

Unit 8 Worksheet 3: Molar Concentration

Part A: Describing Molar Concentration

1. Sodium chloride was dissolved in water to produce a 1.5M solution. Explain what this concentration tells us about the NaCl solution. How might a chemist use this ratio?
2. A 45.3 g sample of potassium nitrate is dissolved in enough water to make 225 mL of solution. Determine the molar concentration of the potassium nitrate.
3. Find the molarity of a solution made from 275 g of CuSO_4 dissolved in enough water to make 4.25 L.
4. An alcoholic iodine solution ("tincture" of iodine) is prepared by dissolving 5.15 g of iodine crystals in enough alcohol to make a volume of 225 mL. Calculate the molarity of iodine in the solution.
5. What final volume would be needed in order to prepare a 0.25 M NaCl solution from 5.2 g of NaCl (s)?

6. Draw a particle diagram of each of these ionic substances in solution. Then calculate the molarity of **each** ion present in each of the following solutions.

a. 0.25 M AlCl_3

b. 0.375 M Na_2CrO_4

c. 0.0020 M $\text{Ca}(\text{OH})_2$

d. 0.103 M Na_3PO_4

7. How many grams of silver nitrate are needed to prepare 250 mL of standard 0.100 M silver nitrate solution?

8. If 10.0 g of AgNO_3 is available, find the volume needed to prepare a 0.25 M AgNO_3 solution.

9. Concentrated hydrochloric acid is made by pumping hydrogen chloride gas into distilled water. If concentrated HCl contains 439 g of HCl per liter, what is the molarity?

Part B: Molar Concentration and Stoichiometry

10. How many moles of lead(II) hydroxide (solid) can be formed when 0.0225L of 0.135 M $\text{Pb}(\text{NO}_3)_2$ solution reacts with excess sodium hydroxide? (Hint: Use a BCA table).
11. Barium nitrate reacts with aqueous sodium sulfate to produce solid barium sulfate and aqueous sodium nitrate. Abigail places 20.00 mL of 0.500 M barium nitrate in a flask. She has a 0.225M sodium sulfate solution available. What volume of this solution must she add to her flask of barium nitrate so she has no excess reactant left over? (Use a BCA table to answer).
12. Calcium chloride (aq) reacts with sodium carbonate (aq) to form solid calcium carbonate and aqueous sodium chloride. Determine the volume of a 2.00 M Calcium chloride solution would be needed to exactly react with 0.0650 L of 1.50 M Na_2CO_3 . (Use BCA!)