

Moles, Molecules, and Grams Worksheet

1) How many molecules are there in 24 grams of FeF_3 ?

$$\frac{6.02 \times 10^{23} \text{ molecules } \text{FeF}_3}{1 \text{ mol } \text{FeF}_3} \times \frac{1 \text{ mol } \text{FeF}_3}{112.85 \text{ g } \text{FeF}_3} \times 24 \text{ g } \text{FeF}_3 = \boxed{1.3 \times 10^{23} \text{ molecules } \text{FeF}_3}$$

2) How many molecules are there in 450 grams of Na_2SO_4 ?

$$\frac{6.02 \times 10^{23} \text{ molecules } \text{Na}_2\text{SO}_4}{1 \text{ mol } \text{Na}_2\text{SO}_4} \times \frac{1 \text{ mol } \text{Na}_2\text{SO}_4}{142.05 \text{ g } \text{Na}_2\text{SO}_4} \times 450 \text{ g } \text{Na}_2\text{SO}_4 = \boxed{1.9 \times 10^{24} \text{ molecules } \text{Na}_2\text{SO}_4}$$

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

$$\frac{107.87 \text{ g } \text{Ag}}{1 \text{ mol } \text{Ag}} \times \frac{1 \text{ mol } \text{Ag}}{6.02 \times 10^{23} \text{ atoms } \text{Ag}} \times 2.3 \times 10^{24} \text{ atoms } \text{Ag} = \boxed{410 \text{ g } \text{Ag}}$$

4) How many grams are there in 7.4×10^{23} molecules of AgNO_3 ?

$$\frac{169.88 \text{ g } \text{AgNO}_3}{1 \text{ mol } \text{AgNO}_3} \times \frac{1 \text{ mol } \text{AgNO}_3}{6.02 \times 10^{23} \text{ molecules } \text{AgNO}_3} \times 7.4 \times 10^{23} \text{ molecules } \text{AgNO}_3 = \boxed{210 \text{ g } \text{AgNO}_3}$$

5) How many grams are there in 7.5×10^{23} molecules of H_2SO_4 ?

$$\frac{98.09 \text{ g } \text{H}_2\text{SO}_4}{1 \text{ mol } \text{H}_2\text{SO}_4} \times \frac{1 \text{ mol } \text{H}_2\text{SO}_4}{6.02 \times 10^{23} \text{ molecules } \text{H}_2\text{SO}_4} \times 7.5 \times 10^{23} \text{ molecules } \text{H}_2\text{SO}_4 = \boxed{120 \text{ g } \text{H}_2\text{SO}_4}$$

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

$$\frac{6.02 \times 10^{23} \text{ molecules } \text{Cu}(\text{NO}_3)_2}{1 \text{ mol } \text{Cu}(\text{NO}_3)_2} \times \frac{1 \text{ mol } \text{Cu}(\text{NO}_3)_2}{187.57 \text{ g } \text{Cu}(\text{NO}_3)_2} \times 122 \text{ g } \text{Cu}(\text{NO}_3)_2 = \boxed{3.92 \times 10^{23} \text{ molecules } \text{Cu}(\text{NO}_3)_2}$$

7) How many grams are there in 9.4×10^{25} molecules of H_2 ?

$$\frac{2.02 \text{ g } \text{H}_2}{1 \text{ mol } \text{H}_2} \times \frac{1 \text{ mol } \text{H}_2}{6.02 \times 10^{23} \text{ molecules } \text{H}_2} \times 9.4 \times 10^{25} \text{ molecules } \text{H}_2 = \boxed{320 \text{ g } \text{H}_2}$$

8) How many molecules are there in 230 grams of CoCl_2 ?

$$\frac{6.02 \times 10^{23} \text{ molecules } \text{CoCl}_2}{1 \text{ mol } \text{CoCl}_2} \times \frac{1 \text{ mol } \text{CoCl}_2}{129.83 \text{ g } \text{CoCl}_2} \times 230 \text{ g } \text{CoCl}_2 = \boxed{1.1 \times 10^{24} \text{ molecules } \text{CoCl}_2}$$

9) How many molecules are there in 2.3 grams of NH_4SO_2 ?

6.02×10^{23} molecules NH_4SO_2	1 mol NH_4SO_2	2.3 g NH_4SO_2	= 1.7×10^{22} molecules NH_4SO_2
1 mol NH_4SO_2	82.12 g NH_4SO_2		

10) How many grams are there in 3.3×10^{23} molecules of N_2I_6 ?

793.41 g N_2I_6	1 mol N_2I_6	3.3×10^{23} molecules N_2I_6	= 430 g N_2I_6
1 mol N_2I_6	6.02×10^{23} molecules N_2I_6		

11) How many molecules are there in 200 grams of CCl_4 ?

6.02×10^{23} molecules CCl_4	1 mol CCl_4	200 g CCl_4	= 8×10^{23} molecules CCl_4
1 mol CCl_4	153.81 g CCl_4		

12) How many grams are there in 1×10^{24} molecules of BCl_3 ?

117.16 g BCl_3	1 mol BCl_3	1×10^{24} molecules BCl_3	= 200 g BCl_3
1 mol BCl_3	6.02×10^{23} molecules BCl_3		

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

229.35 g $\text{Ba}(\text{NO}_2)_2$	1 mol $\text{Ba}(\text{NO}_2)_2$	4.5×10^{22} molecules $\text{Ba}(\text{NO}_2)_2$	= 17 g $\text{Ba}(\text{NO}_2)_2$
1 mol $\text{Ba}(\text{NO}_2)_2$	6.02×10^{23} molecules $\text{Ba}(\text{NO}_2)_2$		

14) How many molecules are there in 9.34 grams of LiCl ?

6.02×10^{23} molecules LiCl	1 mol LiCl	9.34 g LiCl	= 1.33×10^{23} molecules LiCl
1 mol LiCl	42.39 g LiCl		

15) How many grams do 4.3×10^{21} molecules of UF_6 weigh?

352.63 g UF_6	1 mol UF_6	4.3×10^{21} molecules UF_6	= 0.5 g UF_6
1 mol UF_6	6.02×10^{23} molecules UF_6		

16) How many molecules are there in 230 grams of NH_4OH ?

6.02×10^{23} molecules NH_4OH	1 mol NH_4OH	230 g NH_4OH	= 3.9×10^{24} molecules NH_4OH
1 mol NH_4OH	35.06 g NH_4OH		