and body composition
- Lowers risk of cardiovascular disease
- Lowers Body Mass Index (BMI)
- Lowers resting heart rate
- Improve lipid metabolism
- Enables joint mobility
- Helps improve and maintain bone density, thus helps prevent osteoporosis
- Helps recover coordination and neuromuscular skills after injury

Mental/emotional

- Helps keep the brain sharp
- Decreases incidence of dementia and Alzheimer's disease
- Decreases depressive symptoms
- Increases self-esteem and improves body image
- Aids in releasing emotional and physical tension

Social

- Gives sense of togetherness within a group.
- Encourages positive social interaction and interpersonal relationship in a group
- Contributes to the individual's potential for self-actualization in society

Cultural

- Promotes cultural values

B. Elements of dance

Space

- The area that performers occupy and where they move. It can be divided into 4 aspects known as spatial elements.
 - Direction: The dance movements going forward, backward, or sideward
 - Size: Movements can be varied from doing larger or smaller actions
 - Level: Movements can be done in a high, medium, or low
 - Focus: Refers to the direction where the performers look

Timing

- Refers to the execution in varying tempo. Performers move with the tempo on an underlying sound, known as beat or pulse.
- The timing can be varied by moving faster or slower than the normal beat. When a sequence of movement or group of phrases is done in varying tempos, they generate rhythmic patterns

Dance energies

- Movements propelled by energy or force. A force can either initiate or stop an action. Dance uses different energies and a varied use of these minimizes the monotony of the movements in a performance
- Qualities of dance energies
 - Sustained
 - Movements are done smoothly, continuously and with flow and control. It does not have a clear beginning and ending
 - Percussive
 - Movements are explosive or sharp in contrast with sustained movement. They are accented with thrust of energy. They have a clear beginning and ending
 - Vibratory
 - Movements consist of trembling or shaking. A faster version of percussive movements that produces a jittery effect
 - Swinging
 - Movements trace a curved line or an arc in space. The movements are relaxed and giving in gravity on the downward part of the motion, followed by an upwards application of energy.
 - Suspended

- Movements are perched in space or hanging on air. Holding a raised leg in any direction is an example of a suspended movement.
- Collapsing
 - Movements are released in tension and gradually or abruptly giving in to gravity, letting the body descend to the floor. A slow collapse can be described as a melting or oozing action.

Bodily shapes

- Refers how the entire body is molded in shapes or the configuration of body parts
 - Symmetrical
 - Balanced shape, movements are practically identical or similar on both sides.
 - Asymmetrical
 - Unbalanced shape, movements of two sides of the body do not match or completely different from each other.

Group shapes

- A group of dancers perform movements in different group shapes. They are arranged in ways that are wide, narrow, rounded, angular, symmetrical, or asymmetrical and are viewed together as a total picture or arrangement within a picture frame.

C. Dance appreciation and composition

What makes a good dance?

A good dance has a beginning, middle, and end/conclusion. All works, whether it is sports, music, or dance, must have a form brought to their elements by means of orderly arrangement, meaning and purpose called as form.

Form

The instrument by which ideas and elements are arranged or combined into a logical sequence which results in unity and consistency, and by means of which the content or idea can be expressed and communicated. It is the organizing factor of any work or dance composition.

Form should progress through time from the beginning to the end of the choreography. Each section is composed of several units that are smoothly connected to each other, known as phrases.

Motif

A single movement or a short phrase of movement that embodies the style and intention of the dance. A good dance uses motif in which the movements are repeated, varied and developed by manipulating the movement components or elements.

Characteristics of a good dance

Unity

- The interconnected phrases of the dance are coherent and flow smoothly together. The movements fit together and each play an important role that contributes to the entirety of a dance.

Continuity and development

- The phrases of the dance that are organized progressively, making each movement phrase and the audience is swept along the end.

Variety and contrast

- Variety and contrast in movement phases add excitement and flavor in the dance. Changing the direction, use of energy, timing of a movement phrase, and avoiding repeating them in the exact way are ways to add variety of the dance.

Transition

- This is the link between movements, phrases, and sections of the dance. It makes the logical progression of the dance flow smoothly. Also, it is vital because it keeps the unity and continuity of the dance.

Repetition

- Some phrases need to be repeated in choreography so that the audience can see those movements again and identify its significance. Usually, when a certain phrase or a section of choreography is repeated, it is the main message of the dance. This function to make clearer the meaning or intention of the dance.

Climax

- It is similar to a climax in a story to where a series of events culminates. The climax may be a fast and enraged blast of energy and action, or it could fade away to a gentle and quiet exit that marks the end of a particular story.

