

**Worksheet # C43: Percent Composition,  
Empirical Formulas, and Molecular Formulas**

1. What is the percent composition of SO<sub>2</sub>?

$$S: \frac{32.1}{64.1}$$

$$O: \frac{32}{64.1}$$

S = 50 %

O = 50 %

2. What is the percent composition of calcium phosphate?

$$Ca: \frac{3(40.1)}{310.3}$$

$$P: \frac{2(31)}{310.3}$$

$$O: \frac{8(16)}{310.3}$$



Ca = 38.8 %

P = 20.0 %

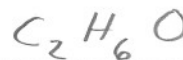
O = 41.2 %

3. Determine the empirical formula of a compound that is 52.11% carbon, 13.14% hydrogen, and 34.75% oxygen.

$$C: \frac{52.11}{12} = 4.34 \quad \frac{4.34}{2.17} = 2$$

$$H: \frac{13.14}{1.01} = 13.01 \quad \frac{13.01}{2.17} = 6$$

$$O: \frac{34.75}{16} = 2.17 \quad \frac{2.17}{2.17} = 1$$

4. Since iron can be either Fe<sup>+2</sup> or Fe<sup>+3</sup>, iron chloride can be either FeCl<sub>2</sub> or FeCl<sub>3</sub>. If a certain red compound is 34.43% iron and 65.57% chlorine, then which is it: FeCl<sub>2</sub> or FeCl<sub>3</sub>?

$$Fe: \frac{34.43}{55.8} = 0.617 \quad \frac{0.617}{0.617} = 1$$

$$Cl: \frac{65.57}{35.5} = 1.847 \quad \frac{1.847}{0.617} = 3$$



5. What is the empirical formula of a compound that is 34.6% gallium, 17.8% carbon, and 47.6% oxygen?

$$Ga: \frac{34.6}{69.7} = 0.496 \quad \frac{0.496}{0.496} = 1$$

$$C: \frac{17.8}{12} = 1.483 \quad \frac{1.483}{0.496} = 3$$

$$O: \frac{47.6}{16} = 2.975 \quad \frac{2.975}{0.496} = 6$$



6. What is the percent composition of potassium chlorate?  
(This is the white fireworks powder,  $\text{KClO}_3$ .)

$$\text{K: } \frac{39.1}{122.6} \quad \text{Cl: } \frac{35.5}{122.6} \quad \text{O: } \frac{3(16)}{122.6}$$

$$\text{K} = \frac{31.9}{\quad} \%$$

$$\text{Cl} = \frac{29.0}{\quad} \%$$

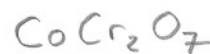
$$\text{O} = \frac{39.1}{\quad} \%$$

7. What is the empirical formula of a compound that is 21.43% cobalt, 37.83% chromium, and 40.74% oxygen?

$$\text{Co: } \frac{21.43}{58.9} = 0.3638 \quad \frac{0.3638}{0.3638} = 1$$

$$\text{Cr: } \frac{37.83}{52.0} = 0.7275 \quad \frac{0.7275}{0.3638} = 2$$

$$\text{O: } \frac{40.74}{16} = 2.5463 \quad \frac{2.5463}{0.3638} = 7$$



8. The beautiful green mineral malachite is 57.48% copper, 5.43% carbon, 36.18% oxygen, and 0.913% hydrogen. What is its empirical formula?

$$\text{Cu: } \frac{57.48}{63.5} = 0.9052 \quad \frac{.9052}{.4525} = 2$$

$$\text{C: } \frac{5.43}{12} = 0.4525 \quad \frac{.4525}{.4525} = 1$$

$$\text{O: } \frac{36.18}{16} = 2.2613 \quad \frac{2.2613}{.4525} = 5$$

$$\text{H: } \frac{0.913}{1.01} = 0.904 \quad \frac{.904}{.4525} = 2$$

