

# 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:

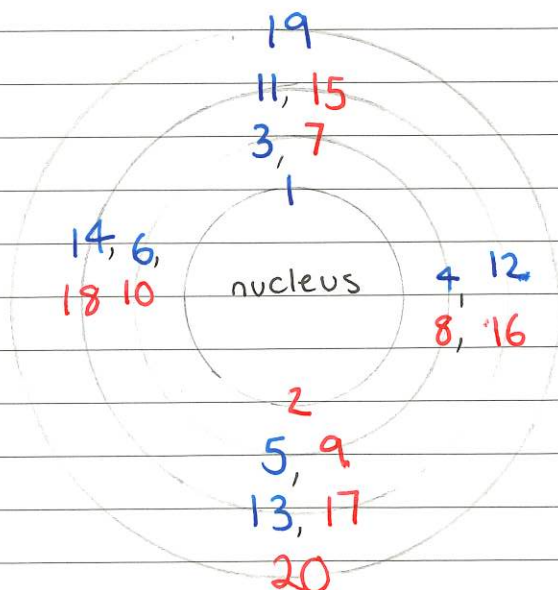
Elements - 1 type of atom

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

cats

Anions - Atoms that have gained electrons

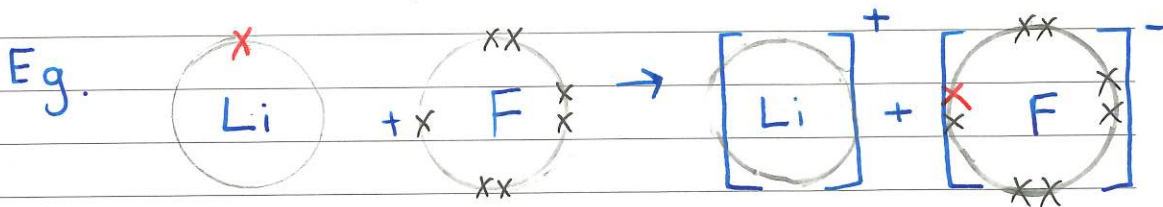
- Have a negative charge

anion looks like onion - and onions are

GROSS

- Ionic bonding: - Atoms donate/accept electrons

- Compound is neutral



## Radiation:

- Alpha, beta + gamma

Type of radiation Particle or energy?

Stopped by.

## Alpha ( $\alpha$ )

$$2 \text{ protons} + 2 \text{ neutrons} \\ \quad \quad \quad {}^4_2\text{He}$$

paper +  
cm of air

Beta ( $\beta$ )

electron

3mm of aluminium,  
cm of wood, m of  
air

Gamma ( $\gamma$ )

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:

# Periodic Table of the Elements

nonmetals

metalloids

metals

1 H Hydrogen 1.01																	2 He Helium 4.00						
3 Li Lithium 6.94	4 Be Beryllium 9.01																	5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31																	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 51.99	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.38	31 Ga Gallium 69.72	32 Ge Germanium 72.63	33 As Arsenic 74.92	34 Se Selenium 78.97	35 Br Bromine 79.90	36 Kr Krypton 84.80						
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.95	43 Tc Technetium 98.91	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.6	53 I Iodine 126.90	54 Xe Xenon 131.29						
55 Cs Cesium 132.91	56 Ba Barium 137.33	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.09	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium [209]	85 At Astatine 209.99	86 Rn Radon 222.02						
87 Fr Francium 223.02	88 Ra Radium 226.03	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [278]	110 Ds Darmstadtium [281]	111 Rg Roentgenium [280]	112 Cn Copernicium [285]	113 Nh Nihonium [286]	114 Fl Flerovium [289]	115 Mc Moscovium [289]	116 Lv Livermorium [293]	117 Ts Tennessine [294]	118 Og Oganesson [294]						

57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium 144.91	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.05	71 Lu Lutetium 174.97
89 Ac Actinium 227.03	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium 237.05	94 Pu Plutonium 244.06	95 Am Americium 243.06	96 Cm Curium 247.07	97 Bk Berkelium 247.07	98 Cf Californium 251.08	99 Es Einsteinium [254]	100 Fm Fermium 257.10	101 Md Mendelevium 258.1	102 No Nobelium 259.10	103 Lr Lawrencium [262]