D. Choreographic dance forms

Sequential forms

- These forms contain themes/motif which progress in a specific order. They are arranged accordingly.
- AB (two-part) form
 - Binary form with two contrasting sections consisting of a beginning section (A) followed by a second section (B). Each section contains elements that contrast in tone or quality.
- ABA (three-part) form
 - Composed of introductory theme (A), a contrasting theme (B), and a restatement of the original theme (A).
 - (A) is the unifying theme as an exact repetition or on an easily recognizable variation or development
- Rondo form (ABACA)
 - In this form, the unifying theme (A) returns after each contrasting theme. (A) appears after every contrasting section at least three times but it can itself be varied
- Theme and variations form
 - The motif is a series of movement to which variations are added throughout the development of the entire choreography
 - The motif/theme can be a single phrase or several movement phrases placed together in a sequence

Contrapuntal forms

- Ground bass
 - Single theme starts the dance and is repeated all the way through the dance while other contrasting themes are simultaneously performed with it
- Round or canon
 - Consists of two or more movement phrases or theme in which the main movement phrases is imitated exactly and completely by the successive movements, but done in a staggered manner
- Fugue or accumulation
 - A choreographic form that is constructed by adding on different movement or dance phrases in every repetition of the main movement theme
- Suite
 - Every section of the dance use different tempos and qualities. Commonly, it has a moderate beginning, a slow middle section and a fast and lively end section

Episodic forms

- Not a musical form, instead, they are found in literature. They tell a story through connected and progressive sections called episodes

Compositional forms

- Neutral structures
 - Mostly come from natural structures such as seasons, life cycle, and everyday life experiences. All these present rich materials for organic dance structures.
- Collage
 - Consists of a series of movement phrases that are often unrelated but have been brought together to create a single dance with a beginning, a middle, and an end
- Tableau
 - Different movement phrases performed by different dancers simultaneously in the same space. The dancers may execute a tableau at a different location on the stage and connect transitional movements for each scene to produce a progression of moving snapshots
- Chance
 - The movement phrases are performed in random order and spatial placing. Every time the dance is performed, it is done in different order and therefore has a different appearance

E. Evaluating a good dance

The success of any dance performance may depend on who the evaluators are. Appreciation on the importance of dance comes from the points of view of the choreographers, the dancer, or the audience

Choreographers

- They will evaluate a part of an ongoing process of developing a personal style which is both spontaneous and organized

Dancers

- They will evaluate according to the specific demands that the performance places them

Audience

- They will evaluate according to the particular context of the dance

Dance critique

- Description
 - Involves close observation of all the elements, characteristics, and components of a dance
- Interpretation
 - Involves an appreciation of the ideas, content, images, and style contained within the dance
- Evaluation
 - Takes into consideration how effectively the features and the context of the dance have been utilized in the actual performance of the dancers to portray the content and quality of the dance

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I. National Dances

Tinikling

- To do things in a tikling-like manner
- Filipino folk theatrical dance that originated during the Spanish colonial period
- One or more dancers stride over and in between bamboo poles
- Involves locomotor motions
- Danced to a rondalla music
- Rondalla: a type of serenade played by a stringed ensemble that dates back to the Middle Ages of Spain
- Performed on major events such as traditional Filipino festivals or school and theater performances
- History and background
 - Originated during the Spanish occupation of the Philippines, mainly on the island of Leyte during the 1500s
 - Represents the attempts of Filipino rice farmers to catch and prevent the Tikling bird from stealing ripe rice grains from the fields
 - Locals are said to have imitated the movement of birds, leading to the creation of Tinikling

- When locals were compelled to work on vast plantations by the king of Spain, those who defied his orders or worked too slowly were forced to stand between two bamboo poles as a punishment
- Francisca Reyes-Aquino
 - Filipino folk dancer and cultural researcher who helped preserve numerous Filipino cultural traditions including the Tinikling
 - A recipient of the Republic Award of Merit and the Ramon Magsaysay Award and is a designated National Artist of the Philippines for dance

J. Philippine Folk Dance

History

Folk dance in the Philippines has a rich and diverse history that includes contributions from immigrants and colonizers

Historical events, such as the arrival of the Spaniards in the 16th century and clashes with the Moors, have inspired several Philippine dances

According to Philippine mythology, many gods and goddesses had to be honored by dancing rituals to bring about certain natural phenomena, including rain and harvests

Finally, folk dances from the Philippines have been saved, shared, and treasured worldwide as the country has become a part of the global dance community

Prominent people

Lucrecia Reyes-Urtula

- A Filipino choreographer, theater director, teacher, author, and researcher on ethnic dance
- She worked on translating folk dancing into the realm of theater
- She adapted indigenous dance traditions to the demands of the modern stage, and performances of her works received international attention

Ligaya Fernando Amilbangsa

- Born in 1943, she was taken to a prominent Catholic political family in Marikina, Metro Manila, Philippines
- She established the AlunAlun Dance Circle in Antipolo in 1999
- She is a Filipino academic known for her studies and promotion of the pangalay dance tradition

Alice Reyes

- She started pursuing dancing when she was young
- She was known as the visionary founder of ballet in the Philippines
- She is one of the National Artists for Dance in the Philippines

Leonor Orosa-Goquingco

- She was a Filipino National Artist in Creative Dancing and is one of the most notable people who led to the development of contemporary Philippine folkloric dance
- She produced various dances such as “Circling Globe” (1939), “Dance Panorama” (1939), “The Elements” (1940), etc.

- She was awarded as one of the National Artists of the Philippines in 1988

Examples

Pandango sa Ilaw

- One of the oldest folk dances in the Philippines
- It has many versions, and used candles instead of oil lamps
- The dance is a waltz-style and is a story about a couple

Itik-itik

- Philippine folk dance form created by imitating the “movements of a duck” such as wading, flying, and short steps and splashing water on their backs like ducks.
- This mimetic folk dance is said to have originated from the province of Surigao in the Philippines

Carinosa

- Philippine dance of Hispanic origin from the Maria Clara suite of Philippine folk dances.
- Originated in Panay Island and was introduced by the Spaniards during their colonization in the country
- It was initially danced with Maria Clara dress and Barong Tagalog for it was a Maria Clara Spanish dance when it was introduced

Maglalatik

- Created to represent the fight between the Moros and the Christian community over latik.
- The costumes used in this dance style will depend on the community the performer is representing.
- In terms of technique, this dance is basically divided into 4 parts namely baligtaran, palipasan, paseo, and escaramusa.

K. Regional Classification of Dances in the Philippines

Cordillera Dances

The tribes that live in the Cordillera mountains have reigned over the area even before the Spanish invasion. The Cordillera is the name given by the Spaniards when they first arrived in the mountain range, meaning “knotted rope”.

These traditions survived for centuries, and the tribes continue to maintain their cultures amid the changing times.

Igorot tribes

- Any of the various ethnic groups in the mountains of Northern Luzon, translating to “mountaineers”.

Example dances

- Banga
 - The word “banga” literally means pots. This dance is from the Kalinga tribe from the Mountain Province. The dance illustrates the grace of a tribe known as fierce warriors.
- Bendayan
 - This circle dance originates from the province of Benguet. It is long known as a dance to celebrate the arrival of successful headhunters.
- Salip
 - This dance celebrates important events in life such as birth, wedding, victory in war, and thanksgiving.
- Ragsaksakan
 - This dance portrays the walk of the industrious Kalinga women.
- Lumagen/tachok
 - When the Kalinga gather to celebrate a happy occasion like the birth of a first-born baby boy, a wedding, or a budong (peace pact), the Tachok dance is performed.

Lowland Christian Dances

Dances coming from places with western influences such as Tagalogs, Ilokanos, Bisayans, and Bicolanas.

The typical attire of these dances includes the colorful balintawak and patadyong skirts for the women, and camisa de chino and colored trousers for the men.

These dances illustrate the fiesta spirit and demonstrate a love of life. The same can be said for the native Philippine folk songs – Bahay Kubo, Magtanim, Leron Leron Sinta, to name a few. They express joy in work, a love for music, and pleasure in the simplicities of life.

These dances are influenced by Hispanic and European cultures.

Example dances

- Binasuan
 - Meaning “with the use of drinking glasses”, this vibrant dance shows off balancing skills of the performers.
- Itik-itik
 - According to the history of this dance, a young woman named Kanang (short for Cayetana) began improvising her steps in the middle of her performance imitating the movements of an itik.
- Sayaw sa salakot
 - The “salakot” is a traditional wide-brimmed hat typically made of rattan or reeds and worn by farmers. In this dance, the hats are embellished and enhances the graceful dance movements of the dancers.

Muslim Dances

Islam was the first-recorded monotheistic religion in the Philippines. It reached the Philippines in the 14th century with the arrival of the Muslim traders from the Persian Gulf, southern India, and their followers from several sultanate governments in the Malay Archipelago.

The ethno-linguistic groups who dance Muslim dances are primarily considered Muslim from tribal groups of Maranao, Maguindanao, Samal, and Tausug. The dances are characterized by vivid colors and rhythmic movements which reflect the influence of Indo-Malaysian cultures.

Example dances

- Pangalay
 - Native to the Badjao, sometimes known as the “sea gypsies”. Pangalay is a dance that emphasizes the agility of the upper body.
- Asik
 - A solo slave dance performed by the umbrella-bearing attendant to win the favor of her sultan master.
- Singkil
 - Takes its name from the bells worn on the ankles of the Muslim princess. Perhaps one of the oldest of truly Filipino dances, the Singkil recounts the epic legend of the “Darangan” of the Marano people of Mindanao.
- Pangsak
 - The Yakan are a Muslim ethnic group in the highlands of Mindanao. They wear elaborately woven costumes tightly on their bodies. Their dances involve complicated hand and foot movements.
- Pagapir
 - Depicts a royal manner of walking among the Maranao people who live mainly around Lake Lanao. Ladies of the royal court perform this stately dance in preparation for an important event.

L. Ethnic Dances

An ethnic dance is a dance that is indigenous to a certain race or country. The term ethnic is used to distinguish religious dances, and designed as hymns of praise to a god, or to bring on good fortune in peace and war. They are symbolic in meaning that can't be understood easily by persons who don't belong to the ethnic group.

