Unit: Atoms and Elements

Mission D: Subatomic Particles & Compounds

Mini Lesson #1: Subatomic Particles

- When looking at ________________ scientists have discovered that they are ______________ made up of

  ___________________ space filled with _________________ moving __________________________.
- The _________________ of the atom is made up of _______________________ charged _______________

  with _______________________ charged ______________________ orbits around it.
- The parts of the _____________________ are known as the _____________________ _________________.

1. **Protons**: +1 ____________
   Found in the _______________ *The ____________ of __________ determines what
   Mass = ________ amu the _________________ is.
2. **Electrons**: -1 _________________
   Orbit _________________ nucleus
   Mass is very ________________ (________/2000 amu)
3. **Neutrons**: ________ charge
   Found in the ______________
   Mass = ________ amu

- An ________________ itself has _____________ charge. It is ___________________.
- There are the _______________ number of ___________________ as _____________________ in every

  atom, so the ______________________ and __________________ charges cancel each other out, leaving a

  net _______________ of _________________.
- Ex: Magnesium

  Positive protons =

  Negative electrons =

  Total net charge of atom =
- How to find subatomic values:

  ___________________ = the atomic #

  Electrons = _______________ as the # of ____________________ (atomic #)

  Neutrons = ___________________ (rounded) - # of ________________
- To help find out how many ________________, _______________________ and __________________ are

  found within an atom we use standard atomic __________________________.
- Example: Boron

  <u>example of atomic formation</u> <u>subatomic particle values</u>

Mini Lesson #2: Bohr Model of an Atom

- A **Bohr model** is a _________________ that represents the ___________________ structure of an

  ______________________. It shows the ______________________ particles found within the

__________________ as well as the number of ____________________ around the

_______________ and how many ___________________ each contains.

- Steps to making a Bohr Model:
  1. Create a circle "_________________" and state the number of ________________ "p" and

  ____________________ "n" found within it.

  2. Find how many ____________________ are found within the element and start drawing

  ______________ around the __________________ (hint: the number of ____________ = the

  ___________ #)

<u>Number of Electrons allowed in each Orbit:</u>

1st orbit = max of 2 electrons
2nd & 3rd orbit = max # of 8 electons
4th & 5th orbits = max #18 electrons
6th & 7th orbits = max #32

- Examples: Create bohr diagrams for the following elements.

1. Flourine — Protons = __________ Diagram:
   Neutrons = ________
   Electrons = _________
2. Calcium — Protons = __________ Diagram:
   Neutrons = _________
   Electrons = _________

<u>Mini Lesson #3: Atoms to Ions</u>

- Atoms can ___________ or ____________ negatively charged ______________ from their

  ________________ shell (outer orbit) with other ______________ so they can become ______________.
- An element is ____________ when its valence shell is ___________ and is ______________ when it is

  ____________ full.
- When an _____________ gains or loses valence _________________ the atom becomes a charged

  ___________.
- If electrons are _______________, the atom becomes a __________________ charged

  ______________. If electrons are _______________, the atom becomes a ___________________

  charged _______________.
- It is still the same ____________________; however it is ___________________.
  - # _______________ & ______________ are the same
  - # ____________________ changed
- The charge describes the ____________________ capacity of the ______________.

- The combining ______________________ is the ability of an element to ________________________ with other

  __________________________ to make ______________________________.

- Examples:

a) Magnesium

b) Phosphorous

<u>Mini Lesson #4: Ionic Compounds</u>

- Positive and negative _______________ are ______________________ to each other because they have

  _________________ charges. **Remember that opposites attract!!**
- When a positive _________________ cation combines (fixes) with a negative __________________________ anion

  an _________________ compound is formed with the ___________________ electrons in each ion.

<u>Ball & Hook Compound Diagrams:</u>

Example 1: Calcium & Fluorine

Example 2: Magnesium & Bromine

<u>Criss-cross Compound Formulas:</u>

Example 1: Calcium & Oxygen

Example 2: Aluminum & Sulfur

Naming Ionic Compounds:

- The name of the ____________________ is first, followed by the name of the ________________________.
- The ______________________ to the name of the ______________________ changes to "_________".

Examples:

Calcium and iodine ------- ________________________________ K_2O ----- ________________________________

Mini Lesson #5: Counting Atoms

- We can see how many ______________________ there are in a __________________ by using the following rules:

1. The symbol of an element represents 1 atom of that element
   Ex: Ca = 1 atom of calcium
2. A subscript (value in lower script) states the number of atoms to that element.
   Ex: N_2 = 2 atoms of nitrogen
3. A subscript outside of a bracket multiplies all the elements within the brackets.
   Ex: $Ba_3(PO_4)_2$ = 3 atoms of barium
   2 atoms of phosphorous
   8 atoms of oxygen
4. (a) A coefficient (# in front of a chemical symbol) indicates the # of molecules of that element.
   Ex: 3C = 3 atoms of carbon
   (b) A coefficient in front of a chemical formula indicates the # of molecules of that compound
   Ex: $2H_2O$ = 4 atoms of hydrogen
   2 atoms of oxygen

   Ex: $3FeSO_4$ = 3 atoms of iron
   3 atoms of sulfur
   12 atoms of oxygen

   Ex: $4Cu(NO_3)_2$ = 4 atoms of copper
   8 atoms of nitrogen
   24 atoms of oxygen