

**ATOMIC CHART 1 WORKSHEET**

	Symbol	Name	Atomic #	Mass #	# of protons	# of neutrons	# of electrons
1.)		calcium - 40					
2.)	$^{201}_{80}\text{Hg}$						
3.)			53	127			
4.)					19	20	
5.)				40		22	
6.)	$^{207}_{82}\text{Pb}^{+2}$						
7.)		barium - 137					
8.)			14	28			
9.)				19		10	
10.)			26			30	

**ATOMIC CHART 2 WORKSHEET**

	Symbol	Name	# of p <sup>+</sup>	# of n <sup>0</sup>	Atomic #	Mass #	# of e <sup>-</sup>	Period	Group
1.)	$^{14}\text{N}^{-3}$								
2.)	$^{27}\text{Al}^{+3}$								
3.)			47			108			
4.)				45		80			
5.)					55	134			
6.)				18	17				
7.)			92			238			
8.)					38	86			
9.)		phosphorus - 31							
10.)	$^{87}\text{Rb}^{+1}$								
11.)						75		4	15
12.)				118				6	11

**AVERAGE ATOMIC MASS WORKSHEET**

Determine the average atomic mass of the following mixtures of isotopes.

1.) 75 %  $^{133}\text{Cs}$ , 20 %  $^{132}\text{Cs}$ , and 5 %  $^{134}\text{Cs}$

2.) 80 %  $^{127}\text{I}$ , 17 %  $^{126}\text{I}$ , 3 %  $^{128}\text{I}$

3.) 50 %  $^{197}\text{Au}$ , 50 %  $^{198}\text{Au}$

4.) 15 %  $^{55}\text{Fe}$ , 85 %  $^{56}\text{Fe}$

5.) 99 %  $^1\text{H}$ , 0.8 %  $^2\text{H}$ , 0.2 %  $^3\text{H}$

6.) 95 %  $^{14}\text{N}$ , 3 %  $^{15}\text{N}$ , 2 %  $^{16}\text{N}$

7.) 98 %  $^{12}\text{C}$ , 2 %  $^{14}\text{C}$

### **MOLES AND MOLECULES WORKSHEET**

Part 1 - Determine the number of moles in each of the quantities below.

- 1.)  $2.50 \times 10^{23}$  molecules of NaCl
- 2.)  $1.25 \times 10^{23}$  molecules of  $\text{H}_2\text{SO}_4$
- 3.)  $1.00 \times 10^{24}$  molecules of  $\text{KMnO}_4$
- 4.)  $7.4 \times 10^{24}$  molecules of KCl
- 5.)  $3.5 \times 10^{25}$  molecules of  $\text{CuSO}_4$

Part 2 - Determine the number of molecules in each of the quantities below.

- 6.) 2.5 moles of NaCl
- 7.) 0.50 moles of  $\text{H}_2\text{SO}_4$
- 8.) 1.70 moles of  $\text{KMnO}_4$
- 9.) 0.25 moles of KCl
- 10.) 3.2 moles of  $\text{CuSO}_4$

ANSWERS:

- |                              |                              |                               |                              |                               |
|------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|
| 1.) 0.415 moles              | 2.) 0.208 moles              | 3.) 1.66 moles                | 4.) 12 moles                 | 5.) 58 moles                  |
| 6.) $1.5 \times 10^{24}$ mcs | 7.) $3.0 \times 10^{23}$ mcs | 8.) $1.02 \times 10^{24}$ mcs | 9.) $1.5 \times 10^{23}$ mcs | 10.) $1.9 \times 10^{24}$ mcs |

### **MOLES AND MASS WORKSHEET**

Part 1 - Determine the number of moles in each of the quantities below.

- 1.) 25.0 grams of NaCl
- 2.) 125 grams of  $\text{H}_2\text{SO}_4$
- 3.) 100. grams of  $\text{KMnO}_4$
- 4.) 74.5 grams of KCl
- 5.) 35 grams of  $\text{CuSO}_4$

Part 2 - Determine the mass (number of grams) in each of the quantities below.

