Atoms

An ATOM is a very complicated “thing”. An ATOM is so small we cannot really comprehend its size;

 Think of a ball of ”nothing but space” with a diameter of 0.000 000 1 mm

 1 [diameter = distance across a ball]

 10,000,000 mm

An ATOM has a mass – very small, but it has a mass. This mass is concentrated in the very centre of these ‘balls of mostly nothing’.

An ATOM is made up of many complex “sub-atomic particles” that Physicists study.

Right now, you need to know only three of them;

Protons

The little parts where most of the mass of an atom is located. They are found in the centre of the atom. We call the centre of an atom the “NUCLEUS of the atom”. Protons have a POSITVE charge (like a magnet). Remember this by looking at the spelling – pr**O**t**O**n has “o” in it, just like p**O**sitive does. The ATOMIC NUMBER of the ELEMENT is decided by the number of PROTONS the atoms of the element have.

Electrons

These really little parts of an atom fly around the outside of an atom. They occupy the space between the ‘nucleus’ and the outside of the ‘ball’ we visualize an atom to be. Electrons have no mass, and they have a NEGATIVE charge. Remember this because ‘n**E**gative’ has an ‘E’ in it, just like ‘**E**l**E**ctron’ does.

Yes, these two parts have opposite charges, so they should attract each other, and repeal others of the same kind…. You will learn about this in the future – it gets complicated quickly…. but for now, the third part you need to know is…

Neutrons

Neutrons exist in the centre (nucleus) of the atom with the protons. They have NO CHARGE (neutral = neutron) , and they have a very cool role – they attract both other types of particle, and so the protons in the nucleus can connect with them (the attraction is stronger than the repulsive charge between protons).

Now for ‘energy levels’

The electrons fly around the outside of the nucleus, kind of like satellites around the Earth… BUT, these electrons can only exist at certain distances (energy levels) from the nucleus. these energy levels are called QUANTUMs, and the study of these levels and the behaviours of electrons is the study of QUANTUM PHYSICS.

Closing notes

As you go through school, you will discover that these definitions are really simplified. In reality, electrons travel in ‘P’ , ‘S’ , ‘D’ and other orbits (and they are not “circular” either), and that the orbits (quantum levels) are “fuzzy” and that as electrons jump levels they give off or take in energy (that we use for many purposes)and that these electrons can be shared between atoms (we call this “chemical bonds)…. complicated, but really cool!

When an ATOM looses parts of its nucleus, we call this “DECAY”, and there are different types of “decay”, including ALPHA and BETA decay. ….. Where the loss energy from the nucleus results in the giving off of a PHOTON – energy (often in the form of visible light, or energy of a much higher level – gamma rays. You may have heard of RADIOACTIVE decay)