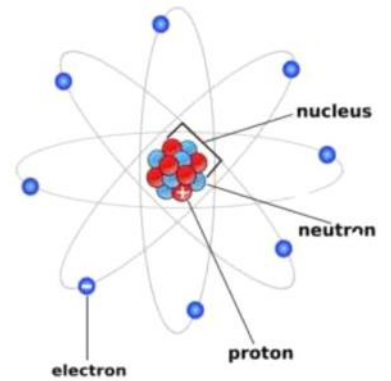
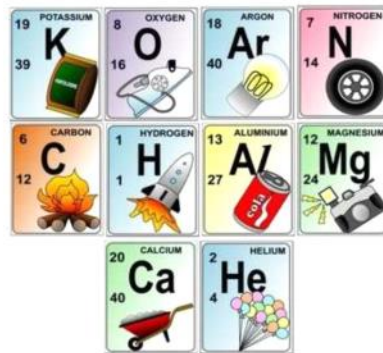


# Unit 2: Chemistry

## REVIEW

### *“Practice Test”*

### Science 9



Name: Answer Key

Date: \_\_\_\_\_

**PART 1: INVESTIGATING MATTER**

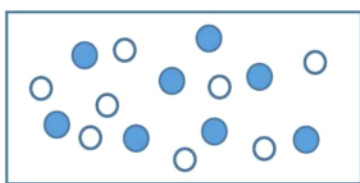
1. **Fill in the Blanks:** Matter is anything that has both mass and volume. Matter can be classified as pure substances or mixtures. Matter that is not a mixture is classified as either elements or compounds. Mixtures in which you can see "particles" are said to be heterogeneous mixtures.

2. **Complete the chart by writing yes or no in each of the boxes:**

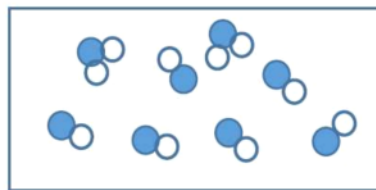
matter	pure substance	element	compound	mixture	homogeneous mixture	heterogeneous mixture	us
oxygen	YES	YES	NO	NO	NO	NO	
ice	YES	NO	YES	NO	NO	NO	
milk	NO	NO	NO	YES	YES	NO	
chocolate chip cookies	NO	NO	NO	YES	NO	YES	

3. **Classify the following by using the following key:**

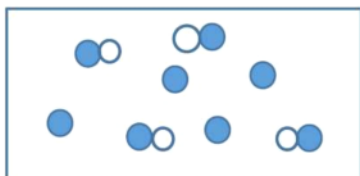
- A. Element  
 B. Compound  
 C. Mixture of Elements  
 D. Mixture of Compounds  
 E. Mixture of Elements & Compounds



