Year 9 Term 3 Revision notes

Atoms:

- Isotopes: Atoms of the same type (same number of protons) but different numbers of neutrons.

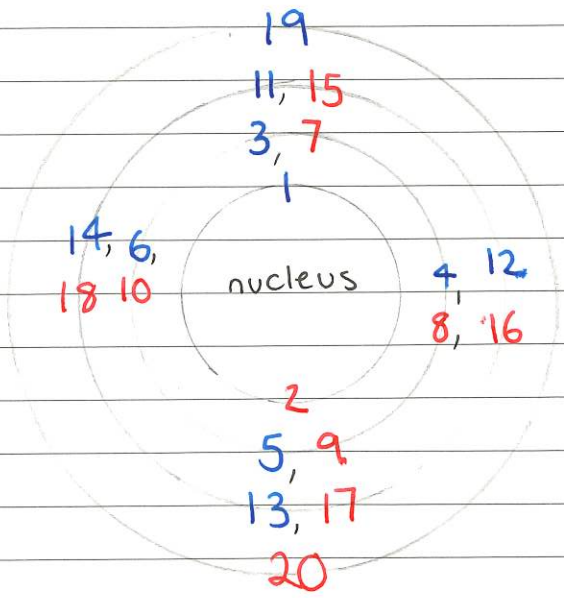
- Protons, neutrons + electrons:

	Charge	Weight	Location
proton	+1	1	nucleus
neutron	0	1	nucleus
electrons	-1	0	shells.

- Elements and compounds:

Elements - 1 type of atom
Compounds - 2+ types of atoms

- Electron shells:
  - Fill from inner shell to the outer shell.
  - Fill in the following order:



Ions: Atoms that have lost or gained electrons
- Cations and Anions:

Cations - Atoms that have lost electrons
- Have a positive charge

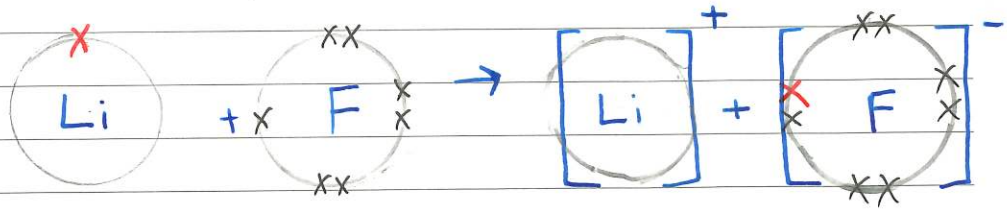
cations

Anions - Atoms that have gained electrons
- Have a negative charge

anion looks like onion - and onions are GROSS

-Ionic bonding: -Atoms donate/accept electrons
- Compound is neutral

Eg.

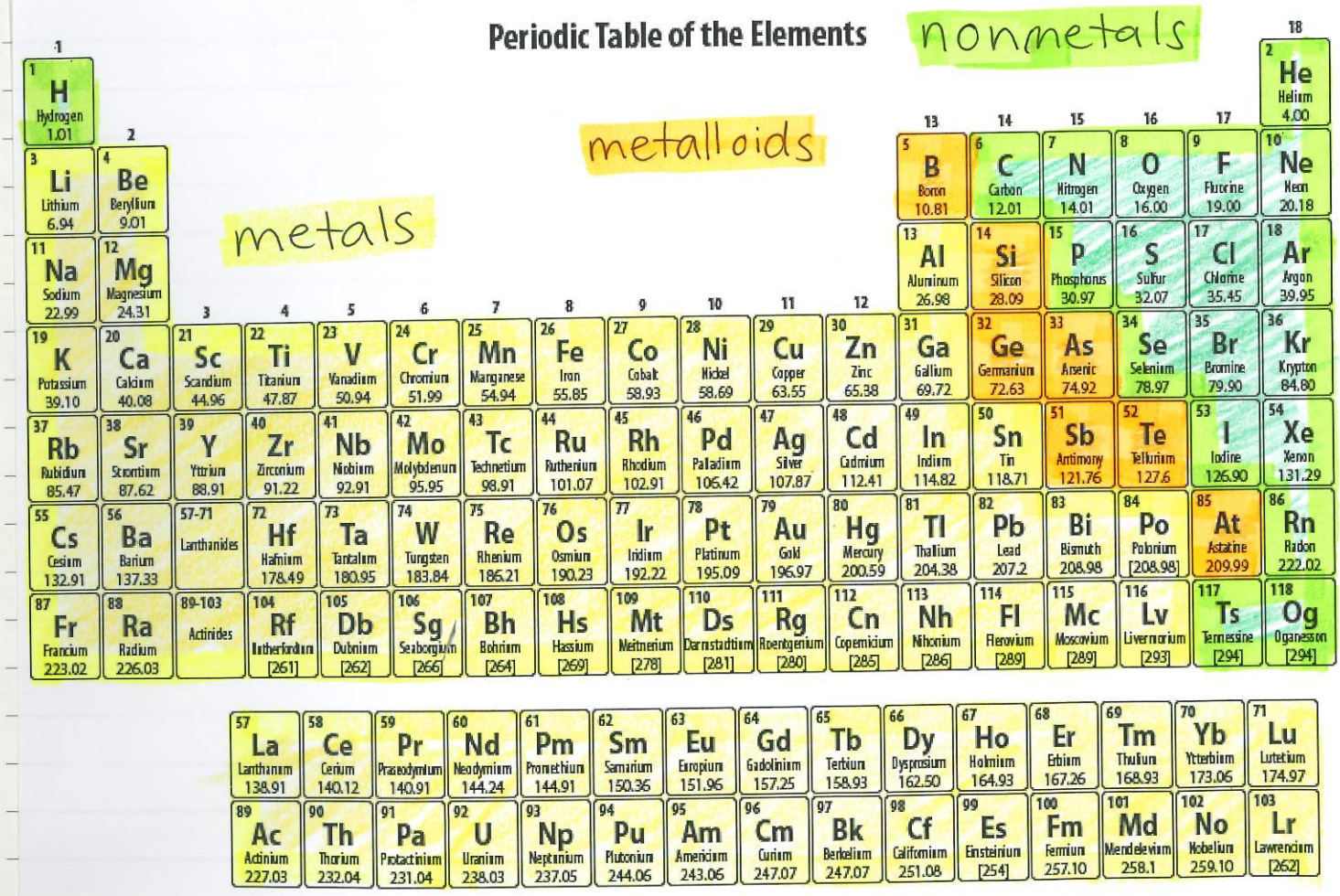


Radiation:
- Alpha, beta + gamma

Type of radiation	Particle or energy?	Stopped by
Alpha (α)	2 protons + 2 neutrons (^4_2He)	paper + cm of air
Beta (β)	electron	3mm of aluminium, cm of wood, m of air
Gamma (γ)	Wave of energy	cm of lead or concrete.

- Half-life - time taken for half of a sample to have decayed
- Carbon dating - the amount of carbon-14 present in a sample can be used to approximate its age.
  - half-life of C-14 is 5730

Metals, alloys, nonmetals:

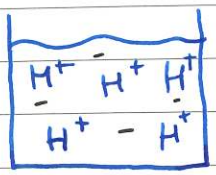


Acids and Bases:

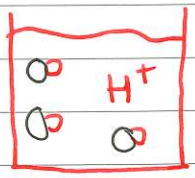
- Properties:

Acids	Bases
• Corrosive	• Caustic
• Sour taste	• Bitter taste
• Reacts with some metals	• Soapy, slimy feel
• Conducts electricity	• Conducts electricity
• Releases H^+ ions	• Releases OH^- ions.

- Strength of acids: Strong - releases lots of H^+
Weak - releases few H^+

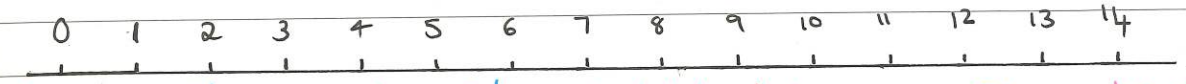


Strong



Weak

- pH and indicators



Strong acid Weak acid neutral Weak base Strong base

- indicators: substances whose solutions change colour due to changes in pH

Combustion and corrosion reactions.

- Exothermic + Endothermic:

energy absorbed
↓ ↓ ↓ ↓
→ Endothermic
↑ ↑ ↑ ↑
feels cold

energy released
↑ ↑ ↑ ↑
← Exothermic →
↓ ↓ ↓ ↓
- feels hot
- releases light + sound.

- Law of conservation of mass:
  - Matter is never created or destroyed.
  - Everything going into a reaction, must come out.

- Writing chemical equations:

1. Identify reactants and products

R - calcium carbonate + sulfuric acid
P - calcium sulfate + carbon dioxide + water

2. Write the word equation.

Calcium carbonate + sulfuric acid →
calcium sulfate + carbon dioxide
+ water

3. Write the chemical equation

$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + CO_2 + H_2O$

4. Balance the equation

$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + CO_2 + H_2O$

Ca	1	1
C	1	1
O	7	7
H	2	2
S	1	1

- Combustion

Complete - blue flame.
- lots of energy produced
- lots of oxygen
- Produces $CO_2 + H_2O$

Incomplete - yellow flame
- not a lot of energy produced
- not a lot of Oxygen
- Produces $CO + H_2O$ or $C + H_2O$
- Produces smoke + soot.

- Corrosion: Copper corrosion -

Copper + H_2O + CO_2 + O_2 → Copper hydroxide + Copper carbonate.

- When metals exposed to water + air
- breaks metal down into other compounds.

Photosynthesis: Used by plants, algae + bacteria to produce food (glucose) for energy.

Carbon dioxide + Water + energy → glucose + oxygen

CO_2 + H_2O + sunlight → $C_6H_{12}O_6$ + O_2

Respiration: - releases chemical energy in glucose for use in life processes.
- All living things, all the time.

Glucose + oxygen → carbon dioxide + water + energy

$C_6H_{12}O_6$ + O_2 → CO_2 + H_2O + energy.