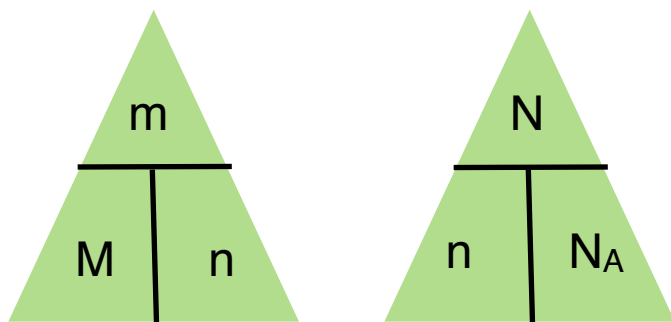


Ms. Kropac's Quick and Easy Chemical Calculations Review



Mass, mole, and number of particles

Calculate the molar mass for calcium carbonate, commonly found in chalk. The formula is CaCO_3 .

Calculate the number of moles present in one Aspirin tablet. Each tablet weights 0.25 grams, and the formula for Aspirin is $\text{C}_9\text{H}_8\text{O}_4$.

Calculate the number of sugar atoms in a cotton candy cone. The average cotton candy cone is 56 grams, and the main ingredient is sucrose, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$.

Molecular and Empirical Formula

An unknown compound is found to contain 40.0% carbon, 6.7% hydrogen and 53.3% oxygen with a molecular mass of 60.0 g/mol. What is the molecular formula of the unknown compound?

Element	Mass in 100g sample	Amount (n)	Ratio

Empirical Formula:

Molecular Formula:

A hydrocarbon is a compound comprised of carbon and hydrogen atoms. An unknown hydrocarbon is found to contain 85.7% carbon and an atomic mass of 84.0 g/mol. What is its molecular formula?

Element	Mass in 100g sample	Amount (n)	Ratio

Empirical Formula:

Molecular Formula:

A piece of iron ore is found to contain a compound containing 72.3% iron and 27.7% oxygen with a molecular mass of 231.4 g/mol. What is the molecular formula of the compound?

Element	Mass in 100g sample	Amount (n)	Ratio

Empirical Formula:

Molecular Formula:

Percent Composition

Calculate the percent composition, by mass, of each element in caffeine. The formula for caffeine is $C_8H_{10}N_4O_2$.

Aspirin is a common drug in many homes that can be used to treat headaches. The formula for Aspirin is $C_9H_8O_4$. Calculate the percentage composition, by mass, of **each** element in Aspirin.

Limiting Reagents:

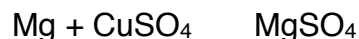
Zinc reacts with hydrochloric acid based on the following equation:



If 150 g of Zn reacts with 73 g of HCl:

- What reactant is the limiting reagent?
- What mass of $ZnCl_2$ would be produced?

If 10.0 g of magnesium is reacted with 95.75 g of copper (II) sulphate, magnesium sulphate and copper are formed.



- Which reactant is in excess?
- Calculate the mass of copper formed.

Identify the limiting reagent when 15.0g of H_2 reacts with 48.0 g of O_2 to produce water. What mass of water is produced?

Percent Yield

When 9.0 g of hydrogen gas, H_2 , reacts with excess oxygen gas, O_2 , 73.0 g of water is produced.

a) What is the theoretical yield?

b) What is the percentage yield?

Powdered zinc metal reacts with sulfur (S_8) when heated to produce zinc sulphide. Assume S_8 is in excess and Zn has a mass of $m=65.4$ g.



a) What is the theoretical yield?

b) What is the percentage yield?

The thermite reaction has been used to weld railroad rails, make bombs, and ignite solid rocket fuel. Assume aluminum is in excess and Fe_2O_3 has a mass of $m=319.4$. The equation of the reaction is:



a) What is the theoretical yield of Al_2O_3 .

b) What is the percentage yield if the experimental yield is 68 g?