

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Due Date: \_\_\_\_\_

# Atoms and Molecules Homework - Answers

1. Describe the difference between atoms, molecules and compounds.

2. Use your knowledge of subscripts and coefficients to complete the table below:

Name	Formula	Number of Atoms in the Substance.
Calcium carbonate	$\text{CaCO}_3$	
Magnesium hydroxide	$\text{Mg(OH)}_2$	
Acetic acid	$2\text{C}_2\text{H}_4\text{O}_2$	
Calcium chloride	$\text{CaCl}_2$	
Sulfuric acid	$\text{H}_2\text{SO}_4$	
Sodium phosphate	$2\text{Na}_3\text{PO}_4$	
Aluminium hydroxide	$\text{Al(OH)}_3$	
Ammonium sulfate	$4(\text{NH}_4)_2\text{SO}_4$	

## Atoms and Molecules Homework - Answers

3. For each of the following compounds, outline the number of named atoms.

- a. The number of chlorine atoms in paradichlorobenzene (moth crystals)  $4\text{C}_6\text{H}_4\text{Cl}_2$ .
  
- b. The number of carbon atoms in Aspirin (pain relief)  $2\text{C}_9\text{H}_8\text{O}_4$ .
  
- c. The number of nitrogen atoms in trinitrotoluene (explosive)  $\text{C}_7\text{H}_5(\text{NO}_2)_3$ .
  
- d. The number of hydrogen atoms in cellulose (plant tissue)  $3\text{C}_6\text{H}_7\text{O}_2(\text{OH})_3$ .
  
- e. The number of hydrogen atoms in calcium dihydrogen phosphate (fertilizer)  $2\text{Ca}(\text{H}_2\text{PO}_4)_2$ .
  
- f. The number of oxygen atoms in lanthanum carbonate (kidney medicine)  $3\text{La}_2(\text{CO}_3)_3$ .

# Atoms and Molecules Homework - Answers

1. Describe the difference between atoms, molecules and compounds.

Atoms are the smallest particle of a given element that retains the elements chemical properties. A molecule is a collection of two or more atoms of the same or different element in definite arrangements that are chemically bonded together. Molecules which contain different types of atoms are called compounds.

2. Use your knowledge of subscripts and coefficients to complete the table below:

Name	Formula	Number of Atoms in the Substance.
Calcium carbonate	$\text{CaCO}_3$	Ca - 1 C - 1 $\text{O}_3 - 3$ Total = 5
Magnesium hydroxide	$\text{Mg(OH)}_2$	Mg - 1 O - 2 H - 2 Total = 5
Acetic acid	$2\text{C}_2\text{H}_4\text{O}_2$	$\text{C}_2 - 2$ $\text{H}_4 - 4$ $\text{O}_2 - 2$ Total = $8 \times 2 = 16$
Calcium chloride	$\text{CaCl}_2$	Ca - 1 $\text{Cl}_2 - 2$ Total = 3
Sulfuric acid	$\text{H}_2\text{SO}_4$	$\text{H}_2 - 2$ S - 1 $\text{O}_4 - 4$ Total = 7
Sodium phosphate	$2\text{Na}_3\text{PO}_4$	$\text{Na}_3 - 3$ P - 1 $\text{O}_4 - 4$ Total = $8 \times 2 = 16$
Aluminium hydroxide	$\text{Al(OH)}_3$	Al - 1 O - 3 H - 3 Total = 7
Ammonium sulfate	$4(\text{NH}_4)_2\text{SO}_4$	N - 2 $\text{H}_4 - 8$ S - 1 $\text{O}_4 - 4$ Total = $15 \times 4 = 60$

## Atoms and Molecules Homework - Answers

**3. For each of the following compounds, outline the number of named atoms.**

- a. The number of chlorine atoms in paradichlorobenzene (moth crystals)  $4C_6H_4Cl_2$ .  
 $Cl_2 = 8$
- b. The number of carbon atoms in Aspirin (pain relief)  $2C_9H_8O_4$ .  
 $C_9 = 9 \times 2 = 18$
- c. The number of nitrogen atoms in trinitrotoluene (explosive)  $C_7H_5(NO_2)_3$ .  
 $N = 3$
- d. The number of hydrogen atoms in cellulose (plant tissue)  $3C_6H_7O_2(OH)_3$ .  
 $H_7 + H_3 = H_{10}$   
 $H_{10} \times 3 = 30$
- e. The number of hydrogen atoms in calcium dihydrogen phosphate (fertilizer)  
 $2Ca(H_2PO_4)_2$ .  
 $H = 2 \times 2 \times 2 = 8$
- f. The number of oxygen atoms in lanthanum carbonate (kidney medicine)  $3La_2(CO_3)_3$ .  
 $O = 3 \times 3 \times 3 = 27$