Folk dances and ethnic dances are not the same. A folk dance reflects the life of the people of a specific country or region. Ethnic dances on the other hand are those performed in primitive tribes and have retained close kinship with religious ritual and community custom. Nearly all folk dance are ethnic dances while not all ethnic dances are folk dances.

Types of Ethnic Dances

Ritual dance

- This dance aims to connect the material world to the spiritual.

Life-cycle dance

- This dance aims to celebrate an individual's birth, baptism, courtship, wedding, and demise.

Occupational dance

- This dance transforms defense and livelihood activities to celebratory performances.

Example dances

Dugso

- Ritual dance from Bukidnon
- The Dugso shows the Higaonon performing the ritual of hinaklaran wherein the men and women hold hands while moving around in measured steps named after a peculiar body movement. The women are also dressed in colorful dresses and panikas or feathered combs full of colorful yarns, mirrors, beads, and gold spangles.

Pagdidiwata

- Ritual dance from Palawan
- A dance originating from the Tagbanua tribe of Palawan which depicts rituals after a rice harvest. These rites are held as part of thanksgiving and part appeal for continued protection.

Salip

- Life-cycle dance from Apayao
- This dance celebrates important events in life such as wedding. A Kalinga wedding dance is an important celebration. The bridegroom offers the bride the protection and comfort of his blanket. He simulates the movements of a rooster at love play, aspiring to attract and seize his love. The bride's friends are ready to help prepare the bride by offering "bangas" (earthen pots) filled with fresh water from the mountain spring.

Binasuan

- Life-cycle dance from Pangasinan
- A Filipino folk dance that involves dancers balancing glasses of wine on their heads and the palms of their hands.

Kin-naras

- Occupational dance from Ilocos Sur
- Far north of the Philippines is Kin-naras, a dance from Cabugao, Ilocos Sur depicting the various ways of catching fish. It is a graceful dance, allowing the dancers to display their skills in trapping and catching fish with their bare hands.

Importance of Ethnic Dance

Ethnic dances represent history, culture, and tradition of the people in the ethnic group. It is really important because this is a way to tell other people on what are the things that they need to know about your culture. It is also a way for other people to be able to show respect, knowledge, and give importance to your traditions and norms.



CHRISTIAN LIVING EDUCATION

A. Christian Hope

Meaning of hope

We all face difficult moments of darkness and anxiety when things can become difficult. Some may become disillusioned with life and lose hope. During these challenging times, hope can also be misunderstood.

We may think that it is having a positive attitude or being optimistic. We may place our hope in things of this world, such as our work or charitable projects, thinking they will bring us happiness.

Hope

- (Noun) A feeling of expectation and desire for a certain thing to happen.
- (Noun) A feeling of trust.
- (Verb) Want something to happen or be the case.

Christian Hope

Hope is the characteristic Christian virtue, since nothing like it is quite possible for the non-Christian. True hope is not built on human words or assurances, but on God's Word and His promise of salvation and eternal life.

It is our longing for the fulfillment of God's Kingdom that comes from the grace to trust in Jesus Christ who promised us life everlasting.

Our passionate longing for a more complete way of living our lives in the here and now – where all seek the peace, love, and justice that should reign.

Heaven is the ultimate language of hope.

Objects of Hope

- Resurrection of the Dead (1 Thes 4:13)
- God's Glory (Rom 5:2)
- New Dispensation of the Spirit (Cor 3:13)
- Salvation (Cor 1:10)
- Right relation with God (Gal 5:5)
- Eternal life (Tim 1:2)
- Victorious second Coming of Christ (Tim 2:13)

Grace of God

- The most important than the particular object hoped for is the grace of God which alone makes hope possible and victorious

B. Three Theological Values and Eschatological Hope

Three Theological Values

The theological virtues are the foundation of Christian moral activity; they animate it and give it its special character.

They inform and give life to all the moral virtues.

1. Faith

- The theological virtue by which we believe in God and believe all that he has said and revealed to us, and that Holy Church proposes for our belief, because he is truth itself. By faith "man freely commits his entire self to God." For this reason, the believer seeks to know and do God's will.

2. Hope

- The theological virtue by which we desire the kingdom of heaven and eternal life as our happiness, placing our trust in Christ's promises and relying not on our own strength, but on the help of the grace of the Holy Spirit.

3. Charity

- Charity is the theological virtue by which we love God above all things for his own sake, and our neighbor as ourselves for the love of God. The practice of all the virtues is animated and inspired by charity, which "binds everything together in perfect harmony".

Love "binds everything together in perfect harmony" (Col 3:14)	
Love/Charity	We love God above all things and our neighbor as ourselves
Faith	We believe in God and believe all that He has revealed to us
Hope	We desire eternal life and the graces to merit it The virtue by which we trust God will fulfill His promises and look forward to eternal life

Prophetic and Eschatological hope

Prophetic hope

- The prophets grounded the hope of salvation on God Himself, based on the memory of Yahweh's saving acts in the past, but always looking toward a future new life that, through God's creative power, drives out all resignation and despair.

