

Molarity ~ Practice Problems

Name KEY

Directions: Complete the table. SHOW ALL WORK ... SHOW ALL WORK ... SHOW ALL WORK ... SHOW ALL WORK!!!

Name	Calcium iodide Sample	Sodium chloride	Potassium carbonate	Aluminum hydroxide	Glucose	Sulfuric acid
Formula	CaI <sub>2</sub>	NaCl	K <sub>2</sub> CO <sub>3</sub>	Al(OH) <sub>3</sub>	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	H <sub>2</sub> SO <sub>4</sub>
Electrolyte or Non-electr.	Electrolyte	Electrolyte	Electrolyte	Electrolyte	NON - Electrolyte	Electrolyte
Ions in Solution	Ca <sup>2+</sup> , 2 I <sup>-</sup> (cation), (anion)	Na <sup>+</sup> , Cl <sup>-</sup>	2K <sup>+</sup> , CO <sub>3</sub> <sup>2-</sup>	Al <sup>3+</sup> , 3OH <sup>-</sup>	N/A	2H <sup>+</sup> , SO <sub>4</sub> <sup>2-</sup>
Mass of Solute	10.0 g	5.85 g	$\frac{0.25 \text{ mol}   138.21 \text{ g}}{1 \text{ mol}}$ 35 g K <sub>2</sub> CO <sub>3</sub>	$\frac{0.90 \text{ mol}   78.01 \text{ g}}{1 \text{ mol}}$ 70 g Al(OH) <sub>3</sub>	$\frac{0.30 \text{ moles}   180.18}{1 \text{ mol}}$ 54 g C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	25.0 g
Moles of Solute	10.0 g x (1 mole / 293 g) = 0.034 mole	$\frac{5.85 \text{ g NaCl}   1 \text{ mol}}{58.44 \text{ g}}$ 0.100 mol NaCl	0.25 mole	0.90 mol	0.30 mole	$\frac{25.0 \text{ g H}_2\text{SO}_4   1 \text{ mol}}{98.09 \text{ g}}$ 0.255 mol
Volume of Solution	750.0 mL	100.0 mL 0.1000 L	0.50 L 500 mL	1200.0 mL 1.2000 L	0.20 L 200 mL	500.0 mL 0.5000 L
Molarity of Solution	0.034 moles / .750 L = 0.045 M	$M = \frac{0.100 \text{ mol}}{0.1000 \text{ L}}$ 1.00 M	0.50 M $0.50 \text{ M} = \frac{0.25 \text{ mol}}{\text{L}}$	0.75 M $0.75 \text{ M} = \frac{x}{1.2000 \text{ L}}$	1.5 M $1.5 \text{ M} = \frac{0.30}{x}$	$M = \frac{0.255 \text{ mol}}{0.5000 \text{ L}}$ M = 0.510 M
Molarity of Cation	1 x .045 M = 0.045 M	1 x 1.01 M = 1.01 M	2 x 0.50 M = 1.0 M	1 x 0.75 M = 0.75 M	N/A	2 x 0.510 M = 1.02 M
Molarity of Anion	2 x .045 M = 0.090 M	1 x 1.01 M = 1.01 M	1 x 0.50 = 0.50 M	3 x 0.75 M = 2.25 M	N/A	1 x 0.510 M = 0.510 M

- SHADED BOXES: You must use the Molarity Formula ( $M = \text{moles} / V_{(L)}$ ) to solve for each.
- Follow the example in the first column to complete the rest of the table above.

Molarity Word Problem:

hat volume of glucose solution above would you need to use in order to prepare 500 mL of 0.55 M solution? SHOW WORK!

$$M_1 = 1.5 \text{ M}$$

$$V_1 = ?$$

$$M_2 = 0.55 \text{ M}$$

$$V_2 = 500 \text{ mL} \Rightarrow 0.500 \text{ L}$$

$$M_1 V_1 = M_2 V_2$$

$$1.5 \cdot V_1 = 0.55 \cdot 0.50$$

$$V_1 = 0.18 \text{ L}$$