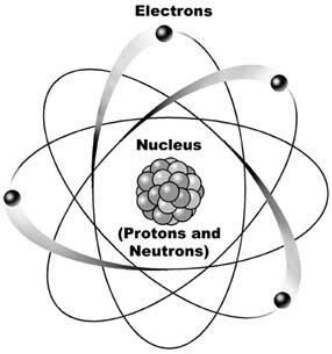
Atoms NOTES



The Atom.

I. **Subatomic Particles**
   1. **Protons**
   2. **Neutrons**
   3. **Electrons**

II. **Atom's nucleus:** contains protons & neutrons.

1. Proton: (+) charge
   mass: 1 a.m.u. (atomic mass unit)

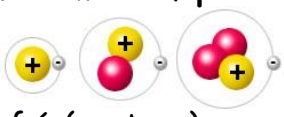
2. Neutron: (0) charge; neutral
   mass: 1 a.m.u.

III. **Atomic number:** the number of protons in the nucleus. This is what determines what the element is! The atomic number identifies the element.

Ex: C has 6 protons in the nucleus.
N has 7 protons in the nucleus.

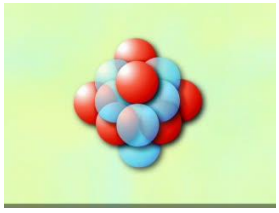
*The atomic number of an element will never change (# of protons), BUT it is possible for atoms of the same element to have a different number of *neutrons*.

IV. **Isotopes:** atoms of the same element that have the **same** number of **protons**, but a **different** number of **neutrons**.



Ex: Carbon will always have an atomic number of 6 (protons) no matter how many neutrons it has.

V. **Mass number:** sum of all protons & neutrons in a nucleus.



Ex: Mass number of C isotope with 6 neutrons.
6 (p) + 6 (n) = 12

Mass number of C isotope with 8 neutrons.
6 (p) + 8 (n) = 14

*To tell the isotopes apart, we use their mass numbers after their name.

Ex: Carbon – 12 (C-12) or Carbon -14 (C-14)

Problem: You have 2 isotopes of U: U-235, U-238. How many neutrons are there in each isotope?

Atomic number of U = 92

1.) 235
-92
143 neutrons

2.) 238
- 92
146 neutrons

VI. **Atomic mass**: average of the masses of the existing isotopes of an element.

Mass number	VS.	Atomic mass
# of protons & neutrons of most common isotope		Average of all an elements isotopes.

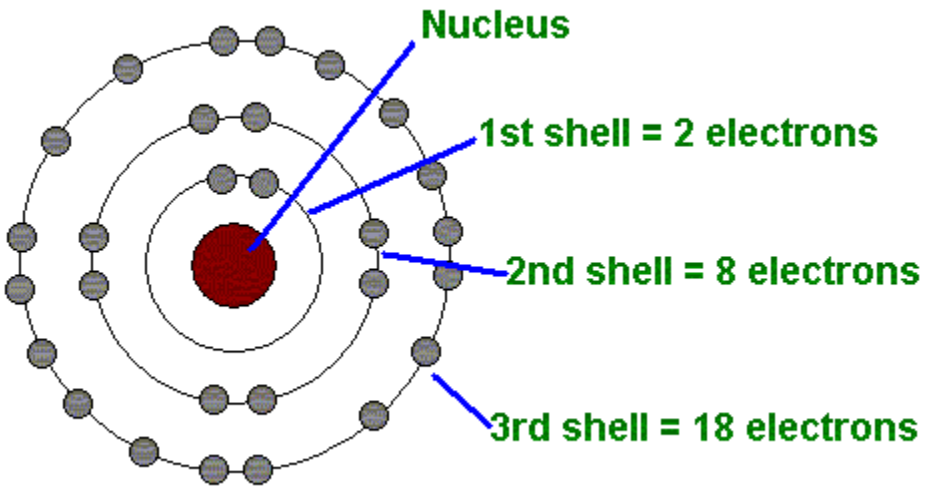
VII. **Electrons:** (-) charge, negative.
Mass: 0.0006 a.m.u.

* a. In a neutral atom, # of protons (+) = # of electrons (-)

b. Electron cloud: space in which electrons are likely to be found around the nucleus of an atom.

c. Electrons are NOT randomly floating around the nucleus. They seem to be locked into a certain area depending on how much energy the electron has.

d.



e. Each energy level in an atom can hold only a certain number of electrons.

f. The arrangement of electrons in atoms is what gives their chemical properties,

Ex: ability for an element to bond.

This ability is determined by the arrangement of electrons in the outermost energy level.

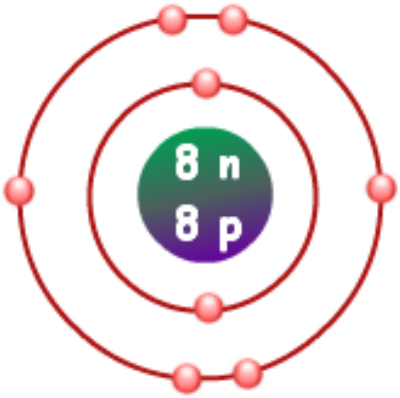
VIII. Subatomic particles chart

Subatomic particle	Mass (a.m.u.)	Charge	Location
Proton	**1**	**+**	**Nucleus**
Neutron	**1**	**Neutral**	**Nucleus**
Electron	**0.0006**	**-**	**Electron cloud**

IX. Summing it Up

Neutral Atom

Atomic mass = 16



1.) How many electrons? **8 e-**
2.) How many protons? **8 p+**
3.) How many neutrons? **16 (mass) – 8 p+ = 8 n**
4.) What element does this atom represent? **oxygen**
5.) How many more electrons can the outer energy level hold? **2 more e-**