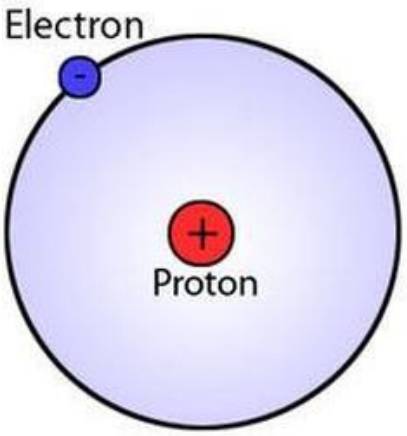
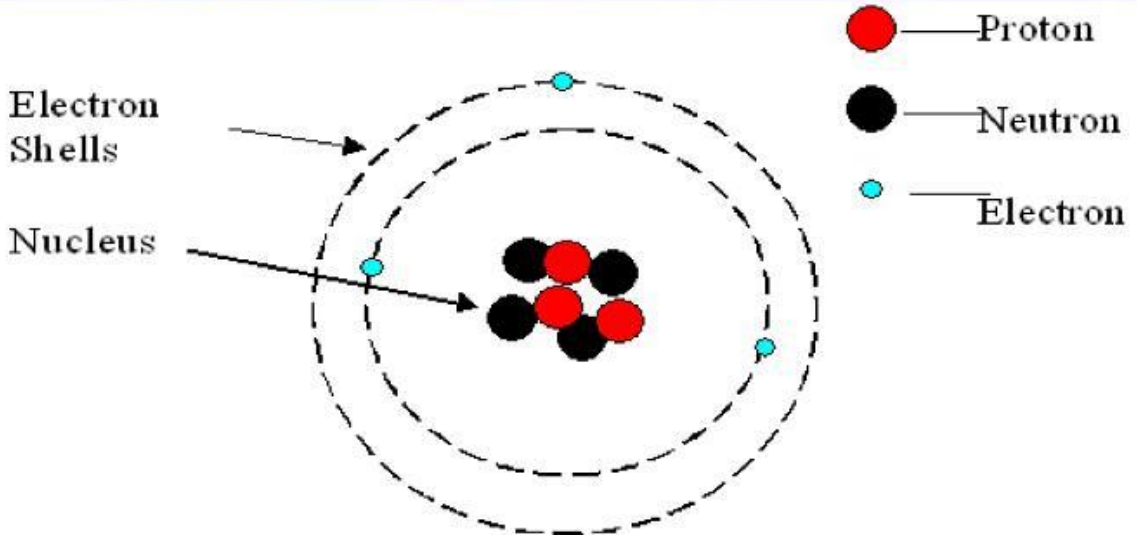
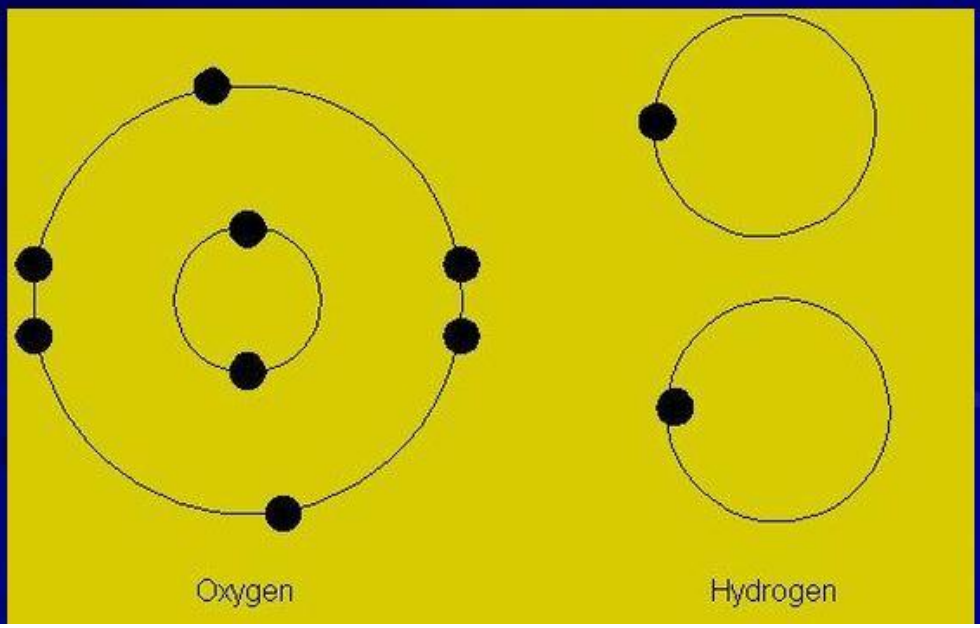
THE RUTHERFORD-BOHR ATOMIC MODEL



- Scientists now know that there are three particles inside of an atom: ***protons***, ***electrons*** and ***neutrons***.



- Atoms are bigger or smaller because they have ***more*** or ***less*** of these particles.



