ConcepTest on Formulas & % Mass

ConcepTest on Calculating Weight % from the Formula

The natural gas that we use to heat houses, cook food over gas stoves and light up in the chemistry lab is mostly methane, CH_4. What is the weight % of hydrogen in methane?

1. 0.25
2. 25
3. 40
4. 12.5

Correct Answer is **2. 25**
Comment to Instructor: Choice 1 indicates students forgot to multiply by 100 to get percent. Choice 3 indicates students used atomic number instead of atomic weight. Choice 4 indicates students think "% of hydrogen" means % H_2.

ConcepTest on Determination of the Empirical Formula from Weight %
(reverse of the previous questions)

One of the noxious gases produced by burning coal is a binary compound of sulfur and oxygen. In the presence of rain, it is converted to sulfuric acid. It is one of the contributors to the acidity in what is called *acid rain*.
The binary compound of sulfur and oxygen is 50.0% S by weight. What is the empirical formula of the compound?

1. SO
2. S_2O
3. SO_2
4. S_2O_2

Correct Answer is ***3. SO_2***
Comment to Instructor: Choice 1 indicates students forgot that formulas are based on atoms or moles of atoms rather than mass and figured that 50% S, 50%O means 1:1 ratio of S to O.

ConcepTest on Molecular Formula from Empirical Formula & Molecular Weight

If the empirical formula is SCl_2 and the molecular weight is 206 g/mol, what is the molecular formula of the compound?

1. SCl
2. S_2Cl_4
3. S_2Cl_2
4. SCl_2

Correct Answer is **2. S_2Cl_4**
Comment to Instructor: The empirical weight is 103 g/mol. The ratio of molecular weight to empirical weight is 206/103 = 2.