

Name: _____

Due: _____

Unit 6 Academic Chemistry Study Guide

Goals & Standards

- I can use dimensional analysis to convert between moles, particles, and grams.
- I can describe what a mole is using Avogadro's number.
- I can calculate the molar mass of any compound.
- I can calculate the percent composition of individual elements within a compound.
- I can determine the empirical and molecular formula of a compound.
- I can safely evaporate water from a hydrate to determine its initial composition.

Practice Problems

- 1) Define the following new terms with a brief definition.
 - a. Mole –
 - b. Avogadro's Number –
 - c. Molar Mass –
 - d. Empirical Formula –
 - e. Molecular Formula –
 - f. Hydrate –
- 2) Draw a simple Moletown Map with correct conversion factors.
- 3) Determine the chemical formula and then calculate the molar mass of each compound.
 - a. Oxygen gas

 - b. Aluminum bromide

 - c. Calcium nitrate
- 4) Complete the following one-step conversions.
 - a. $4.80 \text{ mol H}_2\text{O} = ??? \text{ grams H}_2\text{O}$

 - b. $9.92 \text{ mol F}_2 = ??? \text{ molecules F}_2$
- 5) A bottle contains 75.1 g of AgCl. How many formula units are present in the bottle.

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6) In chemistry lab, a student collects 15 g of ammonia gas, NH_3 . How many molecules of NH_3 were collected?

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7) Determine the percent composition for each element in lithium oxide, Li_2O .

8) Determine the percent composition for each element in aluminum nitrate, $\text{Al}(\text{NO}_3)_3$.

9) An unknown compound was found to be composed of 47.0% K, 14.5% C, and 38.5% O. What is the empirical formula for the compound? If the molar mass is 166.22 g/mol, what is the molecular formula of this compound?

10) What is the written name of $\text{Al}_2(\text{SO}_4)_3 \cdot 5\text{H}_2\text{O}$? _____

11) What is the chemical formula for lithium nitrate tetrahydrate? _____

NCFE Multiple Choice Practice

12) Which of the following is the empirical formula for $\text{C}_8\text{H}_{12}\text{O}_4$?

- a. CHO
- b. $\text{C}_2\text{H}_3\text{O}$

- c. $\text{C}_4\text{H}_6\text{O}_2$
- d. $\text{C}_8\text{H}_{12}\text{O}_4$

13) What is the molar mass of ammonium sulfide, $(\text{NH}_4)_2\text{S}$?

- a. 47.09 g/mol
- b. 54.14 g/mol

- c. 68.15 g/mol
- d. 82.18 g/mol

14) How many atoms of chlorine are in aluminum perchlorate, $\text{Al}(\text{ClO}_4)_3$?

- a. 1
- b. 3

- c. 12
- d. 6

15) How many atoms of oxygen are in aluminum perchlorate, $\text{Al}(\text{ClO}_4)_3$?

- a. 1
- b. 3

- c. 12
- d. 6

16) How many atoms of aluminum are in aluminum perchlorate, $\text{Al}(\text{ClO}_4)_3$?

- a. 1
- b. 3

- c. 12
- d. 6

