

The Mole - 2

Before starting the next worksheet, watch this video to revise what we learnt yesterday about Molar Mass:

<https://www.youtube.com/watch?v=hY7lzRBylSk>

Calculating number of moles:

Now we are going to learn how to calculate the number of moles present in a certain mass of a pure substance (either a COMPOUND or an ELEMENT).

$$n = \frac{m}{M}$$

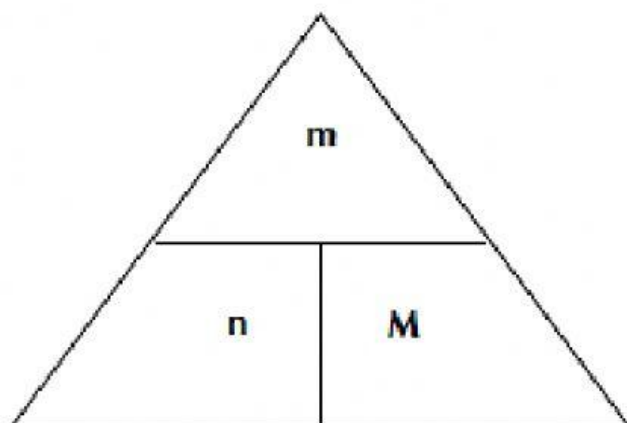
Where:

n = number of moles (Unit: mol)

m = mass of substance (Unit: g)

M = molar mass of substance (Unit: g.mol⁻¹)

We can use this triangle to help with calculations (note that the formula will be given to you in a test, but if you want the triangle you need to learn it):



Examples:

Eg 1) You have a sample that contains 5 moles of zinc.
What is the mass of the zinc in the sample?

$$\begin{aligned} m &= n \times M \\ &= 65 \text{ g.mol}^{-1} \times 5 \text{ mol} \\ &= 325 \text{ g} \end{aligned}$$

Use the Periodic Table to find the Molar Mass of Zn.

2) Calculate the mass of 7,5 moles of Sodium metal

$$\begin{aligned} m &= n \times M \\ &= 7,5 \times \\ &= \text{ g} \end{aligned}$$

3) Calculate the mass of 3,6 moles of Ca(OH)_2

$$\begin{aligned} M &= \quad + 2(\quad + \quad) \\ &= \quad \text{g.mol}^{-1} \end{aligned}$$

First calculate the Molar Mass of Ca(OH)_2 .

$$m = n \times M$$

$$= \quad \times$$

$$= \quad \text{g}$$

4) Calculate the number of moles in 48 g of Magnesium metal

$$n = m/M$$

$$= \underline{48}$$

$$= \quad \text{mol}$$

5) Calculate the number of moles in 70 g of Aluminium metal

$$n = m/M$$

$$= \underline{\quad}$$

$$= \quad \text{mol}$$

6) Calculate the number of moles of sulphur if you have 64 g.

$$n = m/M$$

$$= \underline{\quad}$$

$$= \quad \text{mol}$$

7) Calculate the mass of 2,5 mol of water.

$$m = n \times M$$

$$= \quad \times$$

$$= \quad \text{g}$$

Don't forget you first need to calculate the Molar Mass of water!

Question 4

Give the molar mass of each of the following elements:

4.1 hydrogen gas g.mol^{-1}

4.2 nitrogen gas g.mol^{-1}

4.3 bromine gas g.mol^{-1}

Hint: Don't forget the 7 naturally diatomic molecules!

Question 5

Calculate the number of moles in each of the following samples:

a. 22 g of boron (B)

$$n = m/M$$

$$= \underline{\hspace{2cm}}$$

$$= \quad \text{mol}$$

b. 55 g of manganese (Mn)

$$n = m/M$$

$$= \underline{\hspace{2cm}}$$

$$= \hspace{1cm} \text{mol}$$

c. 100,5 g of mercury (Hg)

$$n = m/M$$

$$= \underline{\hspace{2cm}}$$

$$= \hspace{1cm} \text{mol}$$

d. 50 g of barium (Ba)

$$n = m/M$$

$$= \underline{\hspace{2cm}}$$

$$= \hspace{1cm} \text{mol}$$

e. 40 g of lead (Pb)

$$n = m/M$$

$$= \underline{\hspace{2cm}}$$

$$= \hspace{1cm} \text{mol}$$