

Name: _____

Date: _____

Unit 6: Chemistry Test 1 Study Guide

Due Date: _____

Test Date: _____

Unit 6 Important Topics: Please review the concepts on this study guide as well as any other notes/worksheets from this unit.

- I. Aim # 32 – Atoms and Atomic Structure
- II. Aim # 33 – Periodic Table and Trends
- III. Aim # 34 – Properties of Metals, Nonmetals, Metalloids and Gases
- IV. Aim # 35 – Electron Configuration and Diagrams (Bohr vs. Lewis)
- V. Aim #36 – Atoms, Elements, Compounds and Mixtures
- VI. Aim #37 – Isotopes

I. Aim #32: Atoms and Atomic Structure

1. **Define** the following terms

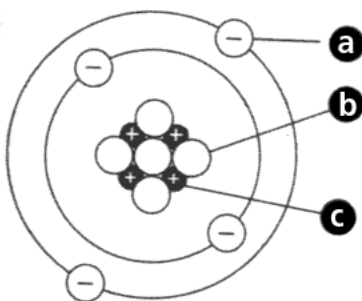
- a. **Chemistry:** _____

- b. **Matter:** _____

- c. **Element:** _____

- d. **Atom:** _____

2. Answer the questions based on the diagram of an atom below



- 1. What is A? _____
- 2. What is B? _____
- 3. What is C? _____
- 4. Where in the atom are particles B and C located? _____
- 5. What is this element's atomic number? _____
- 6. What element is this? _____

3. Complete the chart below for the atom's subatomic particles

Subatomic Particle	Location	Charge	Mass
			0 amu
	Nucleus		
		0 (neutral)	

4. Circle the correct word in parenthesis to make the statement true
- Atoms of (different elements/ the same element) have (different properties/ the same properties)
 - There must be an equal number of protons and (neutrons/electrons) to keep the atom's charge zero
 - Nitrogen has an (atomic number/atomic mass) of 7
 - Fluorine has 10 (protons/neutrons)
 - Aluminum has 18 (electrons/neutrons)

5. Explain how to find an element's:

- Protons: _____
- Electrons: _____
- Neutrons: _____

6. Complete the table below using your periodic table:

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Li	3	7			
P	15	31			
Cl		35	17		
Ni	28			31	
K		39			19
Ag	47			61	
H		1	1		
Si				14	14
W			74	110	
Ne				10	10

II. Aim #33: Periodic Table and Trends

1. Name 4 main pieces of information that the periodic table tells us about an element:

- a. _____
- b. _____
- c. _____
- d. _____

2. What is the name of the elements found touching the zig zag line? _____

Name all of them (give their SYMBOL) _____

3. What elements are found to the left of the zig zag line? _____

Name 4 of them (give their FULL NAME): _____

4. What elements are found to the right of the zig zag line? _____

Name 4 of them (give their FULL NAME): _____

5. What elements are found in group 18? _____

Name all of them (give their SYMBOL): _____

6. What number increases as you move across the periodic table to the right? (This is how the periodic table was arranged by Dmitri Mendeleev!) _____
7. Most elements on the periodic table are what type of element? _____
8. The rows on the periodic table are called: _____. How many are there? _____
9. The columns on the periodic table are called: _____. How many are there? _____
10. Name the element that is in:
- Period 4, group 1: _____
 - Period 6, group 11: _____
 - Period 5, group 18: _____
11. Write the period/group location for sulfur: _____
12. Name an element that has similar properties to sulfur. _____. Explain WHY you chose this element: _____
13. Be able to write the FULL NAME of the following elements:
Al, Ca, C, Cl, F, Au, He, H, I, Fe, Pb, Mg, Hg, Ni, N, O, P, K, Ag, Na, S, U, Zn

