4. CONCENTRATION – CHEMISTRY LAB WORK

CH30S UNIT 3 – SOLUTIONS WIEBE

1

UNDERSTANDING CONCENTRATION

- As the quantity of solute increases, the concentration of the solution increases and vice versa.
- As the quantity of solvent increases, the concentration decreases and vice versa.
- Spilling your solution does not change the concentration (you are losing solute and solvent at the same time!)
- As the solution evaporates, the concentration of solution increases (only solvent evaporates, not solute)

$$Conc = \frac{solute}{solution}$$

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MOLARITY

The number of **moles** of the chemical solute per **litre of solution**.

mol/L = M

For example:

1.8 M HCl means 1.8 moles of HCl per litre of solution.

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{volume of solution in liters}}$$

Table 1 Amount Concentrations of Common Stock Acid Solutions

Stock acid	Amount concentration (mol/L)
hydrochloric acid, HCl(aq)	12
nitric acid, HNO_3(aq)	16
sulfuric acid, H_2SO_4(aq)	18

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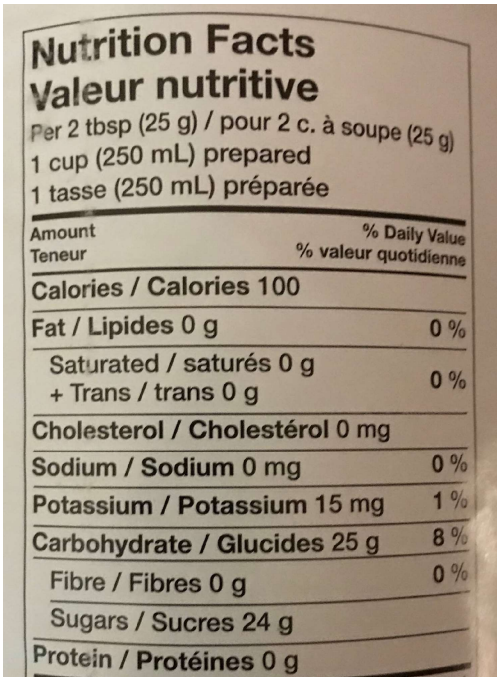
CALCULATING MOLARITY

A student makes some iced tea as per the instructions on the container. Calculate the molarity of **sugar** in the juice. (Assume the sugar in powdered drinks is all **sucrose** $C_{12}H_{22}O_{11}$

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{volume of solution in liters}}$$



4

WORKING WITH MOLARITY

Household chlorine bleach is a 0.067 M solution of sodium hypochlorite. What mass of NaClO solute is required to prepare 225 mL of bleach solution?

5

PREPARING A SOLUTIONS

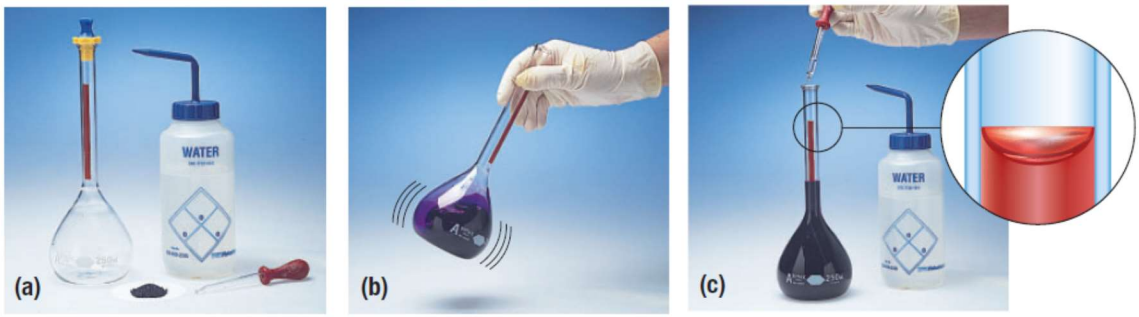


Figure 5 (a) To prepare a 250 mL sample of potassium permanganate solution, you will need a volumetric flask, distilled water, a dropper, and the required mass of potassium permanganate, $KMnO_4$. (b) First dissolve the solid $KMnO_4$ in about 100 mL of distilled water. (c) Use a dropper to add distilled water until the bottom of the meniscus lines up with the calibration mark on the flask.

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SUMMARY

- The concentration of a solution is the quantity of dissolved solute per unit volume of solution.
- Amount concentration is the amount (in moles) of solute dissolved per litre of solution. The units of amount concentration are mol/L.
- Amount concentration is determined using the equation $c = \frac{n}{V}$.
- "Amount concentration" is the preferred IUPAC term for solution concentration (replacing molar concentration and molarity).
- Samples taken from a stock solution are diluted to prepare solutions for use in the laboratory.
- A solution of known concentration is called a standard solution.

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