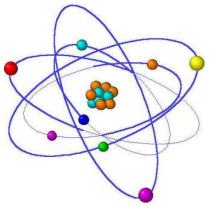
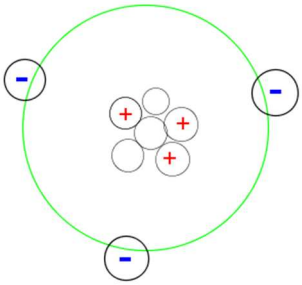
Chapter 4 Atoms
Guided Notes



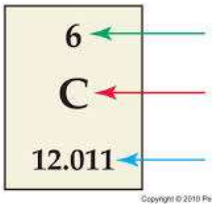
- **What is in an Atom?**
  - Atoms are the _____ of everything.
  - Atoms can be _____, but not easily on _____.
  - No overall _____ (_____).
  - _____ different types of _____

Particle	Charge	Mass	Location

- **Parts of the Atom**
  - Protons
    - An _____ is determine by the _____
    - Protons determine an atoms _____
    - NO _____ WILL HAVE THE SAME _____.
    - _____ charge
    - Located in the _____
  - Electron
    - Electron have a _____
    - Located _____
    - Adding and removing electrons _____
  - Neutron
    - Neutrons have _____ and are _____.
    - Neutrons _____ to the overall _____.
    - Adding and removing neutrons create _____.
  - Nucleus
    - Contains the _____
    - Where most of the _____of the _____
    - Has an overall _____



- **Atomic Mass**
  - Atomic number = the number of _____
    - If the atom is _____, this is also the number of _____
    - No _____ share the same _____or number of protons
      - Carbon: _____
      - Hydrogen:_____
      - Uranium: _____



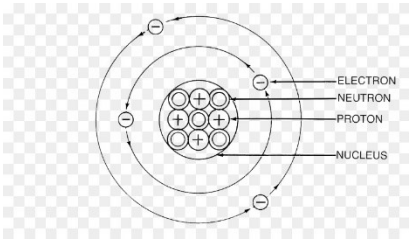
- **Mass Number**
  - Mass number = the total number of _____ in the nucleus
  - The sum of the _____.
    - *Example:* A fluorine atom has ___ protons and _____neutrons, so _____ for fluorine.
      - Carbon:_____
      - Chlorine: _____
      - Aluminum: _____
    - mass number can be estimated by rounding the _____.

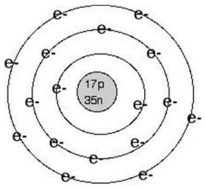
- **Neutrons**
  - We can find the number of _____ by subtracting the _____ from the _____.
    - How many neutrons does S have?
    - How many neutrons does Al have?

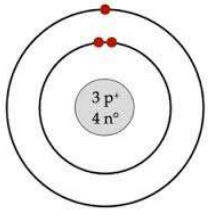
Fill in the table below:

Element	Symbol	Number of Protons	Number of Neutrons	Number of Electrons	Atomic Mass	Atomic Number
Tantalum						
Radium						

Identify the following atom based on their Bohr model.

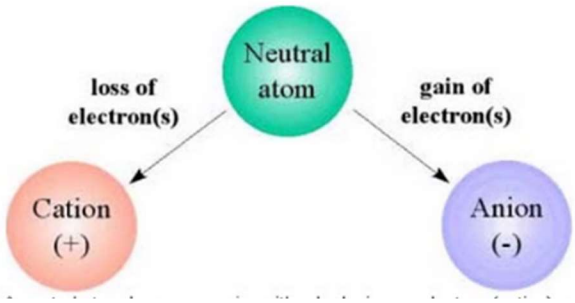






_____ _____ _____

- **Ion Formation**
  - A neutral atoms that becomes charged is called an _____
  - Different number of _____ and _____
  - Form by _____ the number of _____



Ion	Number of Protons	Number of Electrons	# added or removed Electrons	Charge	Atom or Ion
Co					
Co^{+2}					
Co^{+3}					
Cl					
Cl^{-1}					

Ion formation Practice Examples:

Example 1

1. Sodium (Na) atoms have _____ protons and _____electrons with a net charge of _____.
2. If the Sodium ion only has 10 electrons, what is the net charge of the ion? _____
3. What is the chemical symbol for this ion? _____

Example 2

1. Beryllium (Be) atoms have _____ protons and _____electrons with a net charge of ___.
2. If the Beryllium ion has only 2 electrons, what is the net charge of the ion? _____
3. What is the chemical symbol for this ion? _____

State the number of protons, neutrons, and electrons in each of these ions.