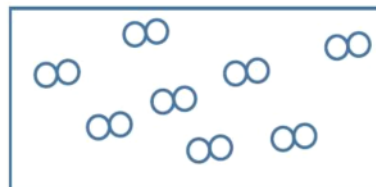
C



D



E



A

4. Match the following:

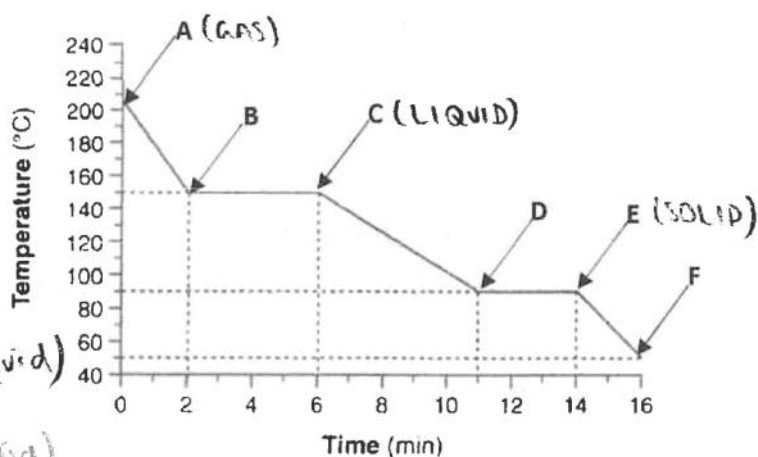
- |                      |   |
|----------------------|---|
| <u>4</u> Compound    | <del>1</del> Changing from gas to solid   |
| <u>1</u> Deposition  | <del>2</del> The amount of matter   |
| <u>8</u> Ductile     | <del>3</del> State with most particle movement  |
| <u>7</u> Element     | <del>4</del> Made up of two or more different types of atoms chemically bonded together |
| <u>6</u> Evaporation | <del>5</del> State with least particle movement   |
| <u>3</u> Gas         | <del>6</del> Changing from liquid to gas  |
| <u>2</u> Mass        | <del>7</del> Composed of only one type of atom  |
| <u>5</u> Solid       | <del>8</del> Can be pulled into wires   |
| <u>9</u> Volume      | <del>9</del> Amount of space  |

9. Amount of space

5. Fill in the blanks below.

- a. The difference between a COLD SOLID and a HOT SOLID is that the particles in the HOT solid vibrate faster (FASTER/SLOWER). This difference is due to the COLD solid's molecules having less (MORE/LESS) kinetic energy.
- b. The difference between a solid and a liquid at the same temperature is that the liquid has more (MORE/LESS) kinetic energy.
- c. The kinetic molecular theory states that:
- All matter is made of particles too small to be seen
  - These particles are in constant motion (unless at absolute zero!).
  - The more energy particles have the faster (FASTER/SLOWER) they move.
  - Particles in a solid (SOLID, LIQUID, GAS) can only vibrate whereas particles in a liquid (SOLID, LIQUID, GAS) can slide past each other and particles in a gas (SOLID, LIQUID, GAS) are very far apart.
  - The more energy (ENERGY/MASS/VOLUME) that particles have the faster they can move.

6. Consider the phase change diagram shown below for an unknown substance, and answer the questions that follow.



- What is this substance's condensation point? 150 °C
- What is its freezing point? 90 °C
- Where is the most liquid found?  
C (LETTER)
- What is happening between B TO C?  
change of state (gas → liquid)
- What is happening between D TO E?  
change of state (liquid → solid)
- At what time did rapid condensation start? 2 minutes
- The highest kinetic energy can be found at A. (LETTER)
- The difference between particles **B** and **C** is that particles at **C** have LESS (MORE/LESS) kinetic energy.

7. Distinguish between physical and chemical changes.

- Physical changes are those which change the appearance or state, but do not result in the creation of any new substances. (ex: ice cube melting)
- Chemical changes always result in the creation of a new substance, and are irreversible (ex: rust forming)

8. Classify each of the following as either a physical or a chemical change.

- |                                   |                 |
|-----------------------------------|-----------------|
| Chopping wood with an axe.        | <u>PHYSICAL</u> |
| Burning wood in a campfire.       | <u>CHEMICAL</u> |
| Baking bread in an oven.          | <u>CHEMICAL</u> |
| Chocolate bar melting in the sun. | <u>PHYSICAL</u> |
| Exploding dynamite.               | <u>CHEMICAL</u> |
| Apple rotting on the ground.      | <u>CHEMICAL</u> |

**PART 2: THE PERIODIC TABLE**

**Vocabulary:** Referring to your notes, define each of the following vocabulary terms in a complete sentence.

1. alkali metal	Elements in group 1 (except for hydrogen). Highly reactive metals.
2. alkaline earth metal	Elements in group 2. Reactive metals if heated.
3. family/group	A group of elements in a vertical column on the periodic table.
4. halogen	Elements in group 17. Highly reactive non-metals.
5. metal	Elements found on the left-hand side of the staircase. Usually solids, shiny, ductile, malleable, good conductors of heat & electricity.
6. metalloid	Elements found around the staircase. Appear like metals, but are not ductile or malleable, and do not conduct heat.
7. noble gas	Elements in group 18. Non-reactive non-metals.
8. non-metal	Elements found on the right-hand side of the staircase. Can be any state, not ductile, malleable, and does not conduct heat & electricity.
9. period	A group of elements in a horizontal row on the periodic table.

