

Key

Mole worksheet:

1. How many moles are present in 45.0 liters of HCl gas at STP?

$$45.0 \text{ l} \div 22.4 \text{ l/m} = 2.01 \text{ mole}$$

2. What volume does 2.8 moles of CO₂ occupy at STP?

$$2.8 \text{ mole} \times 22.4 \text{ l/mole} = 62.7 \text{ liters}$$

3. How many moles are contained in 0.50 liters of NO₂ gas at STP?

$$.50 \text{ liter} \div 22.4 \text{ l/m} = .02 \text{ mole}$$

4. How many grams are there in a 2.0 liter flask of CH₄ gas at STP?

$$C = 12$$

$$2.0 \text{ l} \div 22.4 \text{ l/m} = 0.089 \text{ mole}$$

$$H = 1 \times 4$$

$$0.089 \text{ mole} \times 16 \text{ g/m} = \underline{1.4 \text{ g}}$$

5. What volume does 2.0 g of NO₂ gas occupy at STP?

$$N = 14$$

$$2.0 \text{ g} \div 46 \text{ g/mole} = 0.04 \text{ mole}$$

$$O = 16 \times 2$$

$$\underline{46}$$

$$0.04 \text{ mole} \times 22.4 \text{ l/m} = \underline{.97 \text{ liter}}$$

6. What is the mass of 100 mL of ethane gas (C₂H₆) at STP?

$$C = 2 \times 12$$

$$0.1 \text{ L} \div 22.4 \text{ m/l} = \underline{0.0045 \text{ mole}}$$

$$H = 1 \times 6$$

$$\underline{30}$$

$$0.0045 \text{ m} \times 30 \text{ g/mole} = \underline{0.134 \text{ g}}$$

$$\underline{0.134 \text{ g}}$$

7. What is the mass of 3.0 moles of sulfur?

$$3.0 \text{ mole} \times 32 \text{ g/m} = \underline{96 \text{ g}}$$

8. How many moles in 135 grams of sulfur?

$$135 \text{ g} \div 32 \text{ g/m} = \underline{4.2 \text{ m}}$$

9. What is the mass of 0.350 mole of CO₂?

$$C = 12$$

$$0.350 \text{ m} \times 44 \text{ g/m} = 15.4 \text{ g}$$

$$O = 16 \times 2$$

$$\underline{44}$$

10. How many moles are there in 34.0 grams of NH₃?

$$N = 14$$

$$34.0 \text{ g} \div 17 \text{ g/m} = \underline{2.0 \text{ mole}}$$

$$H = 1 \times 3$$

$$\underline{17}$$

11. How many moles are there in 0.500 g of H_2SO_4 ?

$$H = 2 \times 1$$

$$S = 32$$

$$O = \frac{16 \times 4}{98}$$

$$.5g \div 98g/m = .005 \text{ mole}$$

12. What is the mass of 0.010 mole of $Ba(OH)_2$?

$$0.010 \text{ mole} \times 171g/m$$

$$1.71g$$

$$Ba = 137$$

$$O = 16 \times 2$$

$$H = 1 \times 2$$

$$\underline{171}$$

13. Given the mass of the following determine the following information.

	Moles of atoms	Number of atoms
130 g Zn	$130g \div 65.4$ <u>1.99 mole</u>	$1.99 \times 6.02 \times 10^{23}$ <u>1.20×10^{24} atoms</u>
32.5 g Zn	$32.5 \div 65.4$ <u>.50 mole</u>	$.50 \times 6.02 \times 10^{23}$ <u>2.99×10^{23}</u>
18.0 g C	$18 \div 12$ <u>1.5 mole</u>	<u>9.03×10^{23}</u>
4.0 g C	<u>.33 mole</u>	<u>2.01×10^{23}</u>
21.0 g N_2 <small>14x2</small>	$21 \div 28$ <u>.75 mole</u>	<u>4.5×10^{23}</u>

14. Find the molecular mass for each of the following compounds.

- a. Aluminum chloride $AlCl_3$ $27 + 3(35) = 132g/m$
- b. Tin (IV) hydroxide $Sn(OH)_4$ $119 + 4(16) + 4(1) = 187g/m$
- c. Copper (II) sulfate pentahydrate $CuSO_4 \cdot 5H_2O$ $64 + 32 + 4(16) + 8(1) + 5(16) = 250.5$
- d. calcium bicarbonate $Ca(HCO_3)_2$ $40 + 2(1) + 2(12) + 6(16) = 162$
- e. aluminum nitrate $Al(NO_3)_3$ $27 + 3(14) + 9(16) = 253$
- f. magnesium nitride Mg_3N_2 $3(24) + 2(14) = 100$