Moles in Solution – Quick Quiz

These slides may be downloaded at https://www.chemistrytuition.net/

Concentration of Solutions

$$\text{Concentration in mol/dm}^3 = \frac{\text{Number of moles dissolved}}{\text{Volume in dm}^3}$$

Can be rearranged to give:

$$\text{Number of moles} = \text{Concentration in mol/dm}^3 \times \text{Volume in dm}^3$$

Questions

1. Calculate the number of moles in 5 cm^3 of 0.01 mol/dm^3 NaOH

2. Calculate the concentration of a solution containing 1.05 g of NaOH dissolved in 500 cm^3 of solution

3. Calculate the volume in cm^3 of 0.0100 mol/dm^3 $HCl_{(aq)}$ that contains 1.00 x 10^{-5} moles.

4. Fizzy drinks are made by dissolving carbon dioxide in water. Calculate to volume of CO_2 in cm^3 at RTP required to dissolve in 300 cm^3 of solution to give a concentration of 2.5 mol/dm^3.

Answers coming up…

1. Calculate the number of moles in 5 cm^3 of 0.01 mol/dm^3 NaOH

Number of moles = **Concentration in mol/dm^3** x **Volume in dm^3**

Number of moles = **0.01** x $\frac{\mathbf{5}}{\mathbf{1000}}$ = **5×10^{-5} moles**

2. Calculate the concentration of a solution containing 1.05 g of NaOH dissolved in 500 cm^3 of solution

$$\text{Moles of NaOH} = \frac{\text{Mass}}{\text{Molar mass}} = \frac{1.05}{40} = \mathbf{0.02625\ moles}$$

$$\text{Volume} = 500\ cm^3 = \frac{500}{1000}\ dm^3 = \mathbf{0.500\ dm^3}$$

$$\text{Concentration in mol/dm}^3 = \frac{\text{Number of moles dissolved}}{\text{Volume in dm}^3} = \frac{\mathbf{0.02625}}{\mathbf{0.500}} = \mathbf{0.0525\ mol/dm^3}$$

3. Calculate the volume in cm^3 of 0.0100 mol/dm^3 $HCl_{(aq)}$ that contains 1.00 x 10^{-5} moles.

$$\text{Volume in } dm^3 = \frac{\text{Number of moles dissolved}}{\text{Concentration } \textbf{in mol/dm}^3}$$

$$\text{Volume in } dm^3 = \frac{1.00 \times 10^{-5}}{0.0100} = 0.001 \text{ } dm^3$$

$$\textbf{Volume in } \textbf{cm}^3 = \textbf{0.001 x 1000} = \textbf{1.00 cm}^3$$

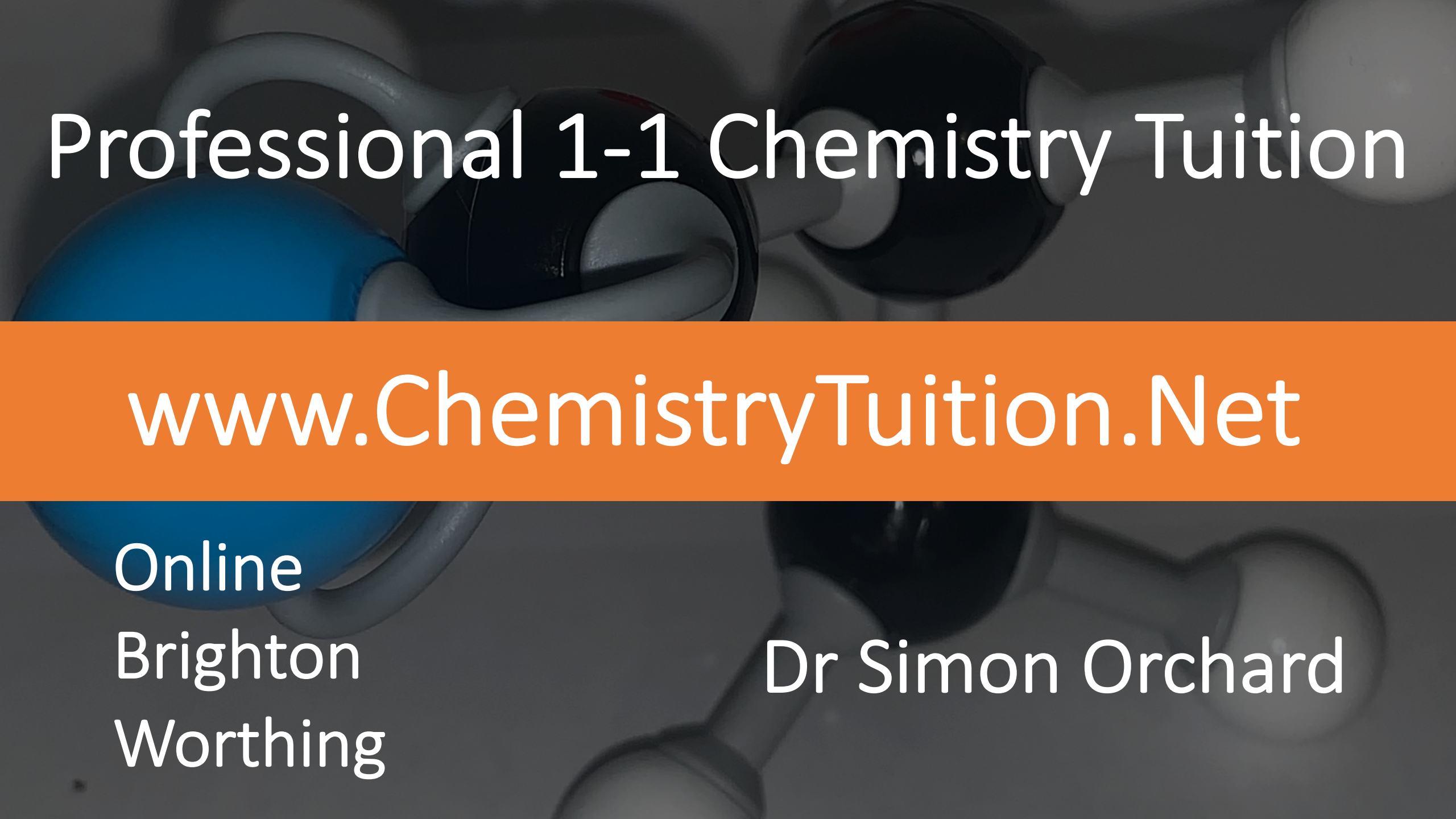
4. Fizzy drinks are made by dissolving carbon dioxide in water. Calculate to volume of CO_2 in dm^3 at RTP required to dissolve in 300 cm^3 of solution to give a concentration of 2.5 mol/dm^3.

Number of moles = **Concentration in mol/dm^3** X **Volume in dm^3**

Number of moles = **2.5** X $\frac{300}{1000}$ = **0.750 moles**

Volume of gas = **Moles** X **24000** = **18,000 cm^3**

= **18 dm^3**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