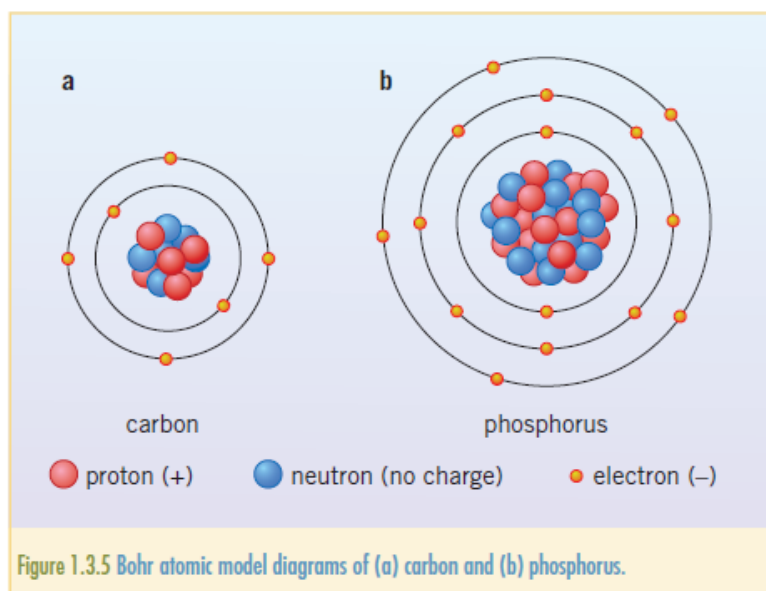


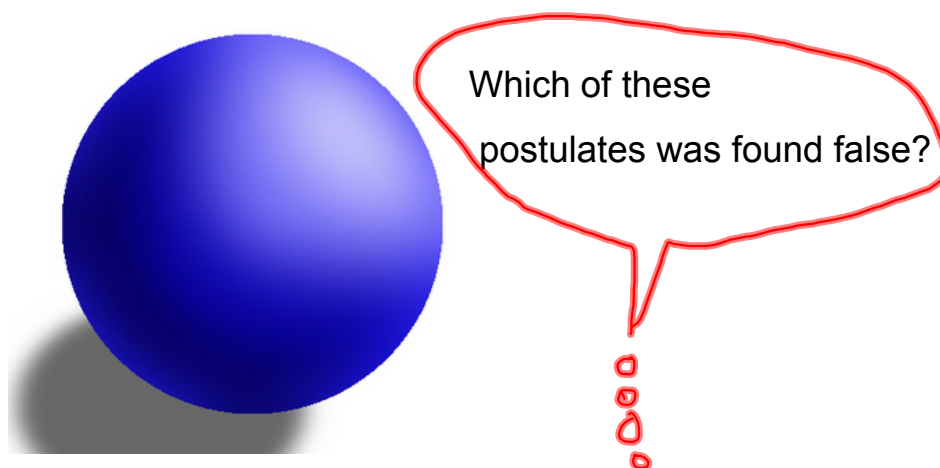
## Ch 2 The Atom and Naming of Compounds



## Dalton's Atomic Theory

### 5 Parts of Dalton's Theory:

- 1.) Each element = tiny particles (atoms)
- 2.) Atoms of same element are identical
- 3.) Chemical compounds form by bonding of atoms and different ratios = diff. compounds
- 4.) Chemical reactions = breaking of bonds and reorganizing of atoms as new bonds form
- 5.) An atom cannot be sub-divided to smaller parts



What else did Dalton do?

Assigned relative masses to known elements, created 1st table of element organization

**Law of multiple proportions:**

- elements combine in whole # ratios
- used to find empirical formulas

Ex.: Compounds A, B, and C all contain Oxygen and Nitrogen. 1.0 g. Oxygen is in each compound, but the mass of Nitrogen varies.

Compound	Mass of Nitrogen Present
A	1.750 g
B	0.8750 g
C	0.4375 g

To Do:

1st - verify that this data follows the law of multiple proportions

Ratio of N in:

A vs B

B vs C

A vs C

2nd - determine the empirical formula of the compounds

**Plum Pudding Model** - J.J. Thomson (1899)

- Entire atom was positive, with - electrons dispersed
1. throughout

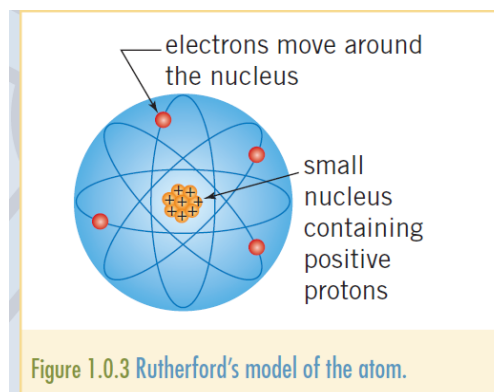
**Gold Foil Experiment** - Rutherford (1919)

2. Experiment proved that \_\_\_\_\_ was in nucleus and not \_\_\_\_\_.

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scientific multimedia



[http://www.youtube.com/watch?v=5p2fhu\\_XM8c&feature=player\\_embedded](http://www.youtube.com/watch?v=5p2fhu_XM8c&feature=player_embedded)



## Atomic Number/Mass Number Review

Atomic number = number of \_\_\_\_\_

Mass number = \_\_\_\_\_ + \_\_\_\_\_

An isotope differs in number of \_\_\_\_\_ from other atoms of the same type.