Acids and Bases:

- Properties:

Acids

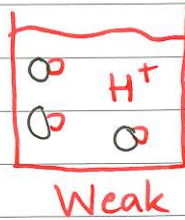
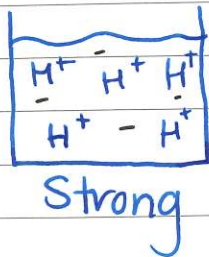
- Corrosive
- Sour taste
- Reacts with some metals
- Conducts electricity
- Releases  $H^+$  ions

Bases

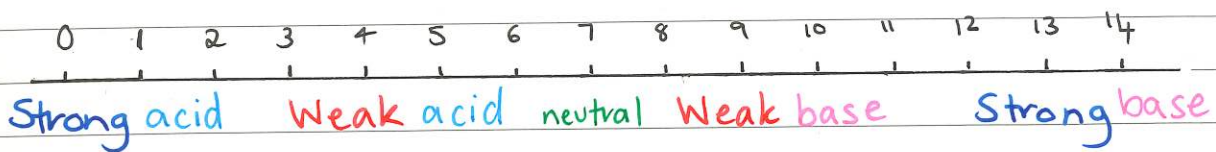
- Caustic
- Bitter taste
- Soapy, slimy feel
- Conducts electricity
- Releases  $OH^-$  ions.



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



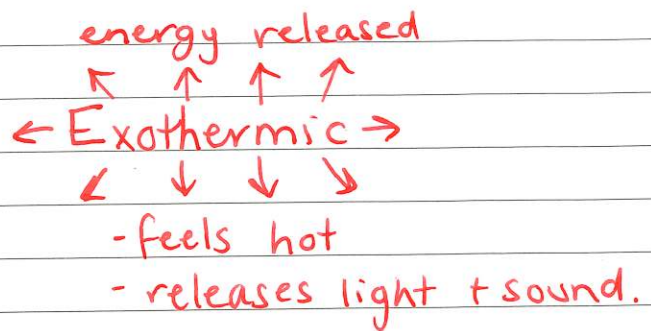
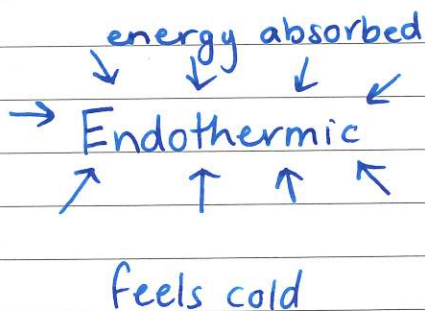
- pH and indicators



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

## Combustion and corrosion reactions.

- Exothermic + Endothermic:



- 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  $\rightarrow$   
calcium sulfate + carbon dioxide  
+ water

3. Write the chemical equation



4. Balance the equation



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

- Combustion

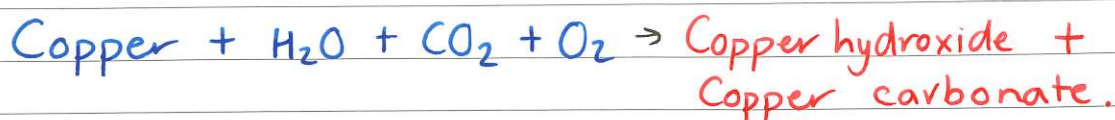
Complete - blue flame.

- lots of energy produced
- lots of oxygen
- Produces  $\text{CO}_2 + \text{H}_2\text{O}$

Incomplete - yellow flame

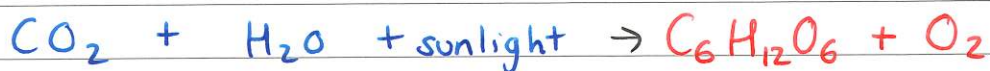
- not a lot of energy produced
- not a lot of oxygen
- Produces  $\text{CO} + \text{H}_2\text{O}$  or  $\text{C} + \text{H}_2\text{O}$
- Produces smoke + soot.

- Corrosion: Copper corrosion -



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

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



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

