

Molarity Worksheet

Name _____ Key _____

1. What is the molarity of a solution that contains 16.0 g NaOH in 2.00 L of solution.

$$16.0 \text{ g NaOH} \times \frac{1 \text{ mol NaOH}}{40.0 \text{ g NaOH}} = 0.400 \text{ mol NaOH}$$

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{Liters of solution}} = \frac{0.400 \text{ mol NaOH}}{2.00 \text{ L}} = 0.200 \text{ M NaOH}$$

2. What is the volume of a 0.250 M NaHCO₃ solution that contains 16.8 g NaHCO₃?

$$16.8 \text{ g NaHCO}_3 \times \frac{1 \text{ mol NaHCO}_3}{84.0 \text{ g NaHCO}_3} = 0.200 \text{ mol NaHCO}_3$$

$$\text{Liters of solution} = \frac{\text{moles of solute}}{\text{Molarity}} = \frac{0.200 \text{ mol NaHCO}_3}{0.250 \text{ mol NaHCO}_3/\text{L}} = 0.800 \text{ L} = 800 \text{ mL}$$

3. What mass of KBr would be needed to prepare 500.0 mL of 1.50 M KBr solution? Tell how this solution would be prepared.

$$\text{moles of solute} = \text{Molarity} \times \text{Liters of solution} = \frac{1.50 \text{ mol KBr}}{\cancel{\text{L}}} \times 0.5000 \cancel{\text{ L}} = 0.750 \text{ mol KBr}$$

$$0.750 \text{ mol KBr} \times \frac{119 \text{ g KBr}}{1 \text{ mol KBr}} = 89.3 \text{ g KBr}$$

Place 89.3 g KBr into a 500 mL volumetric flask. Fill the flask with water to the mark on the neck of the flask. Mix thoroughly to dissolve.

4. What is the concentration of a solution that has been prepared by diluting 5.0 mL of 5.0 % (w/v) NaCl to a volume of 100 mL?

$$C_2 = \frac{C_1 V_1}{V_2} = \frac{[5.0 \% \text{ (w/v) NaCl}][5.0 \text{ mL}]}{100 \text{ mL}} = 0.25 \% \text{ (w/v) NaCl}$$

5. What volume of 6.0 M HNO₃ would be needed to prepare 600 mL of 0.100 M HNO₃? Describe how this solution would be prepared.

$$V_1 = \frac{C_2 V_2}{C_1} = \frac{(0.100 \text{ M HNO}_3)(600 \text{ mL})}{6.0 \text{ M HNO}_3} = 10. \text{ mL}$$

Thoroughly mix 10. mL of 6.0 M HNO₃ with 590 mL of water.