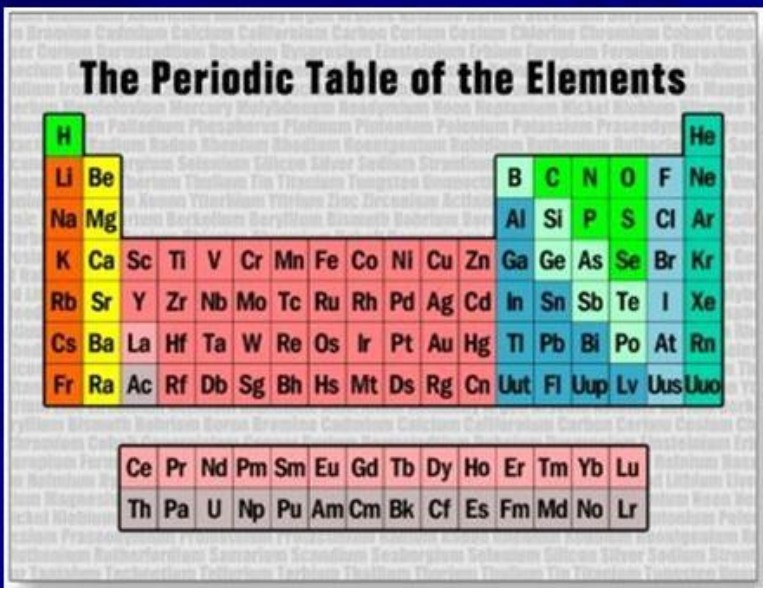
SUBATOMIC PARTICLES

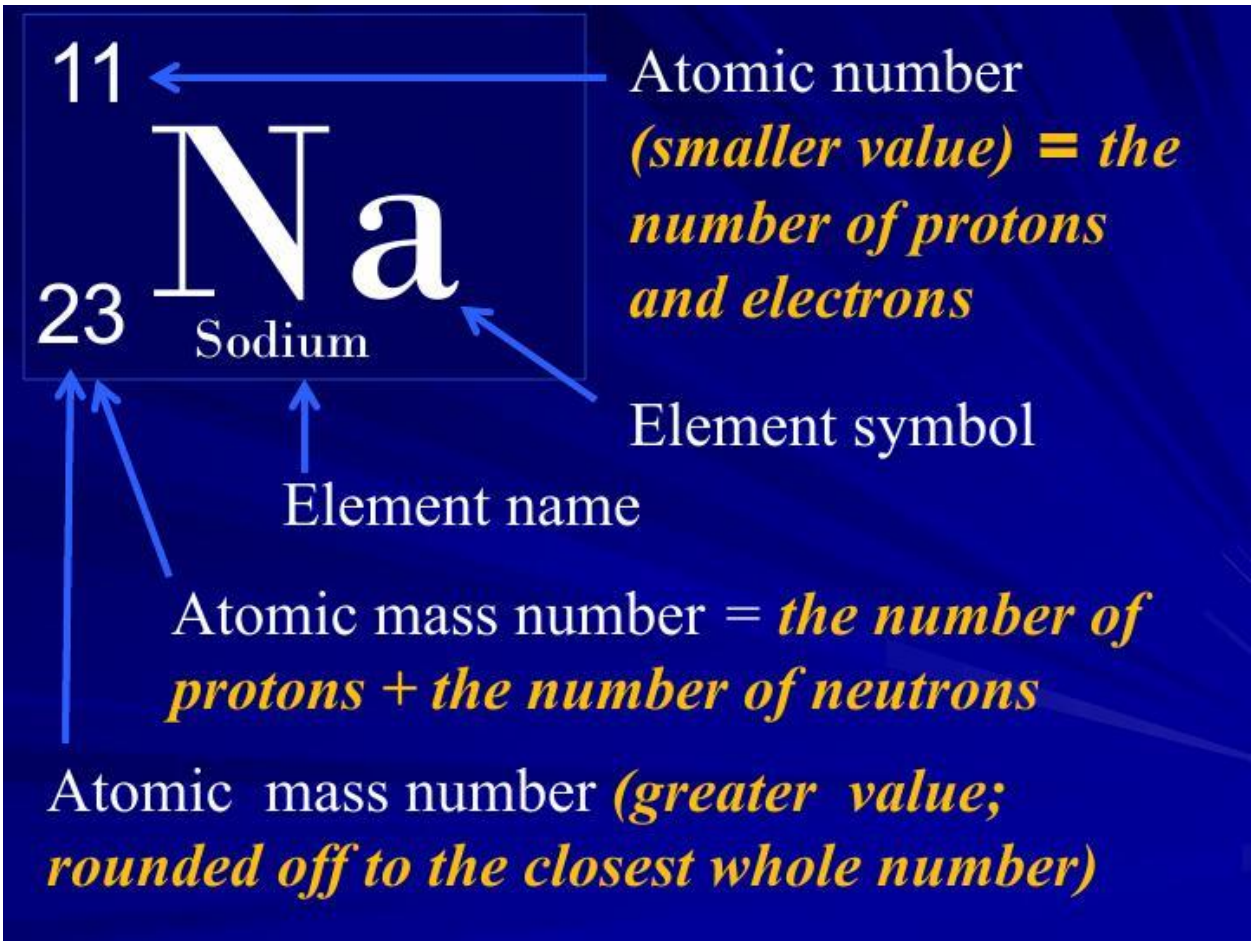
Particle	Mass	Charge	Location
electron	1/1837 amu	-	outside the nucleus
proton	1 amu	+	inside the nucleus
neutron	1 amu	0	inside the nucleus

