PREPARING FOR A LEVEL CHEMISTRY PART 1

ATOMIC STRUCTURE, BALANCING EQUATIONS AND STATE SYMBOLS

MOVING FORWARD

WITH EACH OF THESE LESSONS PLEASE FOLLOW THE PRESCRIBED FORMAT.

1. WATCH THE VIDEO LINKED ON THE VLE
2. READ THROUGH THE POWERPOINT
3. HAVE A GO AT ALL THE QUESTIONS

THE TOPICS MAY SEEM BASIC TO YOU BUT THE QUESTIONS SHOULD TEST YOU AT EACH STAGE.

ATOMIC STRUCTURE

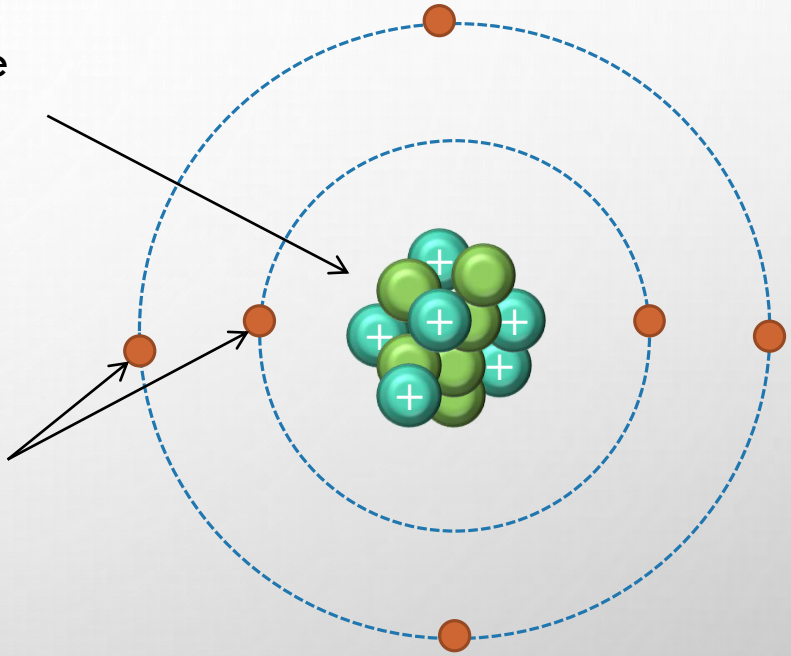
Subatomic particles:

	Mass	Charge
Protons	1	+1
Neutrons	1	0 / Neutral
Electrons	0 *	-1

*(At A level we would say 1/1840)

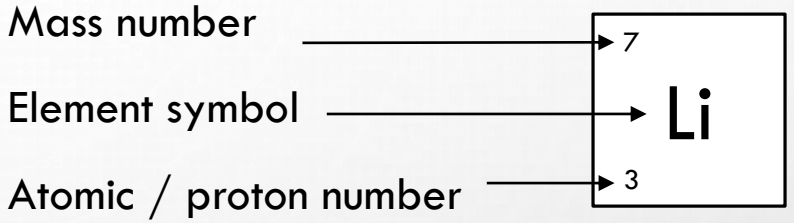
Protons and neutrons are found in the dense nucleus which as a result has an overall positive charge.

Electrons are found in shells, preferably called *energy levels*. There are tules determining how many electrons can go in each energy level.



THE PERIODIC TABLE

The periodic table is a powerful tool and you will see more and more patterns in it as you move forward with your chemistry study.



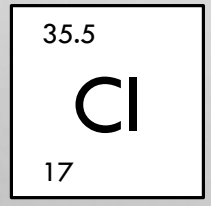
From GCSE you will recal the following:

Number of protons = Atomic number

Number of electrons (*In a neutral atom*) = Atomic number

Number of neutrons = mass number – atomic number

What about chlorine?



How can you have an atomic mass that is not a whole number. At A level you will see that nearly all of the elements are recorded to one decimal place and very few of them are whole numbers.

This is due to the mass being an average of all the different isotopes taking into account abundance (How much of each isotope there are) We will lokk at this in more detail during the first topic of A level chemistry

BALANCING EQUATIONS

Based on the principle of conservation of mass, *you cannot gain or lose atoms during a chemical reaction.*

Key point: You cannot change the formula of chemicals when balancing equations just the number of each species (Atom, molecule, compound etc). This means you can only change the BIG numbers do not change the small ones unless working out the formula.

"*A man walked into a bar and asked for a glass of* H_2O*. He took it drank it and was fine. A second man walked in and said I'll have a glass of* H_2O_2*. He drank it and died!*"

H_2O = water. H_2O_2 = Hydrogen peroxide a form of bleach!

Changing the formula has a big effect don't add atoms randomly!

BALANCING EQUATIONS – EXAMPLE 1

When balancing it is fine to go back over your working and change what you have written.

Example 1: $Al + Cl_2 \rightarrow AlCl_3$

Al is balanced but Cl is not. So you might try this …

$Al + 2Cl_2 \rightarrow AlCl_3$

Cl is still not balanced so …

$Al + 2Cl_2 \rightarrow 2AlCl_3$

But by doing that the Al and the Cl are still not balanced so …

$2Al + \cancel{2}3Cl_2 \rightarrow 2AlCl_3$

Crossing out the 2 is not an issue to replace it with a 3!

BALANCING EQUATIONS – EXAMPLE 2

When balancing it is fine to go back over your working and change what you have written.

Example 1: $Na + O_2 \rightarrow Na_2O$

Neither Na or O are balanced so you might try this …

$2Na + O_2 \rightarrow Na_2O$

The Na is now balanced but the O is not so …

$2Na + O_2 \rightarrow 2Na_2O$

But by doing that the O is now balanced but you have unbalanced the Na so change it.

$\cancel{2}4Na + O_2 \rightarrow 2Na_2O$

Crossing out the 2 is not an issue to replace it with a 4 and everything is now balanced!

STATE SYMBOLS

State symbols are very important in chemical equations and usually worth a mark on their own.

4 state symbols: During A level chemistry we look at them with more importance.

Solid (s)
Liquid (l)
Gas (g)
Aqueous (aq)

E.g 1. When working out equilibrium constants you would never include a solid.

Eg 2. Some specific reactions steam would be used which is obviously $H_2O_{(g)}$ rather than $H_2O_{(l)}$

E.g 3. Nearly all chemicals used in lab are solutions / (aq) as some pure chemicals like hydrochloric acid are gases, or solids like sodium hydroxide so they are always provided as solutions

When looking at an equation the state symbol can give a good indicator as to what you would oberve. E.g if (g) is produced you might see fizzing / effervescence or if (s) produced you might see a precipitate.