Eschatological hope

- Eschatological hope refers in the New Testament particularly the second coming of Christ, the day of judgment, and the resurrection of the body. Christian eschatological hope in no way detracts from commitment to justice and liberation in our present times.

Study of the individual's last things (eschata)

- Death
- Judgment

- Heaven
- Hell

C. Origin of Hope

Sources of Hope

- Encouragement of Scripture (Rom 15:4)
- Gospel (Col 1:23)
- Awareness of God's Call (Eph 1:18)

But all of these are grounded on Christ, our Hope of Glory (Col 1:27; 1 Tim 1: 1)

Mary, Model of the New Creation

The solemn definition of Mary's Assumption into Heaven, body, and soul, has given us a concrete model of the new creation. In eschatological terms, Mary and the Church are linked.

For the Filipino Christians, Mary may be the best help in coming to some personal grasp of what God has prepared for those who love Him.

"Mary is thus the Mother of hope for the community of believers and for individual Christians, and she encourages and guides Her children as they await the kingdom, supporting them in their daily trials and throughout the events of history, however tragic." – Pope John Paul II in Mary: Model of Faith, Hope, and Charity

Hope is the theological virtue by which we desire the kingdom of heaven and eternal life as our happiness, placing our trust in Christ's promises and relying not on our own strength, but on the help of the grace of the Holy Spirit. (CCC 1817)

Our final destiny is the goal of the virtue of Hope, which impels us to seek out Christ within our everyday life, even within our problems and sufferings. Moreover, our sacramental sharing in Christ's Paschal Mystery here on earth is ordered toward the perfect Trinitarian communion with the Father, through the Risen Christ, in their Holy Spirit. (CFC 2084)

D. Human Dignity

The Catholic social teaching principle of human dignity is about understanding that each of us is made in God's image. Every person has an innate human dignity no one can take away. Human dignity is given freely to all human beings; whether saint or sinner, imprisoned or freed, powerful or marginalized.

- The state or quality of being worthy of honor or respect. - Oxford Dictionary
- WE are God's beloved children, always. Not to accept ourselves, means not to recognize our deepest identity. - Pope Francis
- Call to action
- Treat the people around you with dignity
- Guess the baby competition
- Commit to reading the Gospel

E. Human Work

To the first human couple God entrusted the task of subduing the earth and exercising dominion over every living creature. The dominion exercised by man over other living creatures, however, is not to be despotic or reckless. Rather, he should cultivate and care for all the goods created by God.

Despite some claims to the contrary, work is part of the original state of man. It precedes the fall and is, therefore, not a punishment or a curse. However, it does become toil and pain because of the sin of Adam and Eve, who break the relationship of trust and harmony with God.

Work is a source of the conditions for a decent life; it is also an effective instrument against poverty. However, we must be careful not to idolize our work or to become a slave to it.

In his teaching Jesus tells us that we should appreciate work, and this is no surprise given that he himself became “like us in all things, devoted most of the years of his life on earth to manual work at the carpenter’s bench” (John Paul II Encyclical Letter, *Laborem Exercens*) in the workshop of Joseph, to whom he was obedient. Consider also the time when Jesus condemns the behavior of the useless servant who hides his talent in the ground and praises the faithful servant whom the master finds hard at work at the duties entrusted to him (Matthew 24:46).

Each Christian has a duty to work and we are charged by the Apostle Paul to make it a point of honor to work with our own hands, so as to be “dependent on nobody” (1 Thes 4:12), and to practice a solidarity which is also material by sharing the fruits of our labor with “those in need” (Eph 4:28).

St John Chrysostom said that idleness is harmful to man’s being, whereas activity is good for his body and soul. Christians are called to work not only to provide themselves with bread, but also in acceptance of their poorer neighbors, to whom the Lord has commanded them to give food, drink, clothing, welcome, care and companionship. According to St Ambrose, every worker is the hand of Christ that continues to create and to do good.

The industrial revolution presented the Church with a critical challenge which led her Magisterium to respond both forcefully and prophetically through the Encyclical Letter *Rerum Novarum* in 1892 by Pope Leo XIII. The Church needed to respond to the question of workers’ rights in an environment of increasing exploitation and ideological manipulation (both socialist and communist). *Rerum Novarum* is a heartfelt defense of the inalienable dignity of workers, connected with the importance of rights to property, the principle of cooperation among the social classes, the rights of the weak and the poor, the obligations of workers and employers and the right to form associations. The publication of *Rerum Novarum* was timely as it gave momentum to labor-related legislation for the protection of workers, above all children and women; to instruction and to the improvement of salaries and cleanliness in the work environment.

Capital before labor

- Of course, while work is important, there can never be any justification for putting the interests of capital before labor. No reference to the interests of capital, the demands of competition, or the rigorous of globalization can justify demeaning, exploitative wages and working conditions. Pope Benedict summed this up perfectly when he said: “I would like to remind everyone, especially governments engaged in boosting the world’s economic and

social assets, that the primary capital to be safeguarded and valued is man, the human person in his or her integrity.”

