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## Mole to Grams, Grams to Moles Conversions Worksheet

To find moles divide molar mass
To find grams multiply molarmass

What are the molecular weights of the following compounds?

1) NaOH
2) $\mathrm{H}_{3} \mathrm{PO}_{4}$
3) $\mathrm{H}_{2} \mathrm{O}$
4) $\quad \mathrm{Mn}_{2} \mathrm{Se}_{7}$
5) $\mathrm{MgCl}_{2}$
6) $\left(\mathrm{NH}_{4}\right)_{2} \mathrm{SO}_{4}$

There are three definitions (equalities) of mole. They are:
1 mole $=6.02 \times 10^{23}$ particles
1 mole $=$ molar mass (could be atomic mass from periodic table or molecular mass)
1 mole $=22.4 \mathrm{~L}$ 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 $=\operatorname{molar} \operatorname{mass}(\mathrm{g})$ can be written as $\quad\left(\frac{1 \text { mole }}{\text { molar mass }(\mathrm{g})}\right)$ OR $\left.\quad \frac{\text { molar mass }(\mathrm{g})}{1 \text { mole }}\right)$
1 mole $=6.02 \times 10^{23}$ particles can be written as $\quad\left(\frac{1 \mathrm{~mole}}{6.02 \times 10^{23}}\right)$ OR $\left.\frac{6.02 \times 10^{23}}{1 \mathrm{~mole}}\right)$
Solve of the following:

1) How many moles are in 15 grams of lithium?
2) How many grams are in 2.4 moles of sulfur?
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 he following:
9) How many grams are in 4.5 moles of sodium fluoride, NaF ?
10) How many moles are in 98.3 grams of aluminum hydroxide, $\mathrm{Al}(\mathrm{OH})_{3}$ ?
11) How many grams are in 0.02 moles of beryllium iodide, $\mathrm{BeI}_{2}$ ?
12) How many moles are in 68 grams of copper (II) hydroxide, $\mathrm{Cu}(\mathrm{OH})_{2}$ ?
13) How many grams are in 3.3 moles of potassium sulfide, $\mathrm{K}_{2} \mathrm{~S}$ ?
14) How many moles are in $1.2 \times 10^{3}$ grams of ammonia, $\mathrm{NH}_{3}$ ?
15) How many grams are in $2.3 \times 10^{-4}$ moles of calcium phosphate, $\mathrm{Ca}_{3}\left(\mathrm{PO}_{3}\right)_{2}$ ?
16) How many moles are in $3.4 \times 10^{-7}$ grams of silicon dioxide, $\mathrm{SiO}_{2}$ ?
17) How many grams are in 1.11 moles of manganese sulfate, $\mathrm{Mn}_{3}\left(\mathrm{SO}_{4}\right)_{7}$ ?

Unit - 4 Moles and Stoichiometry

## Mole Calculation Worksheet - Answer Key

What are the molecular weights of the following compounds?

1) $\mathrm{NaOH} \quad 23+16+1=40.1$ grams
2) $\mathrm{H}_{3} \mathrm{PO}_{4} \quad 3+31+64=\mathbf{9 8 . 0}$ grams
3) $\mathrm{H}_{2} \mathrm{O} \quad 2+\mathbf{1 6}=\mathbf{1 8 . 0}$ grams
4) $\quad \mathrm{Mn}_{2} \mathrm{Se}_{7} \quad 663.0$ grams
5) $\quad \mathrm{MgCl}_{2} \quad 95.3$ grams
6) $\quad\left(\mathrm{NH}_{4}\right)_{2} \mathrm{SO}_{4} \quad 132.1$ grams

Solve any 15 of the following:

1) How many moles are in 15 grams of lithium? $15 / 7=2.14$ moles
2) How many grams are in 2.4 moles of sulfur? $2.4 \times 32=\mathbf{7 6 . 8}$ grams
3) How many moles are in 22 grams of argon? $22 / 40=\mathbf{0 . 5 5}$ moles
4) How many grams are in 88.1 moles of magnesium? $\mathbf{8 8 . 1} \times 24=\mathbf{2 1 1 4 . 4}$ grams
5) How many moles are in 2.3 grams of phosphorus? $2.3 / \mathbf{3 1}=\mathbf{0 . 0 7 4}$ moles
6) How many grams are in 11.9 moles of chromium? $11.9 \times 52=618.8 \mathrm{grams}$
7) How many moles are in 9.8 grams of calcium? $9.8 / 40=0.25$ moles
8) How many grams are in 238 moles of arsenic? $238 \times 75=\mathbf{1 7}, \mathbf{8 5 0}$ grams
9) How many grams are in 4.5 moles of sodium fluoride, NaF? $4.5 \times 42=\mathbf{1 8 9}$ grams
10) How many moles are in 98.3 grams of aluminum hydroxide, $\mathrm{Al}(\mathrm{OH})_{3}$ ? $98.3 / \mathbf{7 8}=\mathbf{1 . 2 6}$ moles
11) How many grams are in 0.02 moles of beryllium iodide, $\mathrm{BeI}_{2}$ ? $0.02 \times 263=5.26$ grams
12) How many moles are in 68 grams of copper (II) hydroxide, $\mathrm{Cu}(\mathrm{OH})_{2}$ ? 68/99 $=0.69$ moles
13) How many grams are in 3.3 moles of potassium sulfide, $K_{2} S ? 3.3 \times 110=363.0$ grams
14) How many moles are in $1.2 \times 10^{3}$ grams of ammonia, $\mathrm{NH}_{3}$ ? $1.2 \times 10^{3} \times 17=70.59$ moles
15) How many grams are in $2.3 \times 10^{-4}$ moles of calcium phosphate, $\mathrm{Ca}_{3}\left(\mathrm{PO}_{3}\right)_{2} ? 2.3 \times 10^{-4} \times 278=\mathbf{0 . 0 6 4}$ grams

16) How many grams are in 1.11 moles of manganese sulfate, $\mathrm{Mn}_{3}\left(\mathrm{SO}_{4}\right)_{7}$ ? $\mathbf{1 . 1 1} \mathbf{x} \quad 837 \quad=929.07$ grams
