

## Chapter 11 Notes

[\(Great Site for ALL Atom knowledge\)](#)

**Atom** - means not able to be divided; smallest particle an element can be divided into and still be the same substance

Elements combine in certain proportions based on mass to form compounds.

In 1803, scientists believed that atoms could not be broken down or divided into smaller parts. However, Thomson later (1897) found that they could be and further tests were done on atoms by other scientists.

Scientists found *protons, neutrons, and electrons*.

**Nucleus** - positively charged center that includes protons and neutrons; very, very dense

- protons are *positively* charged and neutrons are *neutral*

A pinhead could be compared to a nucleus and a football stadium as the rest of the atom.

**Electron clouds** - areas inside of an atom where electrons are *likely* to be found; the exact path cannot be predicted because they do not travel in exact paths [\(More cloud info\)](#)

**Protons** - positive charge; mass is very small at  $1.7 \times 10^{-24}$  or 1 atomic mass unit, or amu

\*INSIDE the nucleus

**Neutrons** - neutral charge; a little larger than a proton but so slight that it's still considered to be 1 amu

\*INSIDE the nucleus

Electrons - negatively charged

\*mass is so small that they are not part of the total mass of the atom

\*takes more than 1800 electrons to equal the mass of 1 proton

\*the number of protons are ALWAYS equal to number of electrons in an element

\*electrons travel on 4 levels OUTSIDE of the nucleus

Level 1 = 2 electrons

Level 3 = 18 electrons

Level 2 = 8 electrons

Level 4 = 32 electrons

Each level must be filled up before you can move to the next level. ([Extra Credit ;\)](#))

Atoms have an overall neutral charge, but if the number of protons and electrons changes, the atom becomes an *ion*, which is a charged particle.

If an atom *loses* one or more electrons, it will have a *positive* charge. If an atom *gains* 1 or more electrons, it will have a *negative* charge because electrons have a negative charge.

*The protons give an element its identity.* For example, hydrogen has 1 proton, so that's its atomic number.

15
P
Phosphorus
31.0

15 is the atomic number, so you know phosphorus has 15 protons. Since protons are equal to electrons, there are 15 electrons. The mass is 31.0, which is the # of protons and # neutrons added together.

To find the number of neutrons, subtract the atomic # from the mass #.  $31 - 15 = 16$  neutrons inside the nucleus.

Phosphorus - 15 protons, 16 neutrons, and 15 electrons  
Level 1 = 2 electrons, Level 2 = 8 elec., Level 3 = 5 elec.

*See pictures from your school notes!*

Isotope - atoms w/ the same # of protons but different # of neutrons that share the same characteristics as the original element.

Each element has a limited # of isotopes found in nature. Some are unstable, which are called radioactive. They give off energy as they fall apart in nature.