Right to rest from work

- The Church teaches that rest from work is a right. God rested from His work on the seventh day and so we too, as men and women created in His image, are to enjoy sufficient rest and free time to allow us to tend to our family, and our cultural, social and religious life. On Sundays and Holy Days of Obligation we must refrain from “engaging in work or activities that hinder the worship owed to God, the joy proper to the Lord’s Day, the performance of the works of mercy, and the appropriate relaxation of mind and body” (CCC 2185). Sunday is a day that should be made holy by charitable activity, devoting time to family and relatives, as well as to the sick, the infirm, and the elderly. It is also a day for avoiding the excesses of mass entertainment.
- Public authorities have a duty to ensure that citizens are not denied time for rest and divine worship, and employers have an identical obligation with respect to employees.

Unemployment

- Full employment is a mandatory objective for every economic system oriented towards justice and the common good, and the Church considers unemployment as a “real social disaster” (JP II Encyclical Letter *Laborem Exercens*). Society must appreciate that those who are unemployed or underemployed suffer the profound negative consequences that such a situation creates in a personality and they run the risk of being marginalized within society, of becoming victims of social exclusion. This not only strikes young people, but also women, less specialized workers, persons with disabilities, immigrants, ex-convicts, the illiterate, and all those who face greater difficulties in the attempt to find their place in the world of employment. Systems of education, support and training must be put in place to afford people the best opportunity to gain employment and to remain there.
- Although the State doesn’t necessarily need to guarantee the right to work of every citizen it does have a duty to “sustain business activities by creating conditions which will ensure job opportunities, by stimulating those activities where they are lacking or by supporting them in moments of crisis” (JP II Encyclical Letter *Centesimus Annus*).

Family friendly policies

- Work is important for the family as it ensures a means of subsistence and serves as a guarantee for raising children. With this in mind it is necessary that businesses, professional organizations, labor unions and the State promote policies that, from an employment point of view, do not penalize but rather support the family. For example, travelling great distances to work, working two jobs, fatigue all reduce the time devoted to the family. Situations of unemployment also have material and spiritual repercussions on families, just as tension and family crises can have negative effects on productivity in the workplace. It’s important that the feminine genius be appreciated in all expressions of life and society, therefore the presence of women in the workplace must be guaranteed.

Child labor

- The Church condemns the terrible violence that is child labor. Pope Leo XIII summed up the dangers in the Encyclical Letter Rerum Novarum: “in regard to children, great care should be taken not to place them in workshops and factories until their bodies and minds are sufficiently developed. For, just as very rough weather destroys the buds of spring, so does too early an experience of life’s hard toil blight the young promise of a child’s faculties, and render any true education impossible.”

Migrant workers

- If a country decides to welcome migrant workers it must ensure that it doesn’t treat them as second-class laborers. In no way may migrant workers be exploited and in their work they should receive the same rights and wages as local employees. At the same time, conditions that foster increased work opportunities in people’s place of origin are to be promoted as much as possible.

Just wage

- All workers are deserving of a just wage; that is, a wage that is enough to ensure a livelihood for himself and for his family and to allow him to participate comprehensively in the life of society. Whilst it is difficult to determine the exact amount of a just wage there are a number of considerations that should be taken into account. One is the function and productivity of the individual. Another is the economic and social setting. Trade unions can play an important role in this and the State can also play a secondary role by guaranteeing a minimum wage.

The right to strike

- The Church’s social doctrine recognizes the legitimate right to strike “when it cannot be avoided, or at least when it is necessary to obtain a proportionate benefit” (CCC 2435). The right to strike should only be utilized when all other methods for the resolution of disputes has been tried but proven to be ineffectual. It must always be peaceful and can never be accompanied by violence and it can never be contrary to the common good.

Trade unions

- The Magisterium of the Church recognizes the fundamental role played by labor unions in defending the vital interests of workers employed in the various professions. There is usually an imbalance of power between employer and employees and the Church appreciates the need of workers to consolidate their forces in trade unions. The right to found trade unions is a human right.

F. Catholic Social Teaching

Catholic Social Teaching is that body of thought and action through experience and tradition that helps guide us to deeper understanding of the role of our faith values and how to live them in concrete social and historical situations.

There is a broad and a narrow understanding to the expression Catholic social teaching. Viewed one way, Catholic Social Teaching (hereafter CST) encompasses all the ideas and theories that have developed over the entire history of the Church on matters of social life. More commonly, as the term has come to be understood, CST refers to a limited body of literature written in the modern era that is a response of papal and episcopal teachers to the various political, economic and social issues of our time. Even this more narrow understanding, however, is not neatly defined.

Catholic Social Teaching (CST) is deeply rooted in the Catholic Tradition. Pope John Paul II wrote, "The Church's social teaching finds its source in Sacred Scripture, beginning with the Book of Genesis and especially in the Gospel and the writings of the Apostles. From the beginning, it was part of the Church's teaching... [it was] developed by the teaching of the Popes on the modern "social question," beginning with the Encyclical *Rerum Novarum*.

