

## Percent Composition and Empirical & Molecular Formulas 1

1. What is the percent composition of aluminum chloride?



$$\text{Al} = 27 \text{ g/mol} \times 1 = 27 \text{ g/mol}$$

$$\text{Cl} = 35.5 \text{ g/mol} \times 3 = 106.5 \text{ g/mol}$$

$$\text{Al} + \text{Cl} = 27 \text{ g/mol} + 106.5 \text{ g/mol}$$

$$\text{AlCl}_3 = 133.5 \text{ g/mol}$$

$$\% \text{Al} = \frac{27 \text{ g/mol}}{133.5 \text{ g/mol}} \times 100 = 20.23\% \text{ Al}$$

$$\% \text{Cl} = \frac{106.5 \text{ g/mol}}{133.5 \text{ g/mol}} \times 100 = 79.77\% \text{ Cl}$$

$$\% \text{O} = \frac{0 \text{ g/mol}}{133.5 \text{ g/mol}} \times 100 = 0\% \text{ O}$$

2. A white powder is found to contain 41.2% phosphorus and 58.8% oxygen. The molar mass of the compound is 284.30 g/mol. What are the empirical and molecular formulas of this compound? Name the compound.

41.2% P

$$\frac{41.2 \text{ g/mol}}{31 \text{ g/mol}} = 1.329$$

$$\frac{58.8 \text{ g/mol}}{16 \text{ g/mol}} = 3.675$$

emp. formula:  $\text{P}_2\text{O}_5$

$$\frac{284.30 \text{ g/mol}}{284.30 \text{ g/mol}} = 1$$

3. A 100.0 g sample of a compound contains 75.0% carbon, 10.0% hydrogen, and 15.0% oxygen, and the compound has a molar mass of approximately 100 g/mol. What is the molecular formula of the compound?

$$\frac{75 \text{ g/mol}}{12 \text{ g/mol}} = 6.25$$

$$\frac{10 \text{ g/mol}}{1 \text{ g/mol}} = 10$$

$$\frac{15 \text{ g/mol}}{16 \text{ g/mol}} = 0.9375$$

emp. formula:  $\text{C}_6\text{H}_{10}\text{O}$

$$\frac{100}{100} = 1$$

emp. formula:  $\text{C}_6\text{H}_{10}\text{O}$

emp. formula:



emp. formula:

