

## Moles, Molecules, and Grams Worksheet

- 1) How many molecules are there in 24 grams of  $\text{FeF}_3$ ?

$$24 \text{ g FeF}_3 \left( \frac{1 \text{ mol}}{112.85 \text{ g}} \right) \left( \frac{6.02 \times 10^{23}}{1 \text{ mol}} \right) = 1.280283562 \times 10^{23} \text{ molecules FeF}_3$$

$1.3 \times 10^{23} \text{ molecules FeF}_3$

- 2) How many molecules are there in 450 grams of  $\text{Na}_2\text{SO}_4$ ?

$$450 \text{ g} \left( \frac{1 \text{ mol}}{142.04 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 1.907209237 \times 10^{24}$$

$1.9 \times 10^{24} \text{ molecules Na}_2\text{SO}_4$

- 3) How many grams are there in  $2.3 \times 10^{24}$  atoms of silver?

$$2.3 \times 10^{24} \text{ atoms} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{107.87 \text{ g}}{1 \text{ mol}} \right) = 412.127907 \text{ g}$$

$410 \text{ g Ag}$

- 4) How many grams are there in  $7.4 \times 10^{23}$  molecules of  $\text{AgNO}_3$ ?

$$7.4 \times 10^{23} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left( \frac{169.88 \text{ g}}{1 \text{ mol}} \right) = 208.8225914 \text{ g}$$

$210 \text{ g AgNO}_3$

- 5) How many grams are there in  $7.5 \times 10^{23}$  molecules of  $\text{H}_2\text{SO}_4$ ?

$$7.5 \times 10^{23} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23}} \right) \left( \frac{98.08 \text{ g}}{1 \text{ mol}} \right) = 122.192691 \text{ g}$$

$120 \text{ g H}_2\text{SO}_4$

- 6) How many molecules are there in 122 grams of  $\text{Cu}(\text{NO}_3)_2$ ?

$$122 \text{ g} \left( \frac{1 \text{ mol}}{187.57} \right) \left( \frac{6.02 \times 10^{23}}{1 \text{ mol}} \right) = 3.915551527 \times 10^{23}$$

$3.92 \times 10^{23} \text{ molecules Cu}(\text{NO}_3)_2$

- 7) How many grams are there in  $9.4 \times 10^{25}$  molecules of  $\text{H}_2$ ?

$$9.4 \times 10^{25} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23}} \right) \left( \frac{2.02 \text{ g}}{1 \text{ mol}} \right) = 315.4152824 \text{ g}$$

$320 \text{ g H}_2$

- 8) How many molecules are there in 230 grams of  $\text{CoCl}_2$ ?

$$230 \text{ g} \left( \frac{1 \text{ mol}}{129.83 \text{ g}} \right) \left( \frac{6.02 \times 10^{23}}{1 \text{ mol}} \right) = 1.06647154 \times 10^{24}$$

$1.1 \times 10^{24} \text{ molecules CoCl}_2$

- 9) How many molecules are there in 2.3 grams of  $\text{NH}_4\text{SO}_2$ ?

$$2.3 \text{ g NH}_4\text{SO}_2 \left( \frac{1 \text{ mol}}{82.11 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 1.68627451 \times 10^{22} \text{ molecules}$$

$1.7 \times 10^{22} \text{ molecules NH}_4\text{SO}_2$

- 10) How many grams are there in  $3.3 \times 10^{23}$  molecules of  $\text{N}_2\text{I}_6$ ?

$$3.3 \times 10^{23} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left( \frac{789.42 \text{ g}}{1 \text{ mol}} \right) = 432.7385382 \text{ g N}_2\text{I}_6$$

$430 \text{ g N}_2\text{I}_6$

- 11) How many molecules are there in 200 grams of  $\text{CCl}_4$ ?

$$200 \text{ g CCl}_4 \left( \frac{1 \text{ mol}}{153.81 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 7.827839542 \times 10^{23} \text{ molecules CCl}_4$$

$8 \times 10^{23} \text{ molecules CCl}_4$

- 12) How many grams are there in  $1 \times 10^{24}$  molecules of  $\text{BCl}_3$ ?

$$1 \times 10^{24} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left( \frac{117.16 \text{ g}}{1 \text{ mol}} \right) = 194.6179402 \text{ g BCl}_3$$

$200 \text{ g BCl}_3$

- 13) How many grams are there in  $4.5 \times 10^{22}$  molecules of  $\text{Ba}(\text{NO}_2)_2$ ?

$$4.5 \times 10^{22} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left( \frac{229.35 \text{ g}}{1 \text{ mol}} \right) = 17.14410299 \text{ g Ba}(\text{NO}_2)_2$$

$17 \text{ g Ba}(\text{NO}_2)_2$

- 14) How many molecules are there in 9.34 grams of  $\text{LiCl}$ ?

$$9.34 \text{ g LiCl} \left( \frac{1 \text{ mol}}{42.39 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 1.326416608 \times 10^{23} \text{ molecules LiCl}$$

$1.33 \times 10^{23} \text{ molecules LiCl}$

- 15) How many grams do  $4.3 \times 10^{21}$  molecules of  $\text{UF}_6$  weigh?

$$4.3 \times 10^{21} \text{ molecules} \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left( \frac{352.03 \text{ g}}{1 \text{ mol}} \right) = 2.5145 \text{ g UF}_6$$

$2.5 \text{ g UF}_6$

- 16) How many molecules are there in 230 grams of  $\text{NH}_4\text{OH}$ ?

$$230 \text{ g} \left( \frac{1 \text{ mol}}{35.06 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 3.949229892 \times 10^{24}$$

$3.9 \times 10^{24} \text{ molecules NH}_4\text{OH}$