

Set 16 – Molar mass

- Determine the molar mass of:
 - sodium
 - sodium chloride
 - nitrogen gas
 - sulfur dioxide.
- Determine the molar mass of:
 - sodium hydroxide
 - zinc carbonate
 - lead (II) oxide
 - magnesium chloride.
- Determine the molar mass of:
 - aluminium sulfate
 - magnesium hydrogencarbonate
 - tetraphosphorus decaoxide
 - sodium carbonate-10-water.
- Explain the difference between:
 - relative atomic mass (A_r) and relative molecular mass (M_r)
 - relative molecular mass (M_r) and molar mass (M).
- Determine each of the following:
 - relative atomic mass (A_r) for oxygen atoms
 - relative molecular mass (M_r) for oxygen gas
 - molar mass (M) for oxygen gas.

Be sure to include the correct units with your answers.

For the experts

- In researching two elements (X and Y), John found that the A_r for X was 14.0 and the A_r for Y was 19.0. Use this information to determine:
 - molar mass (M) for diatomic molecules of X
 - molar mass (M) for diatomic molecules of Y
 - molar mass (M) for a compound made up of one atom of X and 3 atoms of Y.

Set 17 – Mass to moles

- Calculate the number of moles of:
 - calcium in 80.2 g of calcium 2.0 mol
 - carbon dioxide in 8.8 g of carbon dioxide 0.20
 - hydrochloric acid in 10.0 g of hydrochloric acid 0.30
 - ethanol in 25.0 g of ethanol ($\text{C}_2\text{H}_5\text{OH}$).
- Calculate the number of moles of:
 - hydrogen molecules in 20.0 g of hydrogen gas (H_2)
 - hydrogen atoms in 20.0 g of hydrogen gas (H_2)
 - hydrogen atoms in 20.0 g of ammonia gas (NH_3)
 - hydrogen atoms in 20.0 g of ethyne gas (C_2H_2).
- Calculate the number of moles of:
 - silver chloride in 125 g of silver chloride
 - aluminium nitrate in 4.5 g of aluminium nitrate
 - ammonium carbonate in 25.0 g of ammonium carbonate
 - potassium hydroxide in 240 g of potassium hydroxide.
- A sample of carbon dioxide gas has a mass of 2.20 g. For this sample calculate the moles of each of the following:
 - carbon dioxide molecules
 - carbon atoms
 - oxygen atoms.
- A sample of copper (II) nitrate has a mass of 20.0 g. For this sample calculate the moles of:
 - copper (II) nitrate
 - copper (II) ions
 - nitrate ions
 - oxygen atoms.

For the experts

- Louise dissolved a tablespoon (30.0 g) of sugar (sucrose – $\text{C}_{12}\text{H}_{22}\text{O}_{11}$) into 100.0 g of water (H_2O).
Which substance contained the greatest number of oxygen atoms, the sugar or the water?