

Molarity Worksheet #1

name _____

1. What does molarity mean?

$$\frac{\text{Number of moles of solute}}{1 \text{ liter solution}}$$

2. What is the molarity of a solution that contains 4.53 moles of lithium nitrate in 2.85 liters of solution?

$$\frac{4.53 \text{ mol LiNO}_3}{2.85 \text{ L soln}} = 1.59 \text{ M LiNO}_3$$

3. What is the molarity of a solution that contains 0.00372 moles hydrochloric acid in 2.39×10^{-2} liters of solution?

$$0.156 \text{ M HCL}$$

4. A flask contains 85.5 g $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ (sucrose) in 1.00 liters of solution. What is the molarity?

$$\frac{85.5 \text{g sucrose}}{1.00 \text{ L soln}} \times \frac{1 \text{ mol sucrose}}{342.34 \text{g sucrose}} = 0.250 \text{ M sucrose}$$

5. A beaker contains 214.2 grams osmium (III) fluoride in 0.0673 liters of solution. What is the molarity?

$$12.9 \text{ M OsF}_3$$

6. Calculate the molarity if a flask contains 1.54 moles potassium sulfate in 125 ml of solution.

$$12.3 \text{ M K}_2\text{SO}_4$$

7. A chalice contains 36.45 grams ammonium chlorite in 2.36 liters of solution - calculate the molarity.

$$\mathbf{0.181\ M\ NH_4ClO_2}$$

8. What is the molarity of a solution that contains 14.92 grams magnesium oxalate in 3.65 ml of solution?

$$\mathbf{36.4\ M\ MgC_2O_4}$$

9. What mass of lithium phosphate would you mass to make 2.5 liter of 1.06 M lithium phosphate solution?

$$\mathbf{2.5\ L\ soln \times \frac{1.06\ mol\ Li_3PO_4}{1\ L\ soln} \times \frac{115.79g\ Li_3PO_4}{1\ mol\ Li_3PO_4} = 310g\ Li_3PO_4}$$

10. If you evaporated 250. mL of a 3.5 M solution of iron (II) nitrite, what mass of iron (II) nitrite would you recover?

$$\mathbf{130g\ Fe(NO_2)_2}$$

11. A chemist has 4.0 g of silver nitrate and needs to prepare 2.0 L of a 0.010 M solution. Will there be enough silver nitrate? If so, how much silver nitrate will be left over?

$$\mathbf{There\ is\ enough\ silver\ nitrate\ available.\ 4.0g\ AgNO_3 - 3.4g\ AgNO_3 = 0.6\ g\ AgNO_3}$$

12. A rabbit pours 500.00 mL of a 3.0000 molar solution of sodium hydroxide into a 2.000 liter volumetric flask and fills the flask up with water. What is the new molarity of the solution?

Solve the following solutions Stoichiometry problems:

1. How many grams of silver chromate will precipitate when 150. mL of 0.500 M silver nitrate are added to 100. mL of 0.400 M potassium chromate?



0.150 L AgNO ₃	0.500 moles AgNO ₃ 1 L	1 moles Ag ₂ CrO ₄ 2 moles AgNO ₃	331.74 g Ag ₂ CrO ₄ 1 moles Ag ₂ CrO ₄	= 12.4 g Ag ₂ CrO ₄
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0.100 L K ₂ CrO ₄	0.400 moles K ₂ CrO ₄ 1 L	1 moles Ag ₂ CrO ₄ 1 moles K ₂ CrO ₄	331.74 g Ag ₂ CrO ₄ 1 moles Ag ₂ CrO ₄	= 13.3 g Ag ₂ CrO ₄
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2. How many mL of 0.280 M barium nitrate are required to precipitate as barium sulfate all the sulfate ions from 25.0 mL of 0.350 M aluminum sulfate? (93.8 mL barium nitrate)



0.0250 L Al ₂ (SO ₄) ₃	0.350 moles Al ₂ (SO ₄) ₃ 1 L	3 moles Ba(NO ₃) ₂ 1 moles Al ₂ (SO ₄) ₃	1 L 0.280 moles Ba(NO ₃) ₂	= 0.0938 L Ba(NO ₃) ₂
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3. 25.0 mL of 0.350 M NaOH are added to 45.0 mL of 0.125 M copper (II) sulfate. How many grams of copper (II) hydroxide will precipitate?



4. What volume of 0.415 M silver nitrate will be required to precipitate as silver bromide all the bromide ion in 35.0 mL of 0.128 M calcium bromide?



5. What volume of 0.496 M HCl is required to neutralize 20.0 mL of 0.809 M sodium hydroxide?



6. How many mL of 0.715 M HCl is required to neutralize 1.25 grams of sodium carbonate? (producing carbonic acid)



7. How many grams of magnesium hydroxide will precipitate if 25.0 mL of 0.235 M magnesium nitrate are combined with 30.0 mL of 0.260 M potassium hydroxide?



8. 60.0 mL of 0.322 M potassium iodide are combined with 20.0 mL of 0.530 M lead (II) nitrate. How many grams of lead (II) iodide will precipitate?

