

Name Key

○ - answer
~~~~~ - molar mass

Remember: atoms & molecules  
 can both be used in  
 conv fact:  $\frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ atoms or molec.}}$

Moles, Molecules, and Grams Worksheet

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

$$24 \text{ g } \cancel{\text{FeF}_3} \times \frac{1 \text{ mol } \cancel{\text{FeF}_3}}{112.82 \text{ g } \cancel{\text{FeF}_3}} \times \frac{6.022 \times 10^{23} \text{ molecules } \text{FeF}_3}{1 \text{ mol } \cancel{\text{FeF}_3}} = 1.3 \times 10^{23} \text{ molecules } \text{FeF}_3$$

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

$$450 \text{ g } \cancel{\text{Na}_2\text{SO}_4} \times \frac{1 \text{ mol } \cancel{\text{Na}_2\text{SO}_4}}{123.99 \text{ g } \cancel{\text{Na}_2\text{SO}_4}} \times \frac{6.022 \times 10^{23} \text{ molec. } \text{Na}_2\text{SO}_4}{1 \text{ mol } \cancel{\text{Na}_2\text{SO}_4}} = 1.9 \times 10^{24} \text{ molecules } \text{Na}_2\text{SO}_4$$

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

$$2.3 \times 10^{24} \text{ atoms } \cancel{\text{Ag}} \times \frac{1 \text{ mol } \cancel{\text{Ag}}}{6.022 \times 10^{23} \text{ atoms } \cancel{\text{Ag}}} \times \frac{107.9 \text{ g } \text{Ag}}{1 \text{ mol } \cancel{\text{Ag}}} = 412.0 \text{ g } \text{Ag}$$

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

$$7.4 \times 10^{23} \text{ molec. } \cancel{\text{AgNO}_3} \times \frac{1 \text{ mol } \cancel{\text{AgNO}_3}}{6.022 \times 10^{23} \text{ molec. } \cancel{\text{AgNO}_3}} \times \frac{169.9 \text{ g } \text{AgNO}_3}{1 \text{ mol } \cancel{\text{AgNO}_3}} = 208.8 \text{ g } \text{AgNO}_3$$

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

$$7.5 \times 10^{23} \text{ molec. } \cancel{\text{H}_2\text{SO}_4} \times \frac{1 \text{ mol } \cancel{\text{H}_2\text{SO}_4}}{6.022 \times 10^{23} \text{ molec. } \cancel{\text{H}_2\text{SO}_4}} \times \frac{98.09 \text{ g } \text{H}_2\text{SO}_4}{1 \text{ mol } \cancel{\text{H}_2\text{SO}_4}} = 122.2 \text{ g } \text{H}_2\text{SO}_4$$

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

$$122 \text{ g } \text{Cu}(\text{NO}_3)_2 \times \frac{1 \text{ mol } \text{Cu}(\text{NO}_3)_2}{187.57 \text{ g } \text{Cu}(\text{NO}_3)_2} \times \frac{6.022 \times 10^{23} \text{ molec. } \text{Cu}(\text{NO}_3)_2}{1 \text{ mol } \text{Cu}(\text{NO}_3)_2} = 3.92 \times 10^{23} \text{ molecules } \text{Cu}(\text{NO}_3)_2$$

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

$$9.4 \times 10^{25} \text{ molec. } \cancel{\text{H}_2} \times \frac{1 \text{ mol } \cancel{\text{H}_2}}{6.022 \times 10^{23} \text{ molec. } \cancel{\text{H}_2}} \times \frac{2.016 \text{ g } \text{H}_2}{1 \text{ mol } \cancel{\text{H}_2}} = 314.7 \text{ g } \text{H}_2$$

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

$$230 \text{ g } \text{CoCl}_2 \times \frac{1 \text{ mol } \text{CoCl}_2}{129.83 \text{ g } \text{CoCl}_2} \times \frac{6.022 \times 10^{23} \text{ molec. } \text{CoCl}_2}{1 \text{ mol } \text{CoCl}_2} = 1.1 \times 10^{24} \text{ molecules } \text{CoCl}_2$$