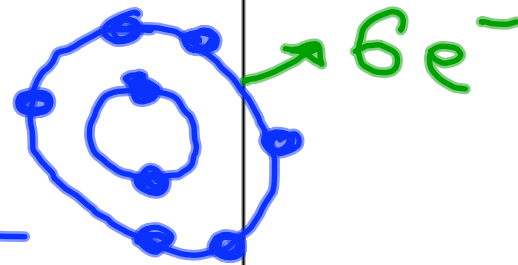


Atomic Structure

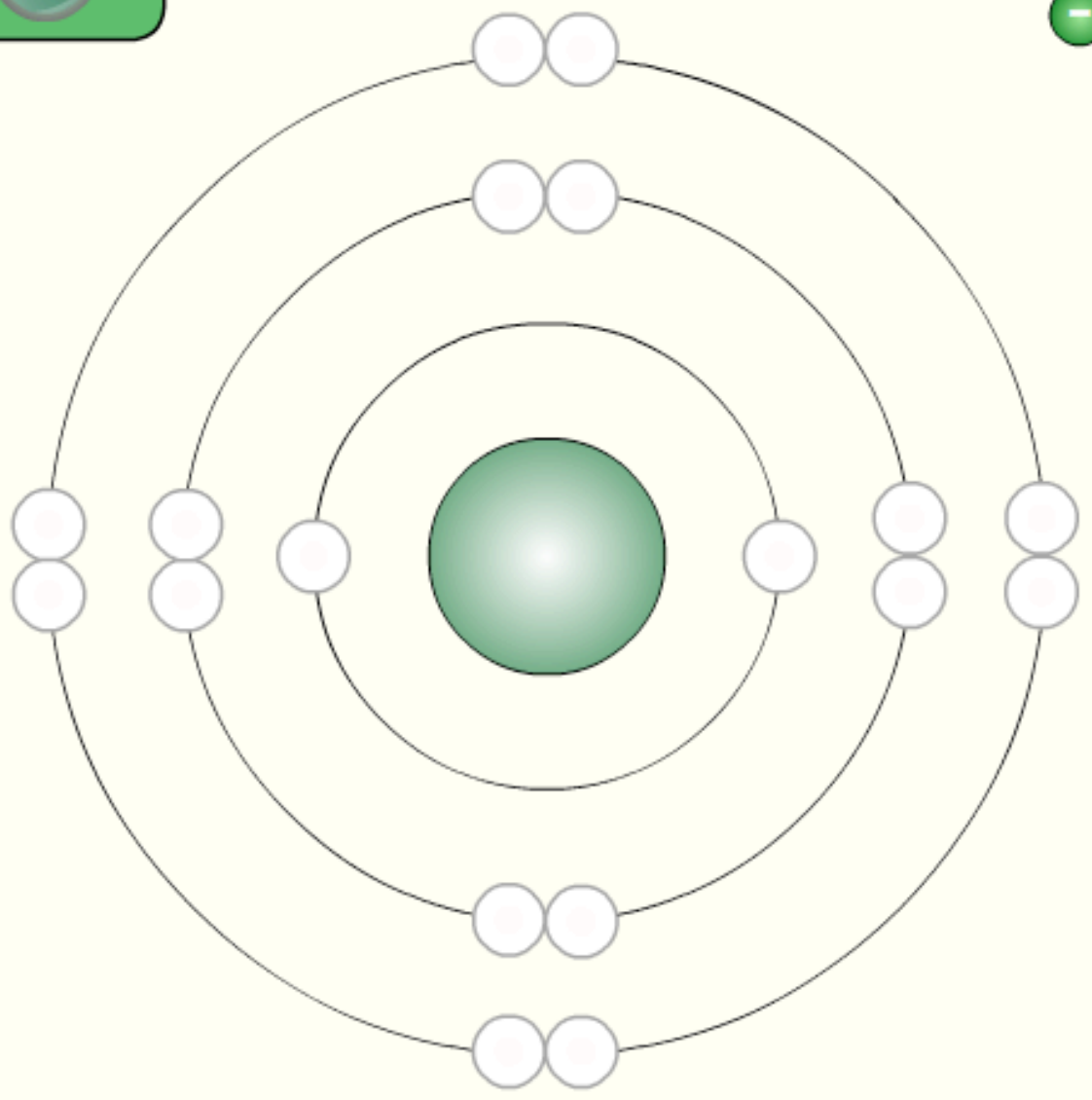
Subatomic Particles

Name	Location	Charge	Mass	Relationship to Periodic Table
Proton	Nucleus	+1	1	# of protons = atomic number
Neutron	nucleus	0	1	# neutrons = atomic mass – atomic number
Electron	Orbiting the nucleus	-1	1/1800	# electrons = atomic number
				# of <u>valence electrons</u> = group number
				# of energy levels = period number

8 e⁻ ex. oxygen
 valency = 6 e⁻



2 orbits



- Electron
- Proton
- Neutron

Electrons = 0
Protons = 0
Neutrons = 0
Atomic mass 0
Atomic No. = 0
Charge = 0

Reset

Reveal next shell automatically when previous is filled.

Isotopes...

atoms which have the same number of protons but a different number of neutrons

atoms with the same atomic number, but a different atomic mass

