



Mole Review

Definition

1 mol = _____ atoms/molecules

1 mol = _____ g

Converting Moles

1. Write out the conversion factor and all variables.
2. Set-up the problem. Write what you start with and multiply by the appropriate conversion factor.
3. Solve the problem for correct significant figures!

You must be able to:

- Name and write compounds and polyatomic ions
- Calculate molar mass
- Write a balanced chemical equation
- Predict products of a chemical equation
- Perform calculations with appropriate sig figs
- Convert between different types of units (especially moles and grams)

Molar Mass

1. Find the molar mass of the following elements or compounds. Give your answers with four significant figures.
 - a. $\text{Cr}_2(\text{CO}_3)_3$
 - b. CoBr_2
 - c. Ag_3PO_4
 - d. $\text{K}_3\text{Al}(\text{SO}_4)_3$
 - e. $(\text{NH}_4)_3\text{PO}_4$
 - f. aluminum phosphate
 - g. sodium cyanide
 - h. calcium hydroxide
 - i. iron (II) bicarbonate
 - j. barium permanganate

Molar Conversions

2. Determine the number of molecules or ions.
 - a. 2.00 mol Fe^{+3}
 - b. 4.5 mol BCl_3
 - c. 0.25 mol Co^{+2}
 - d. 6.022 mol O_2

3. Find the number of moles in the following.
 - a. 3.01×10^{23} molecules of H_2O
 - b. 1.000×10^{23} atoms of carbon
 - c. 5.610×10^{22} potassium ions
 - d. 8.24×10^{20} molecules of naphthalene

4. How many molecules of carbon dioxide exit your lungs when you exhale 5.00×10^{-2} mol of carbon dioxide?

5. You have a solution containing 9.656 mol of nickel (II) nitrate. How many nitrate ions are in your solution?

6. If there are approximately 1 trillion (1×10^{12}) cells in the human body, and approximately 6,732,470,000 people alive on the planet, how many moles of cells are there currently on the planet?
7. Find the mass in grams.
- 3.01×10^{23} molecules of water
 - 1.000×10^{23} atoms of carbon
 - 5.610×10^{22} nitrate ions
 - 8.24×10^{20} molecules of benzene (C_6H_6)
8. Calculate the mass of each of the following.
- 0.500 mol I_2
 - 2.82 mol PbS
 - 4.00 mol C_4H_{10}
 - 0.300 mol aluminum sulfate
 - 0.222 mol copper (II) nitrate

9. How many moles are in each of the following?

a. 6.60 g of ammonium sulfate

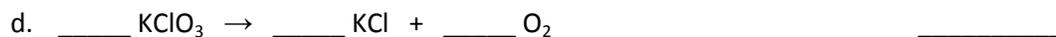
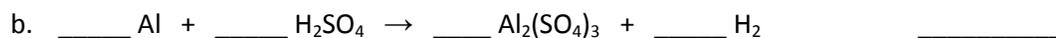
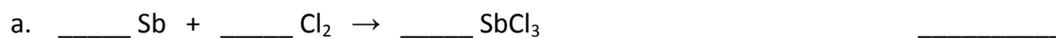
b. 4.5 kg of calcium hydroxide

c. 7.35 mg of sulfuric acid (H_2SO_4)

d. 5.39 μg of hexane (C_6H_{14})

10. Ibuprofen, $\text{C}_{13}\text{H}_{18}\text{O}_2$, is an active ingredient in pain relievers. How many molecules of ibuprofen are present in a pill that contains 250 mg of ibuprofen?

11. Predict the reaction type and balance the following chemical equations.



12. Translate the following word equations into chemical equations and balance them.

- a. nitric acid + sodium carbonate \rightarrow sodium nitrate + water + carbon dioxide

- b. iron (II) sulfate + potassium permanganate + sulfuric acid (H_2SO_4) \rightarrow water + manganese (II) sulfate + iron (III) sulfate + potassium sulfate

- c. Solid silver carbonate decomposes into solid silver oxide and gaseous carbon dioxide when heated.

- d. Iodine crystals react with chlorine gas to form solid iodine trichloride.

13. Predict the products and balance each of the following reactions.

- a. $\text{Ag}_2\text{O} \rightarrow$

- b. $\text{C}_4\text{H}_8 + \text{O}_2 \rightarrow$

- c. $\text{Pb}(\text{NO}_3)_2 + \text{K}_2\text{CrO}_4 \rightarrow$

- d. $\text{Li} + \text{O}_2 \rightarrow$

- e. $\text{Na}_3\text{PO}_4 + \text{Pb}(\text{NO}_3)_2 \rightarrow$