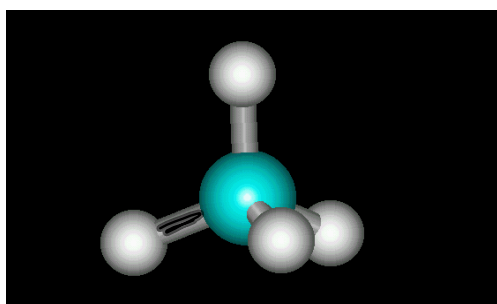
In isotopes, chemical properties are the same  
but physical properties may differ.

Give some examples of chemical vs physical properties

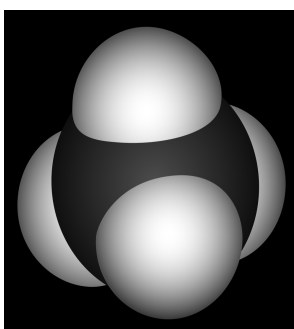
- 1.) Write atomic notation for a Na, having lost 1 electron
- 2.) Write atomic notation for an "isotope" of Sodium, 1 less neutron
- 3.) Write atomic notation for an atom of Phosphorus who is ***isoelectronic*** to chlorine
- 4.) Write atomic notation for Krypton - 74
  - a.) ID # of protons, neutrons, electrons in it
- 5.) Write the atomic notation for fluoride.

Write atomic notation for 2 other elements/ions that are isoelectronic to Fluoride.
- 6.) What common isotope atom is used to date decaying items?  
Why is it used?

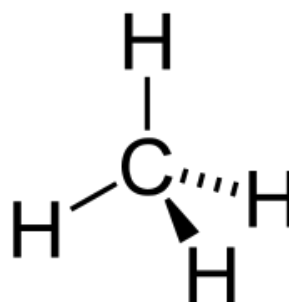
## 2.6 Molecules and Ions



Ball and Stick model



Space filling (bubble) model



Structural model

Words to know/use:

Molecule

Covalent bond

Formula unit

Ion

Ionic bond

Cation

Exchange electrons

Anion

Share electrons

Make a Periodic table outline:


Now, use colors/codes to ID the following as we discuss their characteristics:

Groups

Periods

Metals

Non-metals

Alkali Metals

Alkaline Earth Metals

Halogens

Noble Gases

ID typical charges per group - why are they so predictable?

Which groups are very reactive? Which is nonreactive? Why?

Naming of Ionic compounds:

An ionic compound is?

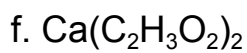
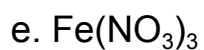
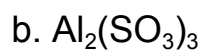
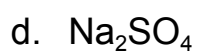
Rules:

- 1.) + and - charges of cation and anion must balance in formula  
(What do we use to balance?)
- 2.) Cation goes 1st
- 3.) Anion receives the -ide ending (in written name)
- 4.) If a transition metal is involved, denote its charge with roman numerals in the written name
  - +1 = I                      +5 = V
  - +2 = II                     +6 = VI
  - +3 = III
  - +4 = IV
- 5.) If polyatomics are involved, you may need parenthesize them in the formula. - How do you know when to do this?
- 6.) Ionic compounds contain atoms and IONS, you may need to count them.



Naming ionic compounds practice:

Name these, then count the atoms and ions:



Give the formula for these:

a. potassium nitride

b. calcium peroxide

c. lead (II) chloride

d. Ammonium nitrate

e. Copper (II) phosphate

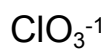
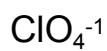
Using/remembering polyatomic ions

-ate vs. -ite rule?

hypo- (less O than -ite)

per- (more O than -ate)

Apply:



What to do if I don't know a polyatomic/can't remember it?

- Find a polyatomic I know, whose non-oxygen atom is in the same group



Let's Practice:

a. sodium selenate

d. potassium bromate



## Naming Molecular compounds

How do I know something is "molecular"?

Rules for naming molecular compounds:

Practice:

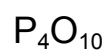
Nitrogen monoxide



Dinitrogen trioxide

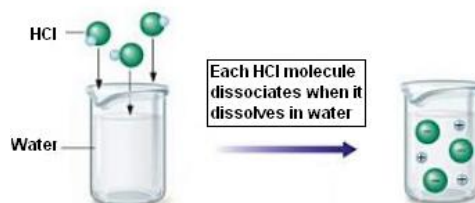


Sulfur hexafluoride



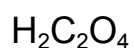
## Naming of Acids

Acid- molecule where one or more  $H^+$  ions is attached to an anion, that when dissolved in water produces  $H_3O^+$



Anion End	Acid	Example
-ide	hydro_____ic	hydrochloric acid
-ite	-ous	nitrous acid
-ate	-ic	sulfuric acid

Try These:



Permanganic acid



Hydroiodic acid



Sulfurous acid



Phosphoric acid



Acetic acid



Chromic acid