- 6.) 2.5 moles of NaCl
- 7.) 0.50 moles of  $\text{H}_2\text{SO}_4$
- 8.) 1.70 moles of  $\text{KMnO}_4$

9.) 0.25 moles of KCl

10.) 3.2 moles of CuSO<sub>4</sub>

ANSWERS:

1.) 0.427 moles

2.) 1.27 moles

3.) 0.633 moles

4.) 0.999 moles

5.) 0.22 moles

6.) 150 g

7.) 49 g

8.) 269 g

9.) 19 g

10.) 510 g

**PRACTICE WITH MOLE CONVERSIONS WORKSHEET**

1. How many moles are equal to 2.548 grams of boron trifluoride, BF<sub>3</sub>?

2. How many grams are there in  $2.45 \times 10^{24}$  molecules of ammonia, NH<sub>3</sub>?

3. How many moles are equal to  $5.29 \times 10^{23}$  atoms of carbon?

4. What is the mass (in grams) of 6.759 moles of sodium chloride, NaCl?

5. How many molecules of H<sub>3</sub>PO<sub>4</sub> are contained in 0.257 moles of H<sub>3</sub>PO<sub>4</sub>?

6. How many atoms of copper are equal to 49.5 grams of copper?

7. What is the mass (in grams) of  $7.14 \times 10^{23}$  molecules of C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>?

8. How many moles are equal to  $8.392 \times 10^{23}$  atoms of uranium?

9. What is the mass (in grams) of 5.685 moles of sodium bicarbonate, NaHCO<sub>3</sub>?

10. How many molecules are equal to 0.027 moles of calcium carbonate, CaCO<sub>3</sub>?

11. How many moles are equal to 93.75 grams of sodium sulfate, Na<sub>2</sub>SO<sub>4</sub>?

12. How many molecules are equal to 103.74 grams of lead nitrate, Pb(NO<sub>3</sub>)<sub>2</sub>?

\*13. A large piece of aluminum foil has a mass of 35.25 grams. What mass of pure tin would contain the same number of atoms as the aluminum foil?

1.) 0.03758 moles

2.) 69.2 grams

3.) 0.878 moles

4.) 395.4 grams

5.)  $1.55 \times 10^{23}$  molecules

6.)  $4.69 \times 10^{23}$  atoms

7.) 213 grams

8.) 1.394 moles

9.) 477.5 grams

10.)  $1.6 \times 10^{22}$  molecules

11.) 0.6597 moles

12.)  $1.8862 \times 10^{23}$  molecules

\*13.) 155.0 grams

**UNIT 3 REVIEW WORKSHEET**

Part 1 - Fill in the blanks

Atoms are made up of electrons, which have a 1 charge;

2, which have a positive charge; and 3, which are neutral.

The latter two particles are found in the 4 of the atom.

It was 5 who discovered the nucleus of the atom. The

nucleus has a 6 charge and it occupies a very small volume

in the atom. In contrast, the negatively-charged 7 occupies most of the volume of the atom.

The number of 8 in the nucleus of the atom is the atomic 9

of that element. Because the atom is electrically neutral, the

number of protons and 10 are equal. The sum of the 11

and neutrons is the mass number. Atoms of the same element are identical in most respects, but they can differ in the number of

12 in the nucleus. Atoms that have the same number of protons

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_

13. \_\_\_\_\_

but different mass numbers are called 13.

The 14 of an element is the weighted average of the masses of the isotopes of that element. Two isotopes of sulfur are  $^{32}\text{S}$  and  $^{34}\text{S}$ . An atom of the sulfur-32 isotope contains 15 protons and 16 neutrons. The sulfur-34 isotope has 17 protons and 18 neutrons.

Each of the three known isotopes of hydrogen has 19 proton(s) in the nucleus. The most common hydrogen isotope has 20 neutrons. It has a mass number of 21 and is called hydrogen-1.

14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_
21. \_\_\_\_\_

Part 2 - Solve the following problems.

22. Calculate the average atomic mass of oxygen given the percent abundance of each of its naturally-occurring isotopes: oxygen-16 is 99.76%, oxygen-17 is 0.037%, and oxygen-18 is 0.204%.
23. What is the mass of 6.00 moles of aluminum?
24. How many moles contain  $8.53 \times 10^{23}$  atoms of platinum?
25. How many atoms of carbon are in 3.25 moles of carbon?
26. How many moles of  $\text{SO}_2$  are in 160.0 grams of  $\text{SO}_2$ ?
27. What is the mass of  $3.58 \times 10^{24}$  atoms of nitrogen?
28. How many molecules does 80.0 grams of  $\text{K}_2\text{O}$  contain?

Part 3 - Fill in the following chart.

Name	# of e <sup>-</sup>	Atomic #	Mass #	# of n <sup>0</sup>	# of p <sup>+</sup>	Symbol
arsenic - 76						
		27	58			
				48	36	
						$^{11}\text{B}$
	25		56			
				8	6	
		7		7		

Answers to # 23 - 28:

- 23.) 162 grams      24.) 1.42 moles      25.)  $1.96 \times 10^{24}$  atoms      26.) 2.496 moles  
 27.) 83.2 grams      28.)  $5.11 \times 10^{23}$  molecules