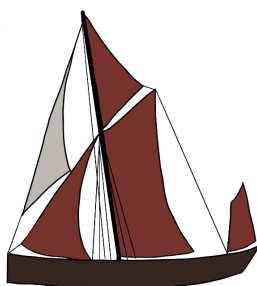

ATOMIC STRUCTURE NOTES

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Atomic Structure Notes

What actually is an atom, and what is an atom made of? When it comes to GCSE chemistry knowledge of the atom and what atoms are made from is absolutely crucial.

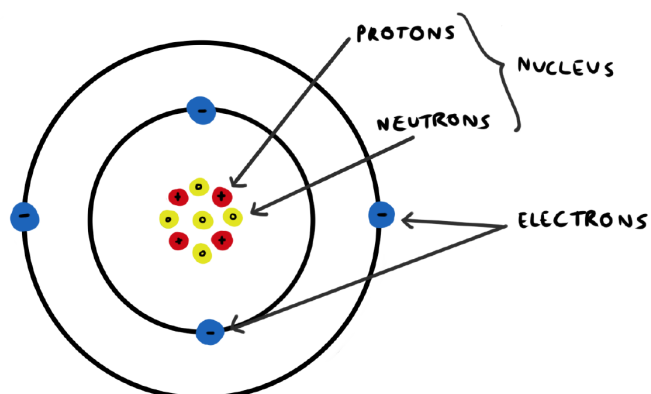
Let us start with that first question. What is an atom?

An atom: is the simplest particle of an element that is neutral.

And secondly, what is an atom made of?

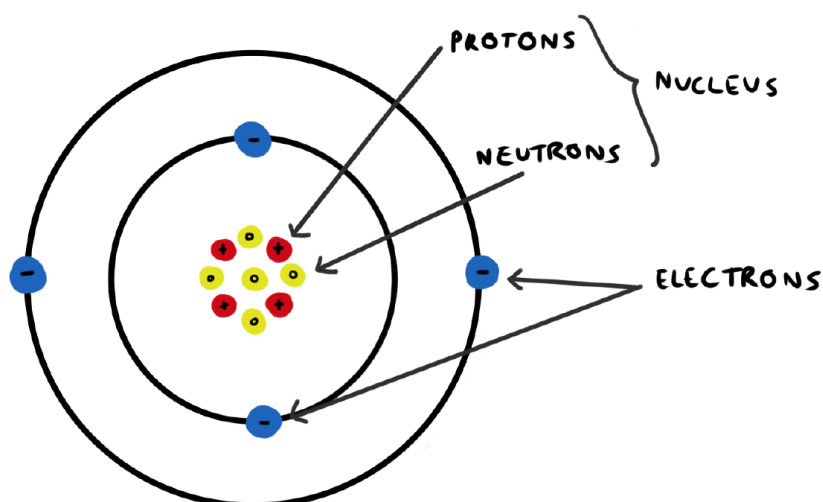
Atoms are made of three different types of particles.

1. Protons.
2. Neutrons.
3. Electrons.



Protons and neutrons are located in the nucleus of the atom.

Electrons are located in the orbits also known as electron shells surrounding the nucleus.



Atomic Structure Notes

Electronic configuration

As mentioned, electrons are arranged in orbits or shells around the nucleus of an atom.

The rules are quite straight forward. They are as follows;

First shell	→	a maximum of <u>2 electrons</u> .
Second shell	→	a maximum of <u>8 electrons</u> .
Third shell	→	a maximum of <u>8 electrons</u> .

