Introduction

Chemistry	study of matter, its properties, changes it undergoes, and energy associated with its changes
	central science. everything is composed of matter
Matter	takes up space and has mass
	anything composed of atoms and molecules
Atom	building block of matter
	always in constant motion
	has endless combinations

States of Matter

	Def Vol	Def Shape	Inc Temp Result	Compressibility
Solid	/	/	small	x
Liquid	/	x	small	x
Gas	x	x	large	/

Chemical Properties of Matter

observed when chemical makeup is altered

Ability to Burn

Ability to Decompose

Ferment

Reacts With

Physical Properties of Matter

can be measured without changing the substance or chemical composition

Color	
Odor	smell
Luster	how shiny
Malleability	to be beaten into thin sheets
Ductility	to be made into thin wires
Physical	use of senses

2 Properties Under Physical Property

Extensive	amount of matter in the sample
	mass, volume, no. of cal present
	identifiers of unknown matter
Intensive	
	depends on state of matter
	density, hardness, melting point, boiling point

Evidence of Chemical Change

Absorption/Release of Energy

Color Change

Light Evolution

Production/Liberation of Gas

Formation of Precipitate

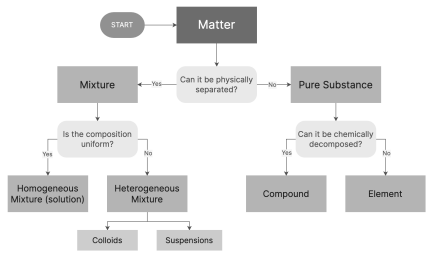
Law of Conservation of Mass

-mass of products = mass of reactants. Always

-no change in quantity despite chemical/-physical change

-not created nor destroyed. converted from one substance to another

Classification of Matter



Classification of Matter

Pure Substance	cannot be physically separated
	elements and compounds
Mixture	2+ substances physically combined
	constant BP and MP nonexistent
	retains characteristic properties of components
Hetero-genous Mixture	can be physically separated
	components are distinguishable
Homogenous Mixture	particles distributed evenly throughout
	components not distinguishable

Separating Techniques/Methods

-to remove unwanted particles

-to obtain important substance

-to obtain pure substances

Mechanical Separation	manual separation based on physical properties
Magnetic Separation	when component has magnetic property

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Separating Techniques/Methods (cont)

Filtration	diff of solid particle size
Decantation	diff densities, pour out liquid, leave solid
Distillation	2 substances have diff BP
Evaporation	vaporize liquid, leave reside behind
Density Separation	less dense floats, more dense sinks
Centrifuge	circular motion to sink denser components
Paper Chromatog-raphy	diff in solubility
	faster flow through solid = lower solubility

Parts of Lab Report

Theoretical Framework	main idea (statement of problem)
	introduce experiment, discuss theory, law, or concept behind what's investigated
Materials & Procedure	list of all items used
	paragraph or narrative explaining details
	procedure
Data & Results	data tables, figures with titles, short descriptions
	label all tables, graphs, charts
	attach separate sheet if necessary

Parts of Lab Report (cont)

Analysis & Discussion	discuss what results mean
	answer to all guide questions (par form)
	follow format in objective type items
Conclusion	answer statement of the problem
	summary of the data
	discuss insights, application to real-life situations
	possible errors (experimental errors, scope & limitations,) & recommendations
References	CSE citation style
Reflection	each member needs own reflection
	go beyond reflection questions given
Contri-bution	tabulate contributions of each member
	which part conducted

Atomic History & Subatomic Particles

Ancient Greek Philosophers	
Atomists	- everything is made of tiny indivisible particles

Atomic History & Subatomic Particles (cont)

	Leucippus	- matter is composed of 2 **indivisible** things, atoms, and void
	Democritus	- atoms from one object are **different** from another object
		-Democritus' Building Blocks (first figure for atoms)
Natural Elemen talists	- everything is made of **natural elements**	
	Empedocles	- everything is made of water, earth, fire, & air
	Aristotle	- everything is infinitely divisible, and made of water, earth, fire, air, and aether

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John Dalton's Postulates

Indivisible Atoms	elements are made of small indivisible particles called atoms
Mass & Properties	mass & properties of all its other atoms are same, for all elements
Atomic Ratios	atoms in given compound are present in a constant whole--number ratio
Reactions	atoms are not created nor destroyed; they combine, separate, or rearrange

History of Atomic Models

Dalton's Atom	a singular circle
Thomson's Plum Pudding Atom	electrons needed a positive "-something" to counter the charge
Ruther-ford's Nucleus Atom	discovered the nucleus, something that deflected the particles
Bhor's Planetary Model	discovered shells and energy levels
Bhor's Planetary Model v2.0	discovered neutrons
	light elements bombarded with alpha particles will produce lots of ionizing radiation

Atom Structure

Atom	electrically neutral
	spherical
	contains, protons, neutrons, (+) charged nucleus surrounded by (-) electrons
Electrons (e^- or beta)	move rapidly around nucleus (probability cloud)
	Charge: -1.602x10-19C
	Mass: 9.109x10-31 kg
	Diameter: ~10-18m
Protons (p^+ or H+)	all (+) charge of nucleus results from protons
	Charge: +1.602x10-19 C
	Mass: 1.672x10-27kg
	Diameter: ~10-15m
Neutrons (n^0)	no charge
	Mass:1.674x10-27kg
	Diameter: ~10-15m
Atomic Number (Z)	=no. of p^+ in nucleus = no. of e^- in atom
Mass Number (A)	=p^+ + n^0 in nucleus (there are no electrons in the nucleus because nucleus us + charged)
Isotope	isos = same, topos = place
	different no. of n^0, but same no. of p^+

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