

Ch. 3 & 7 – The Mole



II. Molarity (p. 412-415)

I

II

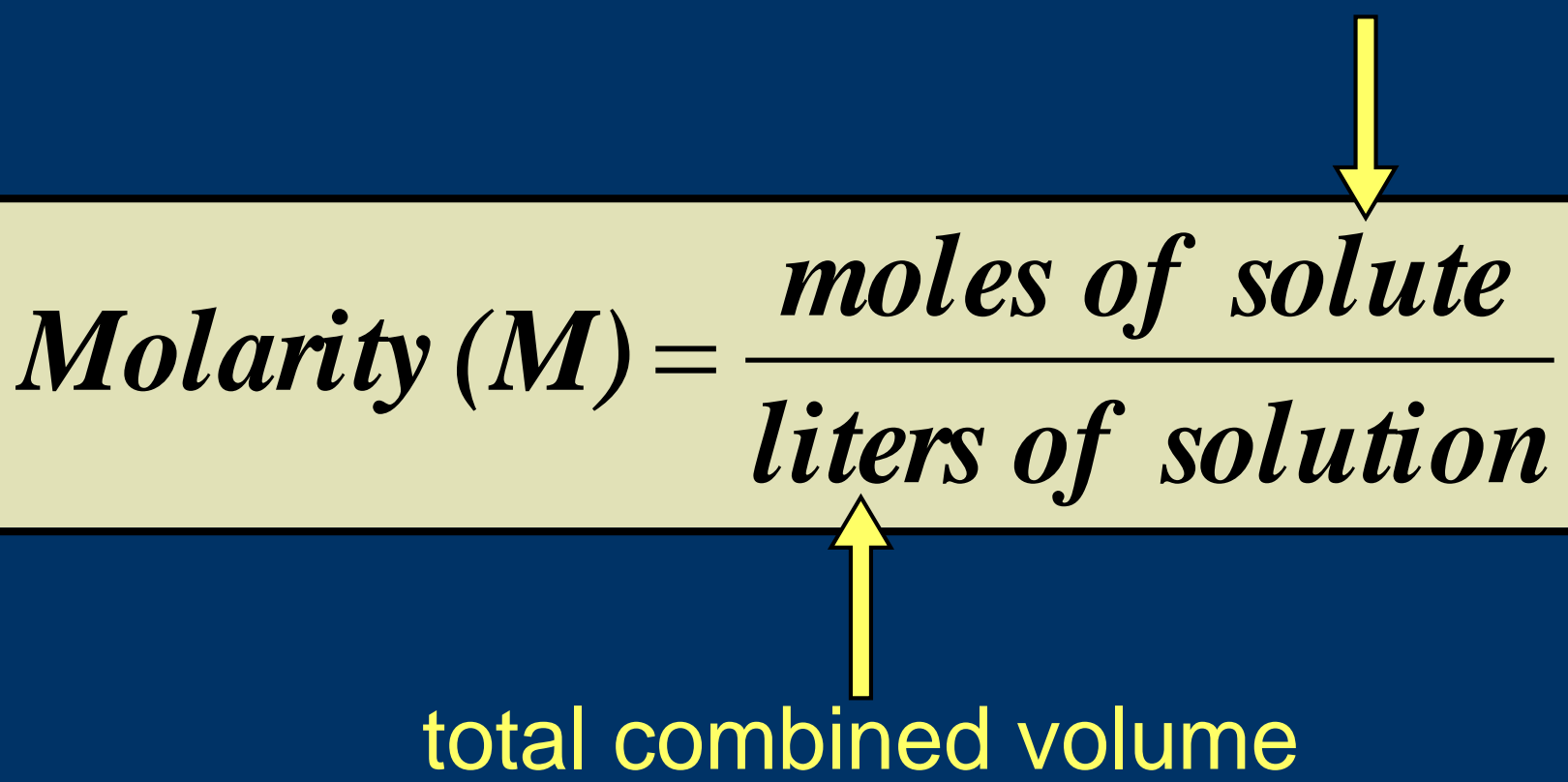
III

IV

A. Molarity

- Concentration of a solution.

substance being dissolved



The diagram shows the molarity formula in a yellow box. A yellow arrow points from the text 'substance being dissolved' to the numerator 'moles of solute'. Another yellow arrow points from the text 'total combined volume' to the denominator 'liters of solution'.


$$\text{Molarity (M)} = \frac{\text{moles of solute}}{\text{liters of solution}}$$


total combined volume

A. Molarity

2M HCl

What does this mean?


$$M = \frac{\text{mol}}{L}$$


$$2M \text{ HCl} = \frac{2 \text{ mol HCl}}{1 L}$$

B. Molarity Calculations

molar mass
(g/mol)

6.02×10^{23}
(particles/mol)

MASS
IN
GRAMS



MOLES



NUMBER
OF
PARTICLES



Molarity
(mol/L)

LITERS
OF
SOLUTION

B. Molarity Calculations

- How many grams of NaCl are required to make 0.500L of 0.25M NaCl?

$0.500 \cancel{\text{L}}$	$0.25 \cancel{\text{mol}}$	58.44 g
	$1 \cancel{\text{L}}$	$1 \cancel{\text{mol}}$

$$0.25M = \frac{0.25 \text{ mol}}{1 \text{ L}}$$

$$= 7.3 \text{ g NaCl}$$

B. Molarity Calculations

- Find the molarity of a 250 mL solution containing 10.0 g of NaF.

$$\frac{10.0 \text{ g} \cancel{\text{g}}}{41.99 \text{ g} \cancel{\text{g}}} \times \frac{1 \text{ mol}}{1} = 0.238 \text{ mol NaF}$$

$$M = \frac{\text{mol}}{L}$$

$$M = \frac{0.238 \text{ mol}}{0.25 \text{ L}} = 0.95 M \text{ NaF}$$