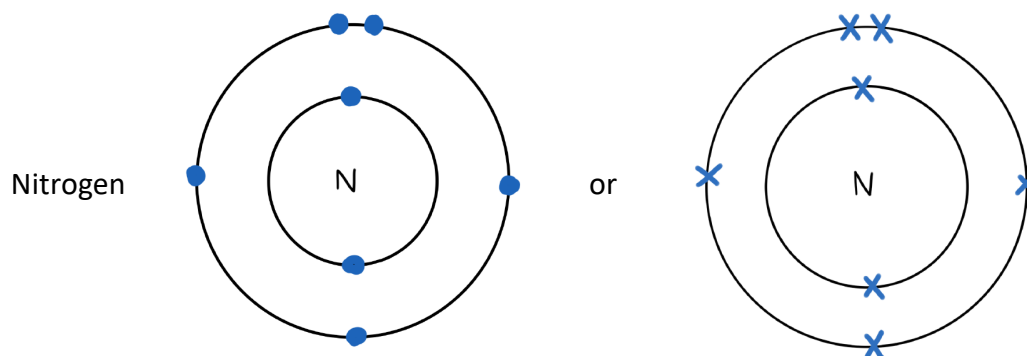
There are two ways to represent the atomic structure of an element or compound;

1. Electronic Configuration.
2. Dot & Cross Diagrams.

With electronic configuration elements are represented numerically by the number of electrons in their shells and number of shells. For example;

Nitrogen		N	7
	$2 + 5 = 7$		
2 in 1 st shell			14
5 in 2 nd shell	configuration = 2, 5		

With Dot and Cross diagrams electrons are represented by Dots or Crosses to show electrons, and circles to show the shells. For example;



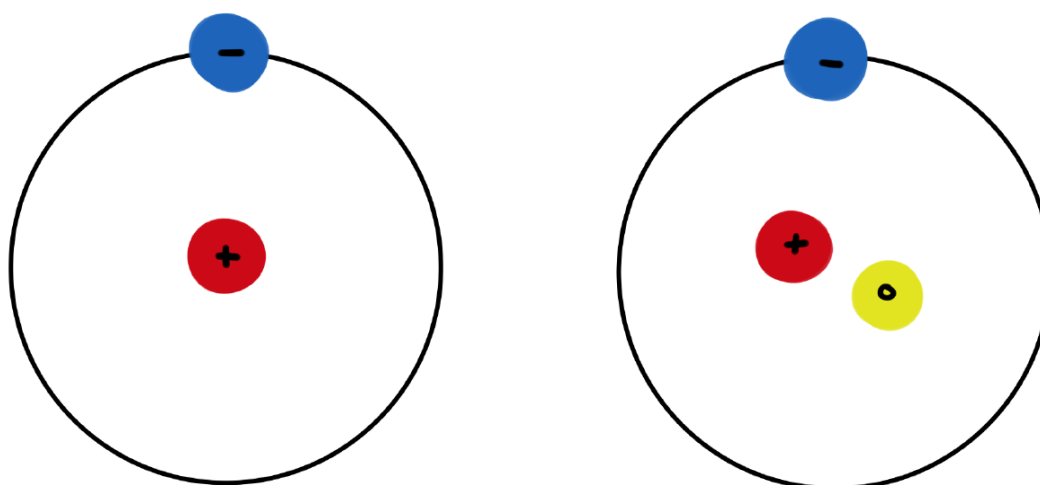
Atomic Structure Notes

Isotopes

Isotopes: are atoms of elements that have the same number of protons but different numbers of neutrons.

So, an isotope can still be the same element even though the mass numbers are different. So, again isotopes have the same number of protons but different numbers of neutrons.

Take the next figure as an example.



Hydrogen atom

Deuterium atom

We can see here that a deuterium atom is an isotope of hydrogen. Having the same number of protons and a different number of neutrons 😊.

We can be asked to calculate the relative atomic mass of a sample containing two or more isotopes of an element. "Two isotopes" are the most common style of question. To put it simply we are being asked to find the mean (average) of the two. Take the following example.

E.g.1 A sample of copper contains 70% of copper-63 and 30% of copper-65 atoms. Calculate the relative atomic mass of the sample of copper.

$$\frac{(63 \times 70) + (65 \times 30)}{70 + 30} = \frac{4410 + 1950}{100} = 63.6$$

The existence of isotopes results in relative atomic masses of some elements not being whole numbers.