6.1.1 Introduction to Atomic Particles

The physicist Niels Bohr developed a model of the atom that looked like the picture below.

<table>
<thead>
<tr>
<th>Part of Atom</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>protons</td>
<td></td>
</tr>
<tr>
<td>neutrons</td>
<td></td>
</tr>
<tr>
<td>electrons</td>
<td></td>
</tr>
<tr>
<td>nucleus total</td>
<td></td>
</tr>
<tr>
<td>total charge</td>
<td></td>
</tr>
</tbody>
</table>

**Parts of the Atom**

<table>
<thead>
<tr>
<th>Part of Atom</th>
<th>Overall Charge</th>
<th>Atomic Weight (u)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nucleus</td>
<td>0 (neutral)</td>
<td>depends on atom</td>
<td></td>
</tr>
<tr>
<td>proton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neutron</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>electron</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**What is?**

Charge: 

Atomic Weight:
Atomic Theory:

The atom is the smallest WHOLE unit of matter that can retain chemical properties, but the atom is made up of more than 200 SUBATOMIC particles. There are 3 main subatomic particles that are very important:

**AMU: Atomic Mass Unit** = a special unit of weight used to measure the mass of one PROTON (or Neutron). One (1) gram is approximately 602,213,670,000,000,000,000,000 AMUs.

1) The **PROTON**:
   - These are subatomic particles with a POSITIVE charge
   - The positive charge is equal but opposite to the charge of an electron
   - Every Atom must have at least one proton
   - In every neutrally charged atom, # protons = # electrons
   - The proton has a mass of 1 AMU
   - Atoms do not gain or lose protons in normal chemical reactions

2) The **NEUTRON**:
   - These are subatomic particles with no charge (neutral)
   - They are found in every atom’s nucleus except for in Hydrogen.
   - Atoms do not gain or lose neutrons in normal chemical reactions
   - The function of the neutron is to help stabilize the nucleus
   - If there are too few or too many neutrons in a nucleus, it will fall apart!!
   - A neutron weighs 1 AMU

3) The **ELECTRON**:
   - These are subatomic particles with a NEGATIVE charge
   - The negative charge is equal but opposite to the charge of a proton
   - An electrons circles the nucleus in a path called an electron cloud
   - In every neutrally charged atom, # protons = # electrons
   - The electron has a mass of 1/1836 AMUs
     (1836 electrons = 1 AMU)
   - Electrons move very fast (about 13,000 km/h)
   - You can not know the exact position of an electron; you can only know the probability of the region in which it can be found. This region is known as the electron cloud.
   - The electron clouds give the atom its shape
   - The Electrons are responsible for the chemical properties of atoms

The **NUCLEUS**

The PROTONS and NEUTRONS are contained in the middle of the atom in a region known as the NUCLEUS.

The nucleus is the core or center of the atom and …

- it contains 99.9% of the mass of the entire atom but.
- it is 100,000 times smaller than the size of the entire atom.
HOW DO YOU FIND THE NUMBER OF NEUTRONS????

The number of neutrons can be determined if you know the mass of the nucleus. You simply take the "Atomic Mass" (the larger number), round the atomic mass to a whole number to get the Mass Number, and subtract the Atomic Number from it.

# Neutrons = Mass Number - Atomic Number

Example: Hydrogen (H)

atomic number = 1

number of protons = 1, and number of electrons = 1

atomic mass = 1.008 which rounds to 1

number of neutrons = atomic mass – atomic number = 1-1 = 0