$^{39}_{19}K^{+}$	$^{16}_{8}O^{-2}$	$^{41}_{20}Ca^{+2}$
$\#p^{+}$ _____	_____	_____
$\#n^{o}$ _____	_____	_____
$\#e^{-}$ _____	_____	_____

Write the nuclear symbol form for the following atoms or ions:

A. 8 p^{+}, 8 n, 8 e^{-} _____

B. 17p^{+}, 20n, 17e^{-} _____

C. 47p^{+}, 60 n, 46 e^{-} _____

- **Isotopes**
  - An isotope is an atom that has the _____ but a different _____(relative to other atoms of the _____).
  - Same number of _____
  - They _____ and _____ .
    - Examples:
  - Same _____, but different _____ due to different number of _____
    - Carbon-12: ___ protons ___ neutrons
    - Carbon-14: ___ protons ___ neutrons
  - CHANGE IN WEIGHT, BUT NOT _____

Examples:

- Boron-10 (10B) = _____ protons _____ neutrons
- Boron-11 (11B) = _____ protons _____ neutrons

*Atoms are the same _____ but with different _____ making them _____.

Modern Atomic Theory

- Electrons can be found only in _____, not _____ levels.
- _____ (not precise) is _____ to energy levels.
- Electron _____.
- The whole shaded region is called an _____.

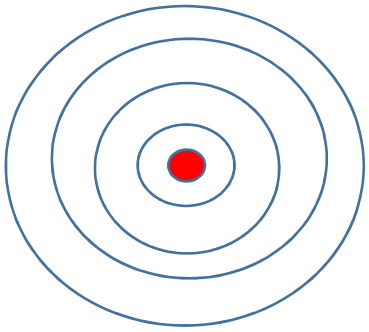
Bohr Model

- Bohr models show every electrons on each energy level of an atom.

K	Ni

Energy Level

- Describe the _____ takes around the _____
- They have different amounts of energy
- Energy levels closest to the nucleus have the least energy.
- Electrons are arranged in a predictable pattern from inner to outer levels.



Nucleus	

Name	Symbol	Atomic number	Mass Number	Number of neutrons	Number of Electrons	Charge
hydrogen -2	^{2}H	1	2	1	1	0
	^{3}H					
sodium-22	$^{22}Na^{+}$				10	
		12	24		12	
		12	25		13	
	$^{46}Ti^{-2}$					
	^{107}Ag					

Atom 1	Atom 2	Relationship between atom 1 and atom 2
$^{12}_{6}C$	$^{13}_{6}C$	☐ Isotopes ☐ Same Atom, Not Isotopes of Each Other ☐ Different Element
Carbon-12	$^{12}_{6}C$	☐ Isotopes ☐ Same Atom, Not Isotopes of Each Other ☐ Different Element
Argon-40	Argon-41	☐ Isotopes ☐ Same Atom, Not Isotopes of Each Other ☐ Different Element
$^{11}_{5}B$	Boron-10	☐ Isotopes ☐ Same Atom, Not Isotopes of Each Other ☐ Different Element
An atom with 13 protons and 13 neutrons	An atom with 14 protons and 13 neutrons	☐ Isotopes ☐ Same Atom, Not Isotopes of Each Other ☐ Different Element

1. List out the number of protons, electrons, and neutrons of $^{207}_{82}Pb$

2. List out the number of protons, electrons, and neutrons of $^{55}_{25}Mn^{+2}$