Isotope Notation:

mass number
atomic number
Symbol
charge
atomic mass

Examples

Carbon-12

$$\begin{aligned} p^+ &= 6 \\ n^0 &= 12 - 6 = 6 \\ e^- &= 6 \end{aligned}$$

Carbon-13

$$\begin{aligned} p^+ &= 6 \\ n^0 &= 13 - 6 = 7 \\ e^- &= 6 \end{aligned}$$

Carbon-14

$$\begin{aligned} p^+ &= 6 \\ n^0 &= 14 - 6 = 8 \\ e^- &= 6 \end{aligned}$$

SMART Technologies

? Electron
Proton
Neutron

Electrons = 0
Protons = 0
Neutrons = 0
Atomic mass = 0
Atomic No. = 0
Charge = 0

Reset Reveal next shell automatically when previous is filled.

SMART Technologies

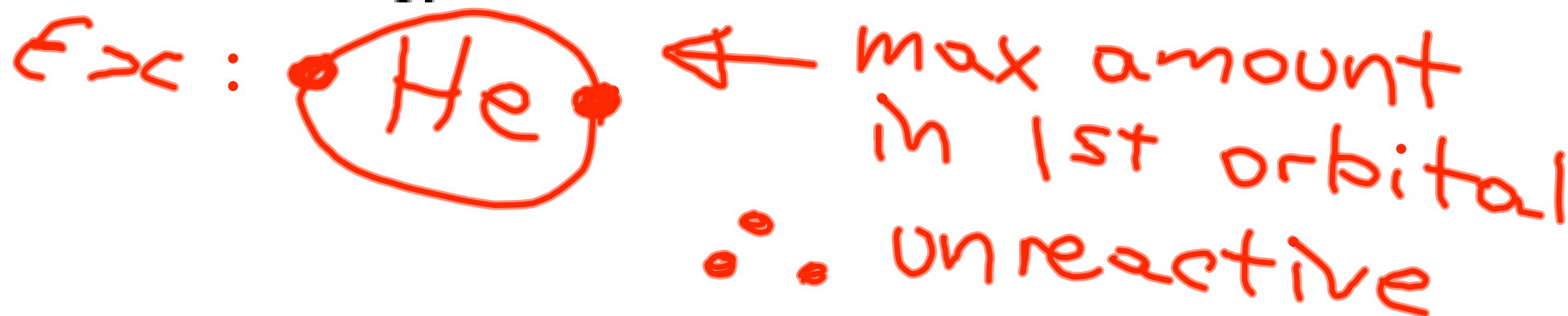
? Electron
Proton
Neutron

Electrons = 0
Protons = 0
Neutrons = 0
Atomic mass = 0
Atomic No. = 0
Charge = 0

Reset Reveal next shell automatically when previous is filled.