- **Amu** (***a***tomic ***m***ass ***u***nit) is the 12^{th} part of the mass of a carbon atom.
- **1 amu** = 1.67×10^{-27} kg

CALCULATION OF THE NUMBER OF SUBATOMIC PARTICLES

- We use the periodic table.
- Each element occupies a box:

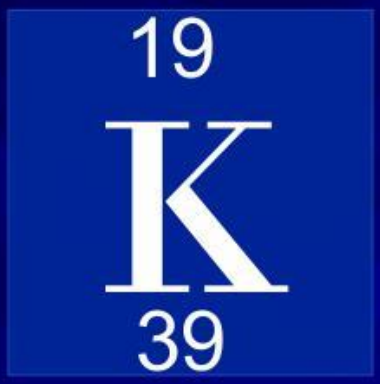



11
Na
23
Sodium
Atomic number
(smaller value) = the number of protons and electrons
Element symbol
Element name
Atomic mass number = the number of protons + the number of neutrons
Atomic mass number (greater value; rounded off to the closest whole number)

- In an atom:
  - The ***atomic number*** equals the ***number of protons*** and equals the ***number of electrons.***
  - If 20 protons are present in an atom then 20 electrons are there to balance. The overall charge of the ***atom*** is ***neutral.***

– The ***number of neutrons*** is found by ***subtracting the atomic number from the atomic mass number.***

Example: Potassium



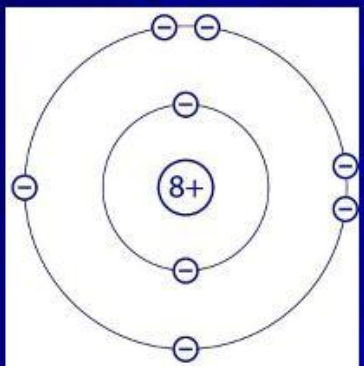
- Atomic number: ***19***
- Atomic mass number: ***39***
- Number of protons: ***19***
- Number of electrons: ***19***

- Number of neutrons: ***20***

atomic mass number – atomic number=
39 -19 = 20

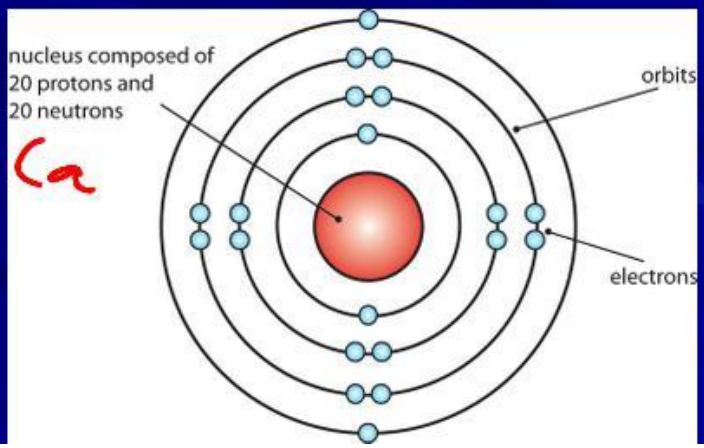
THE RUTHERFORD-BOHR ATOMIC MODEL

- Representation of the atom as a very small ***nucleus*** made up of ***positively charged protons***, surrounded by negatively charged ***electrons*** moving in ***defined orbits*** (also called energy levels or simply shells).



ELECTRON CONFIGURATION

- Distribution of electrons on the different orbits
- Capacity of the energy levels for the first 20 elements: 2-8-8-2



- Ex: Neon

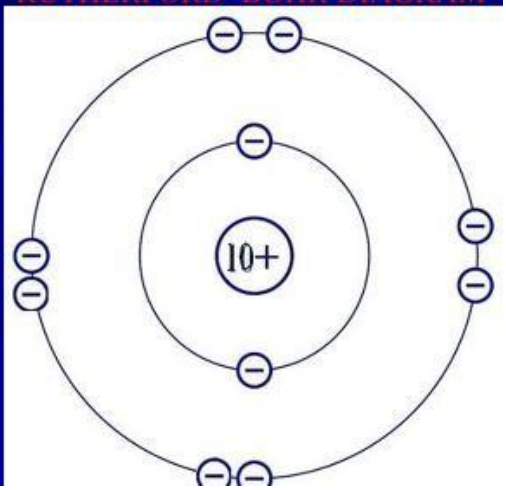
Atomic # ***10***

Atomic mass # ***20***

10 electrons distributed like this:

- ***2*** on the first level
- ***8*** on the second level

RUTHERFORD- BOHR DIAGRAM



VALENCE ELECTRONS

- The electrons situated on the last shell are called ***valence electrons***.
- They take part in chemical reactions