Ch 9
Sec 9.5

Obj: What are the two Laws that describe how compounds are formed?

Dalton's Atomic Theory

* When atoms combine they always combine in simple whole# ratios.
  CO_2 ⇒ 1 : 2 ratio

The Law of Definite Proportions

- Comes from Daltons Atomic Theory.
- Atoms also combine by mass
- In compounds the mass of the elements are always in the same proportion.

CO_2	H_2O
1:2 atoms	2:1 atoms
12g : 32g mass	2g : 16g mass
3:8	1:8

* All compounds follow the Law of definite proportions.

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The Law of Multiple Proportions

- Deals w/ compounds that have the same elements but with different ratios.
- Molecular Compounds are the only compounds that have multiple proportions.
- When two compounds of the same elements exits the ratio of the compounds definite proportion is a whole number ratio.

CO	CO_2
1:1 atoms	1:2 atoms
12 : 16 mass	12 : 32 mass
3:4	3:8

$$\frac{3/4}{3/8} = \frac{.75}{.375} = 2$$

1:2

H_2O	H_2O_2
2:1 atom	2:2 atom
2:16	2:32
1:8	1:16

$$\frac{1/8}{1/16} \Rightarrow 1:2$$

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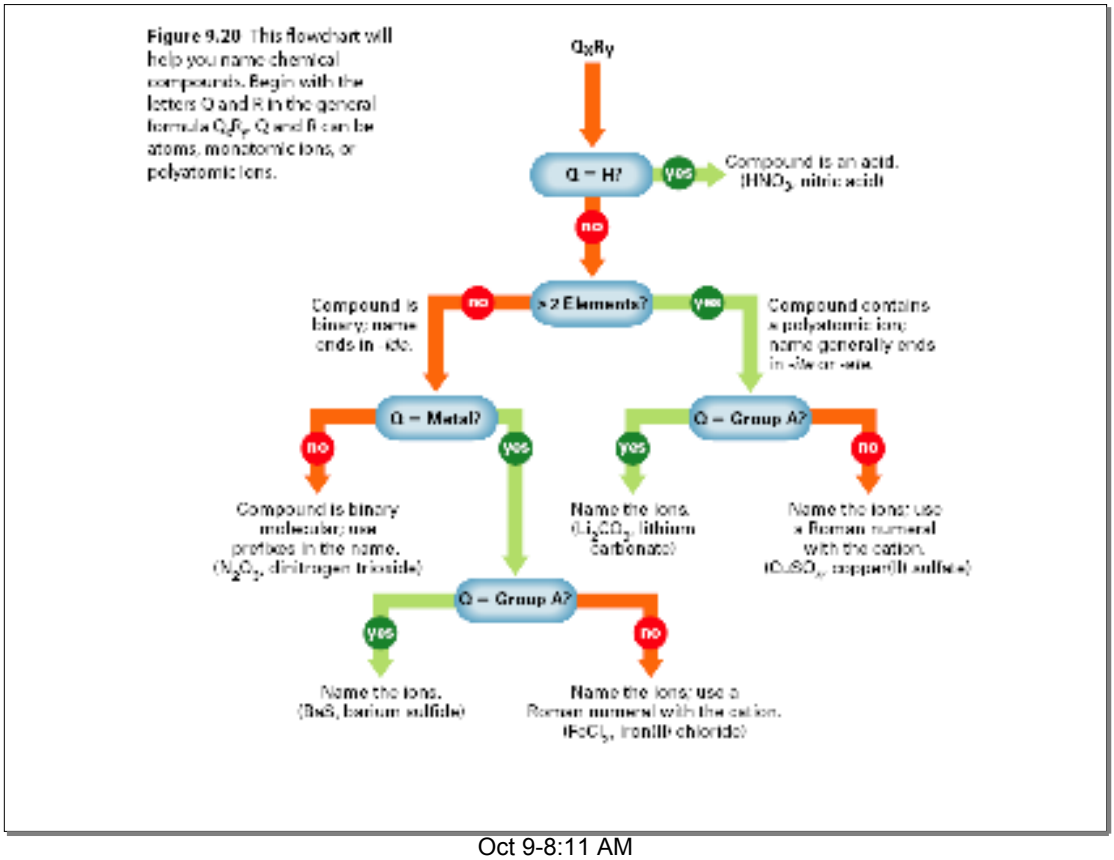
Figure 9.20 This flowchart will help you name chemical compounds. Begin with the letters Q and R in the general formula Q_xR_y. Q and R can be atoms, monatomic ions, or polyatomic ions.
Q_xR_y
Q = H?
yes
Compound is an acid. (HNO_3, nitric acid)
no
> 2 Elements?
no
Compound is binary; name ends in -ide.
yes
Compound contains a polyatomic ion; name generally ends in -ite or -ate.
Q = Metal?
no
yes
Q = Group A?
yes
no
Compound is binary molecular; use prefixes in the name. (N_2O_3, dinitrogen trioxide)
Name the ions. (Li_2CO_3, lithium carbonate)
Name the ions; use a Roman numeral with the cation. ($CuSO_4$, copper(II) sulfate)
Q = Group A?
yes
no
Name the ions. (BaS, barium sulfide)
Name the ions; use a Roman numeral with the cation. ($FeCl_3$, iron(III) chloride)

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