

**Molecular Formula**

1. The molecular formula of a compound is either the same as its empirical formula or a **Factor** of it.

2. What do you need to know to calculate the molecular formula of a compound?
   
   **Amount of each element or empirical formula and Total mass of molecular compound**

3. If you divide the molecular mass of a compound by the empirical formula mass, what is the result?
   
   **The multiplier**

4. What would you use to convert the empirical formula of a compound to a molecular formula?
   
   **The multiplier**

5. Gas X is found to be 24.0% carbon and 76.0% fluorine, what is its empirical formula?

   \[
   \begin{align*}
   \text{24.0 g C} & \div 12.01 \text{ g C} = 2 \\
   \text{76.0 g F} & \div 19 \text{ g F} = 4
   \end{align*}
   \]

   \[
   2\div2 = 1 \text{ of C} \\
   4\div2 = 2 \text{ empirical formula CF}_2
   \]

   Given that the molar mass of gas X is 200.04 g/mol, determine its molecular formula.

   \[
   \text{200.04 g/mol X } = 4 \times \text{CF}_2 \\
   \text{50.01 g/mol CF}_2
   \]

6. Ribose is an important sugar (part of RNA), with a molar mass of 150.15 g/mol. If its empirical formula is CH\(_2\)O, what is its molecular formula?

   C\(_{10}\)H\(_8\)O\(_5\)

7. Naphthalene is a soft covalent solid that is often used in mothballs. Its molar mass is 128.18 g/mol and it contains 93.75% carbon and 6.25% hydrogen. Determine the molecular formula of naphthalene from this data.

   C\(_{22}\)H\(_{14}\)

8. What is the molecular formula for a compound with a molecular mass of 30.0 g/mol containing 80.0% carbon and 20.0% hydrogen? There was a typo on the original sheet

   C\(_4\)H\(_8\)

9. If a compound contains 37.8% carbon 6.3% hydrogen, 55.8% chlorine and a molecular mass of 127.0 g/mol, what is the molecular formula?

   C\(_8\)H\(_8\)Cl\(_2\)

10. Sulfadiazine, a sulfa drug used in the treatment of bacterial infections, give, on analysis: 48.0% carbon, 4.0% H, 22.4% nitrogen, 12.8% sulfur and 12.8% oxygen. The molar mass was
found to be 250 g/mol. Calculate the molecular formula for sulfadiazene.