Catholic social teaching is social. Pope Benedict XVI wrote "No man is an island, entire of itself. Our beliefs are involved with one another, through innumerable interactions they are linked together. No one lives alone. No one sins alone. No one is saved alone."

The lives of others continually spill over into mine: in what I think, say, do, and achieve. And conversely, my life spills over into that of others: for better and for worse."

Social justice and charitable works

Catholic Social Teaching isn't only about dropping your spare change into a bucket at Christmas. Jesus calls us to a radically different kind of discipleship - a life that is daily marked by care and concern for the poor and for one another.

In His gospel, the evangelist Mark tells this story: [Jesus] sat down opposite the treasury and observed how the crowd put money into the treasury. Many rich people put in large sums. A poor widow also came and put in two small coins worth a few cents. Calling his disciples to himself, he said to them, "Amen, I say to you, this poor widow put in more than all the other contributors to the treasury. For they have all contributed from their surplus wealth, but she, from her poverty, has contributed all she had, her whole livelihood."

Two feet of love in action

Charitable works and social justice have been called the two feet of CST. Charitable works meets the immediate needs of persons and families. It treats the symptoms of social problems. Charitable works calls forth a generous response from individuals and responds to particular situations

Social justice changes social structures that attack human dignity, oppress people, and contribute to poverty. It focuses on the rights of people, addresses underlying social causes, and works for long term social change. Pope Benedict XVI expresses it in this way, "The Church cannot neglect the service of charity any more than she can neglect the sacraments and the word. Charity must animate the entire lives of the lay faithful and therefore also their political activity, lived as 'social charity'"

Principles of Catholic Social Teaching

1. Dignity of the human person
 - The foundation of all Catholic Social Teaching is the inherent dignity of the human person, as created in the image and likeness of God. The Church, therefore, calls for

integral human development, which concerns the wellbeing of each person in every dimension: economic, political, social, ecological, and spiritual.

2. Common good

- We must all consider the good of others, and the good of the human family, in organizing our society – economically, politically, and legally. Human dignity can only be realized and protected through our relationship with society at large. We must love our neighbor, locally and globally, and prioritize the good of the human family over commercial interests. We must seek the good of the broader community – that is, each person, every person and the whole person – and not just our own interests.

3. Solidarity

- Each of us is part of the human family and we are all interconnected and interdependent. Loving our neighbor has global dimensions. We must see ourselves in others and collaborate towards solutions. Solidarity is a recognition that we are “all in this together”, and is a commitment to strengthen community and promote a just society. Every human person is deeply connected to every other person. We are called to stand together as one human family.

4. Preferential option for the poor

- The moral test of any society is based on how the most vulnerable are treated. God's love is universal, so this principle does not intend that we should focus on the poor to the exclusion of others, but rather that we are called to prioritize those who are in most need of our solidarity. Caring for the poor is everyone's responsibility. Preferential care should be shown to poor and vulnerable people, whose needs and rights are given special attention in God's eyes.

5. Stewardship of creation

- The earth is sacred. Creation has its own intrinsic value. We have a responsibility to protect and to cherish the Earth's ecological diversity, beauty and life-sustaining properties. Together, we must hold it in trust for future generations. We must all respect, care for and share the resources of the earth, which are vital for the common good of people. Care for animals and the environment is a common and universal duty, and ecological problems call for a change of mentality and the adoption of new lifestyles.

6. Subsidiarity & the role of the government

- The state is an instrument to promote human dignity, protect human rights, and develop the common good. Subsidiarity holds that such functions of government should be performed at the lowest level possible, as long as they can be performed adequately. When they cannot, higher levels of government must intervene. This principle goes hand-in-hand with participation, the principle that all people have a right to participate in the economic, political, and cultural life of society, and in the decisions that affect their community.

7. Participation

- Human beings are social, and how we live together affects the dignity of the individual and the progress of society. All persons are entitled to participate in community, and in decisions that affect their lives, and cannot be excluded for any

reason. We must seek the good of the broader community – that is, each person, every person and the whole person – and not just our own interests.

8. Rights and responsibilities

- We all have a right to those things which are required by human dignity. Rights arise from what we need to live as God intended us to. These are innately linked with our responsibility to ensure the rights of others – that we do not take more than is needed to fulfill our rights at the expense of another's.

9. Economic justice

- The economy must serve people, and not the other way around. All persons have a right to dignified work, and to fair wages and working conditions. Work is more than a way to make a living; it is a form of continuing participation in God's creation.

10. Peace

- To be in right relationship with God and with each other. Peace is the fruit of charity and the consequence of justice. It is the sign of caritas in action.

Themes of Catholic Social Teaching

Seven themes have been at the heart of Catholic social tradition as found in papal, conciliar, and episcopal documents. These themes teach about the building of a just society and living lives of holiness in the midst of modern society.

The Church has always taught that human life is sacred, from the moment of conception until natural death. Each and every person has intrinsic dignity.

Actions, events, and circumstances which violate that dignity are immoral and must be stopped or changed.

Among these are abortion, euthanasia, the death penalty, unjust wars, the oppression of minority populations, and political or economic systems which treat human beings as no more than a means to an end.

1. Life and dignity of the human person

- Every human person is created in the image and likeness of God. Therefore, every person's life and dignity must be respected and supported from conception through natural death. We believe that the measure of every institution is whether it threatens or enhances the life and dignity of the human person.

2. Call to family, community, and participation

- We are social creatures, and live in interdependence with one another.
- We have a responsibility to care for families and to work to protect the sacredness of marriage.
- The sacred bond of marriage, between one man and one woman, is the central unifying force of the family, as the family is the central unifying force of society.
- We have an effect on our neighborhoods, our cities, our state, our country, and our world and have the responsibility to care for our larger communities with the same love, trust, and selfless care that unites our family.

3. Rights and responsibilities

- Every person has the intrinsic right to life and the duty and responsibility to protect it.

- Every person has the right to the necessary elements of human decency and the duty and responsibility to provide it for others.
 - The Catholic tradition teaches that human dignity can be protected and a healthy community can be achieved only if human rights are protected and responsibilities are met.
4. Option for the poor and vulnerable
- Are we a just society?
 - A basic test is to see how we treat the most vulnerable in our society, especially women and children.
 - Is there a wide gap between the rich and the poor?
 - Are there enough resources available for the elderly, the sick, the homeless, or those in poverty?
 - Christ calls us to put the poor and vulnerable at the center of our concern.
 - The primary commitment to the poor is to enable them to become active participants in the life of society. It is not handouts, but elevating the situation through a collaborative effort.
5. The dignity of work and the rights of workers
- The economy must serve people, not the other way around. Work is more than a way to make a living; it is a form of continuing participation in God's creation.
 - If the dignity of work is to be protected, then the basic rights of workers must be respected—the right to productive work, to decent and fair wages, to the organization and joining of unions, to private property, and to economic initiative.
6. Care for God's creation
- Caring for the world is not just an Earth Day slogan, it is a requirement of our faith.
 - We show our reverence for the Creator and our gratitude for His gifts by our stewardship of creation.
 - We are called to protect people and the planet, living our faith in relationship with all of God's creation. This environmental challenge has fundamental moral and ethical dimensions that cannot be ignored.
7. Solidarity
- We are one human family—whatever our national, racial, ethnic, economic, and ideological differences. We are our brothers and sisters keepers, wherever they may be.
 - Loving our neighbor has global dimensions in a shrinking world.

Other major themes from the Catholic Social Teaching

- Human dignity
- Community
- Rights and duties
- Option for the poor
- Participation
- Economic justice
- Stewardship of creation
- Solidarity

- Role of government
- Promotion of peace

G. Encyclicals

Rerum Novarum (On Capital and Labor) ...

Quadragesimo Anno (After Forty Years) - On Reconstruction of the Social Order. ...

Mater et Magistra (On Christianity and Social Progress) ...

Pacem in Terris (Peace on Earth) ...

Populorum Progressio (On the Development of Peoples) ...

Laborem Exercens (On Human Work)

REFERENCES, ATTRIBUTES, AND EXTERNAL LINKS

Understanding Culture, Society, and Politics

Early Sociologists	https://www.youtube.com/watch?v=oTdzIkkPPxU
Darwin's Theory of Evolution	https://www.youtube.com/watch?v=w56u2gv8XLs
Biological and Cultural Evolution	https://www.youtube.com/watch?v=GyRzCoK4dCs&t=108s
Sociocultural and Political Evolution	https://www.youtube.com/watch?v=a_MaG3LUVgE&t=248s
Sociocultural and Political Evolution 2	https://www.youtube.com/watch?v=4dUMsuóvkik
Evolution of the Philippine Government	https://www.youtube.com/watch?v=WbnKkZklUlk
Definition of Culture	https://www.youtube.com/watch?v=S258bwpOsJY
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Ethnocentrism	https://www.youtube.com/watch?v=wlyS4zrkIww
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Agents of socialization	https://youtu.be/E3y8B5buDE
Conformity and deviance	https://youtu.be/S9xq5dluTUU
Labeling theory	https://youtu.be/JVAD_EXj5JQ
Social control theory	https://youtu.be/E8Mw7WtN8is
<i>Some parts included are from student reports.</i>	

Social Aggregates	From the presentation presented by Gian
Social Categories	From the presentation presented by Kurt
Social Interactions	From the presentation presented by John Vincent
Social Groups (Voluntary and involuntary)	From the presentation presented by Fitz

Physical Education

<i>Some parts included are from group reports</i>	
National Dances	From the presentation presented by the group of Carmela
Folk Dances	From the presentation presented by the group of Paula
Regional Classification of Dances in the Philippines	From the presentation presented by the group of Rein
Ethnic Dance	From the presentation presented by the group of Elijah

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