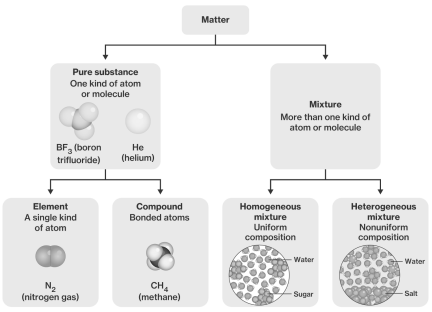
Matter

Everything is made up of matter.

Matter is made up of atoms.

Classification of matter



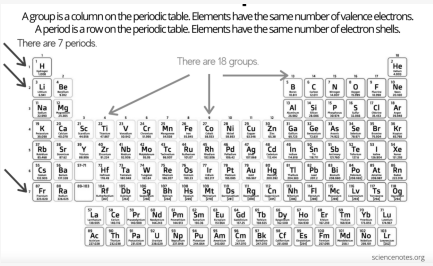
Periodic Table

Table of all known **elements arranged** from left to right and top to bottom in **order** of **increasing atomic number,** or the number of protons.

Columns: Refer to **groups** of the table

Rows: Refer to as **periods** or the **families** of the table

Structure of the Periodic Table



Elements, Compounds, and Mixtures

Element: A pure substance made from one type of atom.

E.g. Sodium
Formula: Na

Compounds: Made from more than one type of atom bonded together.

E.g. Sodium Hydroxide
Formula: NaOH

Elements, Compounds, and Mixtures (cont)

Mixtures: Made of substances which are not chemically bonded and can be separated.

E.g. Salt Water
Formula: NaCl

Information on the Periodic Table

Atomic Number

Atomic Mass

Number of Protons

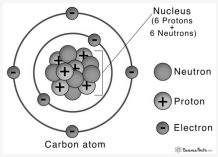
Number of Neutrons

Number of Electrons

Atoms:

Atoms consist of three subatomic particles protons, Neutrons, and Electrons.

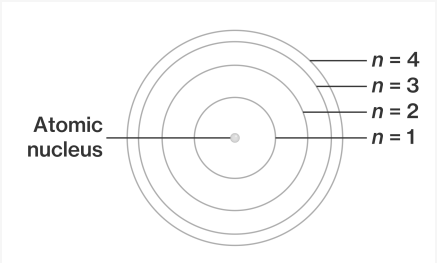
Atomic Structure



Electron Configurations

The shells are numbered beginning with the shell closest to the nucleus and increasing in number farther away from the nucleus.

Electron Shell Diagrams



Electron shells are numbered from the shell closest to the nucleus outwards.

Electrons

Electrons:
Particles **orbiting** the **nucleus** of the atom

Properties:
Negatively charged
No mass

Electrons orbit the nucleus in **electron shells**.

Maximum Number of electrons:

The **first** electron shell holds	**2 atoms**
The **second** electron shell holds	**8 atoms**
The **third** electron shell holds	**8 atoms**

The Law of Conservation of Mass

The mass in an isolated system can neither be created nor be destroyed but can be transformed from one form to another

Counting Atoms

https://mrskmclean.files.wordpress.com/-2013/09/counting-atom-notes.pdf

Acid-Metal Reactions

Metals react with **acids** to form a **salt** and **hydrogen**.

Identification: Pop Test

The presence of hydrogen gas can be determined by placing a lit splint near the test tube.

Hydrogen reacts causing a squeaky pop sound.

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Acid + Metal General Formula

Exothermic and Endothermic Reactions

All chemical reactions either use energy or release energy.

Reactions that **require** energy are **endothermic**.	Reactions that **release** energy are **exothermic**.

Properties of Acids & Bases

Acids	Bases
pH between 0-7	pH between 7-14
Taste sour	Taste bitter
Neutralizes bases	Neutralizes acids
Reacts with metals to form hydrogen gas	

pH Scale

pH Scale

pH 0 - 6	Acid
pH 7	Neutral
pH 8-14	Alkaline (Basic)

Indicators

Name	Colour in Acid	Colour at neutral	Colour in Base
Universal Indicator (UI)	Red	Green	Blue
Blue Litmus Paper	Red	Purple	Blue

General Word Equations

Acid-Base:	Acid + Base → Salt + water
Acid-Metal:	Acid + Metal → Salt + Hydrogen gas
Acid-Carbonate:	Acid + Carbonate → salt + water + carbon dioxide
Combustion:	Fuel + Oxygen → Carbon dioxide + water
Corrosion:	Oxygen + iron + water → iron oxide (rust)

General Formula for Acid-Base Reactions

ACID + BASE ⟶ SALT + WATER

Acid + Base Reactions

Hydroxide ions (**OH-**) from the **base,** attach to hydroxide (**H+**) ions from the **acid,** producing **water.**

The remaining atoms form a **salt.**

Identification:

Neutralisation reaction using **universal indicator** to indicate **pH of 7**

Naming Salts

The **first** part of the name comes from the **base,** the **second** from the **acid.**

Sodium hydroxide	+	Hydro**chloric** acid	→	Sodium chloride
Magnesium oxide	+	Nitric **acid**	→	Magnesium Nitrate
Sodium hydroxide	+	Sulfuric **acid**	→	Sodium sulfate

Acid-Carbonate Reactions

Acids react with **metal carbonates** to form a salt, water and carbon dioxide.

Identification: Limewater Test

Limewater can be used to indicate CO2 production turning **milky white** when the gas is present.

Acid + Carbonate General Equation

ACID + CARBONATE ⟶ SALT + WATER + CARBON DIOXIDE

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