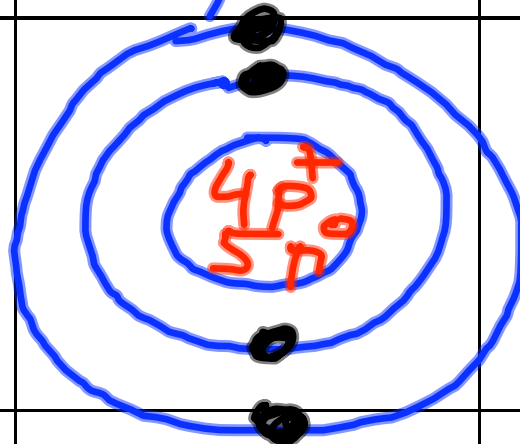
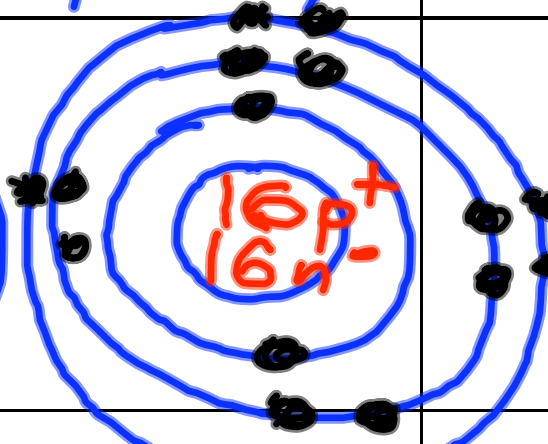
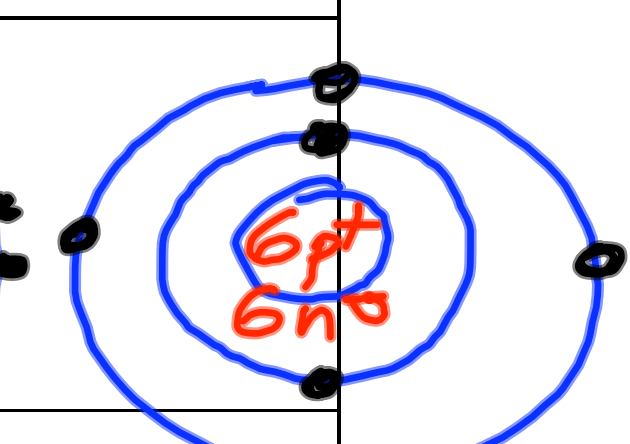
Electron Configuration

- electrons exist in specific energy levels called orbits
- the higher the energy level of the electron, the further away from the nucleus it is
- each energy level holds a maximum # of electrons
 - the first energy level holds 2 electrons
 - the second energy level holds 8 electrons
 - the third energy level holds 8 electrons
- electrons in the highest energy level are called valence electrons
- an atom with the maximum # of electrons in its outer energy level is unreactive



$$32 - 16 = 16$$

Example

Element	Beryllium	Sulfur	Carbon
Atomic #	4	16	6
p ⁺	4	16	6
n ⁻	5	16	6
e ⁻	4	16	6
Electron Configuration	2e ⁻ , 2e ⁻	2e ⁻ , 8e ⁻ , 6e ⁻	2e ⁻ , 4e ⁻
Bohr Diagram			
Valence Electrons	2e ⁻	6e ⁻	4e ⁻

$$12 - 6 = 6$$



Ions

-an atom will gain or lose electrons to have a full valence energy level

→ octet rule

-this creates an **ion**

-an ion is a atom with a different number of proton and electrons

Metals	lose electrons to form positive ions called cations
Non-Metals	Gain electrons to form negative ions called anions

Examples

Ion	Ion Symbol	Parent Atom	Ionic Electron Configuration
Magnesium ion <i>metal</i>	Mg^{2+}	Ne	$2e^{-}, 8e^{-}$
Phosphide ion <i>non metal</i>	P^{3-}	Ar	$2e^{-}, 8e^{-}, 8e^{-}$
Iron (III) ion <i>metal</i>	Fe^{3+}		$2e^{-}, 8e^{-}, 8e^{-}, 5e^{-}$



Some atoms do not form ions very easily.

