

| Particle | Charge         | Relative Mass |
|----------|----------------|---------------|
| Proton   | Positive ( + ) | 1             |
| Neutron  | Neutral        | 1             |
| Electron | Negative ( - ) | 0.0005        |

Inside every atom there is a nucleus which contains protons and neutrons. Orbiting this core are the electrons. The electrons orbit at vast distances, so most of the atom is empty space

**Proton Number:** Number of protons in the nucleus

**Nucleon Number:** Total number of protons and neutrons in the nucleus

**Example Question:** How many protons, neutrons and electrons are there in a neutral atom of oxygen?

- Oxygen has a proton number of 8 = 8 protons and 8 electrons  
and a nucleon number of 16 = total number of protons and neutrons  
The number of protons is already known (this is the proton number) to find number of neutrons: subtract number of protons (in this case 8) from nucleon number (in this case 16)  
= 8 neutrons

***Number of protons and electrons are always equal***

**Number of neutrons = Nucleon number – Proton number**

**Isotopes:**

Isotopes are atoms with the same number of protons but different numbers of neutrons. They are the same element but have different atomic masses

Isotopes have the same chemical reactions and behaviour but have different physical properties. The nuclei of isotopes have different stabilities

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