III. Aim #34: Properties of Metals, Nonmetals, Metalloids and Gases

14. For each statement below, write **M** if it is a property of a **metal**, **NM** for **nonmetal**, **ML** for **metalloid** and **NG** for **noble gas**
- _____ Inactive
 - _____ Characteristics of both metals and nonmetals
 - _____ Boron
 - _____ Ductile
 - _____ Poor conductor of electricity
 - _____ Calcium
 - _____ Does not combine or react with any other elements
 - _____ Shiny (luster)
 - _____ Can be hammered into shapes (malleable)
 - _____ Carbon
 - _____ Can conduct electricity and heat
 - _____ Helium
 - _____ Brittle
 - _____ Elements As, Te and B
15. Who am I? (name the element based on the clues below)
- Period 2, 11 amu (atomic mass) _____
 - Period 3, nonmetal, 32 amu _____
 - 26 protons, period 4 _____
 - Gas, 48 neutrons _____
 - A metal existing as a liquid at room temperature _____
 - Period 5, 51 neutrons _____
 - Metal, 80 electrons _____
 - 27 electrons _____
 - Period 4, smallest mass in period _____
 - Group 1, nonmetal _____

IV. Aim #35 Electron Configuration and diagrams (Bohr and Lewis)

16. Define **Valence Electrons**: _____

- Why is the **valence** shell so important: _____
- What do you notice about the number of valence electrons as you move from left to right across a row or period in the periodic table? (**Na → Mg → Al...**) _____







17. Complete the chart below for each element using the periodic table

Element	# of Electrons	# of Shells	Electron Configuration	# Valence Electrons
Carbon				
Zinc				
Sulfur				
Potassium				

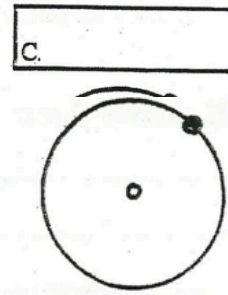
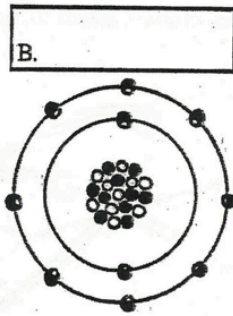
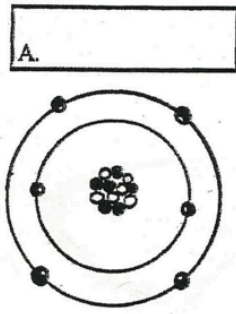
18. Name the group of elements that have completely filled outer shells that do not react with other elements _____

19. Complete the following properties for each element:

- Write the element's **atomic mass** on the line above its symbol
- Write the element's **full name** on the line below the symbol
- Write the element's **atomic #** on the line below the full written name
- Fill in the # of **P (protons)**, **N (neutrons)** and **E (Electrons)** for each element
- Draw the **Bohr** and **Lewis** Structures

<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> Ar</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure Ar</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> Si</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure Si</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> Na</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure Na</p> </div>
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> Be</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure Be</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> O</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure O</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><u> </u> Cl</p> <p style="text-align: right;">P = ____ N = ____ E = ____</p> <hr style="width: 50%; margin: 5px auto;"/> <p style="text-align: center;">Bohr Diagram</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Lewis Structure Cl</p> </div>

20. Based on the diagrams below, use your periodic table to name each element Write the name in the box.



- Which would be most reactive? _____ Least reactive? _____
- Explain why using the concept of valence electrons: _____

V. Aim #36: Atoms, Elements, Compounds and Mixtures

21. Which of the following substances is a compound?

- a. oxygen
- b. salt
- c. magnesium
- d. copper

COMPOUNDS: MADE OF ELEMENTS

22. What kind of substance is composed of two or more elements that are chemically combined?

- a. element
- b. compound
- c. mixture
- d. particle

23. How do the properties of a compound compare with the properties of the elements that form it?

- a. always the same
- b. always different
- c. sometimes the same
- d. sometimes different

24. Explain why water (H_2O) can be broken down by a chemical change but hydrogen, boron or magnesium can't?

25. Which of the following statements about compounds is true?

- a. All compounds react with acid.
- b. Each compound has its own physical properties.
- c. Compounds are used to identify elements.
- d. Compounds are similar to elements.

