Name_____   Date_____   Per_____

Mole to Grams, Grams to Moles Conversions Worksheet

What are the molecular weights of the following compounds? (all masses must be to nearest hundredth)

1)   NaOH   2) H_3PO_4

3) H_2O 4) Mn_2Se_7

5) $MgCl_2$ 6) $(NH_4)_2SO_4$

There are three definitions (equalities) of mole. They are:
          1 mole = 6.02 x 10^{23} particles
          1 mole = molar mass (could be atomic mass from periodic table or molecular mass)
          1 mole = 22.4 L of a gas at STP (**You do not need to worry about this yet**)

Each definition can be written as a set of two conversion factors. They are:

1 mole = molar mass(g) can be written as $\left(\dfrac{\text{1 mole}}{\text{molar mass (g)}} \right)$ **OR** $\left(\dfrac{\text{molar mass (g)}}{\text{1 mole}} \right)$

1 mole = 6.02 x 10^{23} particles can be written as $\left(\dfrac{\text{1 mole}}{\text{6.02 x }10^{23}} \right)$ **OR** $\left(\dfrac{\text{6.02 x }10^{23}}{\text{1 mole}} \right)$

Solve the following:

1)   **How many moles** are in 15 grams of lithium? (**molar mass of lithium is 6.94 g/mole**)

      15 grams x   1 mole   =   2.1614 moles lithium   = **2.2 moles Li**
                    6.94grams

2)   **How many grams** are in 2.4 moles of sulfur? (**molar mass of sulfur is 32.07 g/ mole**)

      2.4 moles x 32.07 grams   =   76.97 grams sulfur   =   **77 g Sulfur**
                    1 mole

3)   **How many moles** are in 22 grams of argon?

4)   **How many grams** are in 88.1 moles of magnesium?

5)   **How many moles** are in 2.3 grams of phosphorus?

6)   **How many grams** are in 11.9 moles of chromium?

7)   **How many moles** are in 9.8 grams of calcium?

8)   **How many grams** are in 238 moles of arsenic?

Solve the following:

9)   How many grams are in 4.5 moles of sodium fluoride, NaF?
      (**molar mass of NaF is 22.99 + 19.00 = 41.99 g/ mole**)
      4.5 moles   x   41.99 grams   = 188.955 g NaF   =   **190 g NaF**
                       1 mole

10)   How many moles are in 98.3 grams of aluminum hydroxide, $Al(OH)_3$?
      (**molar mass of $Al(OH)_3$ is 26.98 + (3 x 16.00) + (3 x 1.01) = 78.01 g/ mole**)
      98.3 grams   x   1 mole   =   1.2601 moles $Al(OH)_3$ =   **1.26** moles $Al(OH)_3$
                       78.01 grams

11)   How many grams are in 0.02 moles of beryllium iodide, BeI_2?

12)   How many moles are in 68 grams of copper (II) hydroxide, $Cu(OH)_2$?

13)   How many grams are in 3.3 moles of potassium sulfide, K_2S?

14)   How many moles are in 1.2×10^3 grams of ammonia, NH_3?

15)   How many grams are in 2.3×10^{-4} moles of calcium phosphate, $Ca_3(PO_3)_2$?

16)   How many moles are in 3.4×10^{-7} grams of silicon dioxide, SiO_2?

Mole Calculation Worksheet – Answer Key

What are the molecular weights of the following compounds?

1) NaOH **22.99 + 16.00 + 1.01 = 40.00 grams/mol**   2) H_3PO_4 **3(1.01) + 30.97 + 4(16.00) = 98.00 grams**

3) H_2O **2(1.01) + 16.00 = 18.02 grams**   4) Mn_2Se_7 **2(54.94) + 7(78.96) = 662.60 grams**

5) $MgCl_2$ **= 24.31 + 2(35.45) = 95.21 grams**   6) $(NH_4)_2SO_4$ **2(14.01) + 8(1.01) + 32.07 + 4(16.00) =132.17 grams**

Solve the following:

1)   How many moles are in 15 grams of lithium? **2.161moles = 2.2moles**

2)   How many grams are in 2.4 moles of sulfur? **76.968 g = 77 grams**

3)   How many moles are in 22 grams of argon? **0.550688 moles = 0.55 moles**

4)   How many grams are in 88.1 moles of magnesium? **2141.711 grams = 2140 g**

5)   How many moles are in 2.3 grams of phosphorus? **0.074265 moles = 0.074 moles**

6)   How many grams are in 11.9 moles of chromium? **618.8 grams = 619 g**

7)   How many moles are in 9.8 grams of calcium? **0.24451 moles = 0.24 moles**

8)   How many grams are in 238 moles of arsenic? **17,830.96 grams = 17,800 g**

9)   How many grams are in 4.5 moles of sodium fluoride, NaF? **188.955 g NaF = 190 g**

10)   How many moles are in 98.3 grams of aluminum hydroxide, $Al(OH)_3$? **1.2601 moles = 1.26 moles**

11)   How many grams are in 0.02 moles of beryllium iodide, BeI_2? **5.2562 grams = 5 g**

12)   How many moles are in 68 grams of copper (II) hydroxide, $Cu(OH)_2$? **0.6969 moles = 0.70 moles**

13)   How many grams are in 3.3 moles of potassium sulfide, K_2S? **363.891 grams = 360 g**

14)   How many moles are in 1.2×10^3 grams of ammonia, NH_3? **70.5882 moles = 71 moles**

15)   How many grams are in 2.3×10^{-4} moles of calcium phosphate, $Ca_3(PO_3)_2$? **0.06398 g = 0.064 g**

16)   How many moles are in 3.4×10^{-7} grams of silicon dioxide, SiO_2? **5.6582×10^{-9} mol = 5.7×10^{-9} mol**

17)   How many grams are in 1.11 moles of manganese sulfate, $Mn_3(SO_4)_7$? **1.11 x   837   = 929.07 grams**
                Bad formula