Properties: Compounds Versus Elements

26. Why are we able to eat sodium and chlorine in a compound?

- a. Sodium reacts violently with calcium.
- b. Chlorine is table salt.
- c. The compound is harmless.
- d. Sodium is a metal.

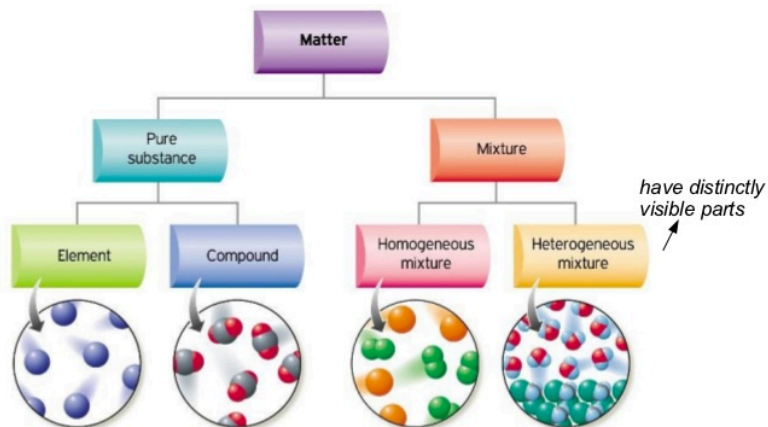
27. Identify how many total elements and total atoms are in the following common **COMPOUNDS**

Compound Name	Compound Formula	# of elements	# of total atoms
Calcium Chloride	CaCl ₂		
Water	H ₂ O		
Carbon Dioxide	CO ₂		
Sodium Chloride (salt)	NaCl		
Ammonia	NH ₃		
Sugar	C ₆ H ₁₂ O ₆		

28. Mixtures (**can/cannot**) be separated into the components by chemical or physical means. It involves two or more elements or compounds that (**are/are not**) chemically combined

29. What is the difference between a **homogeneous** mixture and a **heterogeneous** mixture?

30. **Element (E), homogeneous mixture (HM), heterogeneous mixture (HT) or compound (C)?**



Look at a Periodic Table. There are 113 elements in the Periodic Table

Most materials we encounter in the world are mixtures. The air we breathe is a mixture of oxygen, nitrogen, and other gases. The oceans are mixtures of water, salts and other substances

- a. _____ Apple juice
- b. _____ Salt water
- c. _____ CaCl
- d. _____ H₂O
- e. _____ Pizza
- f. _____ Sugar (C₆H₁₂O₆) and Water (H₂O)
- g. _____ Air
- h. _____ Mercury

31. Classify each of the pictures below by placing the correct label in the blanks below:
 A= Element
 B= Compound
 C= Mixture of elements
 D= Mixture of compounds
 E= Mixture of elements and compounds

Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

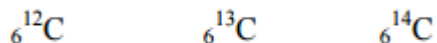
8) _____

9) _____

VI. Aim #37: Isotopes

32. What is an **isotope**? (what is different in each isotope) _____

33. Here are **three isotopes** of an element:



- The element is: _____
- The number 6 refers to the _____
- The numbers 12, 13, and 14 refer to the _____
- How many protons and neutrons are in the first isotope? _____
- How many protons and neutrons are in the second isotope? _____
- How many protons and neutrons are in the third isotope? _____

34. Complete the table below

isotope symbol	nuclear symbol	mass number	number of protons	number of neutrons	number of electrons	atomic number
carbon-12						
	${}_{18}^{40}\text{Ar}$					
iodine-128						
	${}_{28}^{60}\text{Ni}$					
		34	16			