10. Look up the names of the following elemental symbols.

Ne	<u>NEON</u>	K	<u>POTASSIUM</u>
As	<u>ARSENIC</u>	Hg	<u>MERCURY</u>
Ag	<u>SILVER</u>	Dy	<u>DYSPROSIUM</u>
W	<u>TUNGSTEN</u>	Se	<u>SELENIUM</u>

11. Look up the symbols of the following elements.

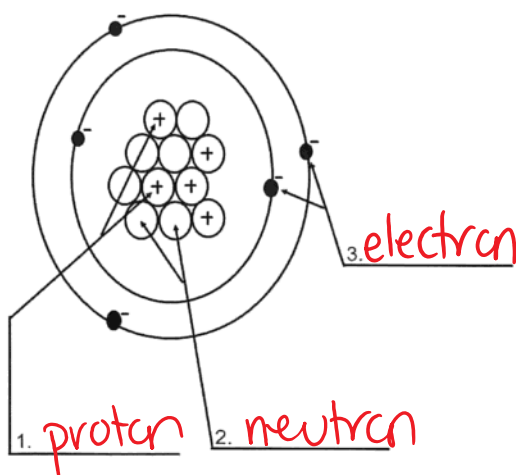
cesium	<u>CS</u>	phosphorus	<u>P</u>
nickel	<u>NI</u>	magnesium	<u>Mg</u>
rutherfordium	<u>RF</u>	tin	<u>SN</u>
americium	<u>AM</u>	oxygen	<u>O</u>

### PART 3: ATOMIC THEORY

**Vocabulary:** Referring to your notes, define each of the following vocabulary terms in a complete

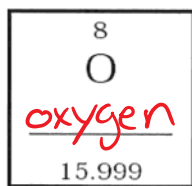
1. atom	The smallest particle of an element, which still has properties of the element.
2. atomic charge	The overall charge of an atom. Found by subtracting the number of protons and electrons.
3. atomic number	The total number of protons in the nucleus of an element (unique to every element).
4. Bohr model	A diagram showing the number of protons and neutrons in the nucleus of an atom, and electrons as dots around the nucleus.
5. electron	The subatomic particle with +1 charge and no mass. Located orbiting around the nucleus.
6. mass number	The total mass of an atom. Found by adding up the number of protons and electrons.
7. neutron	The subatomic particle with no charge and mass of 1. Found in the nucleus to hold protons together.
8. proton	The subatomic particle with +1 charge and mass of 1. Located in the nucleus.
9. standard atomic notation	A way of writing the element's symbol, mass number, and atomic number (mass # atomic # symbol)
11. valence shell	The outermost shell in an atom. Electrons in this shell participate in chemical reactions.

Label the parts of an atom on the diagram below.

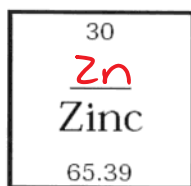


- What type of charge does a proton have?  
positive (+)
- What type of charge does a neutron have?  
no charge 0
- What type of charge does an electron have?  
negative (-)
- Which two subatomic particles are located in the nucleus of an atom?  
proton and neutron

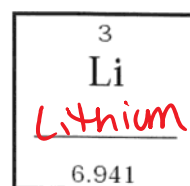
10. Answer the questions for the elements shown below. Complete the Periodic Table box by filling in the element name or symbol.



Atomic # = 8  
 Atomic Mass = 16  
 # of Protons = 8  
 # of Neutrons = 16-8=8  
 # of Electrons = 8



Atomic # = 30  
 Atomic Mass = 65  
 # of Protons = 30  
 # of Neutrons = 65-30=35  
 # of Electrons = 30

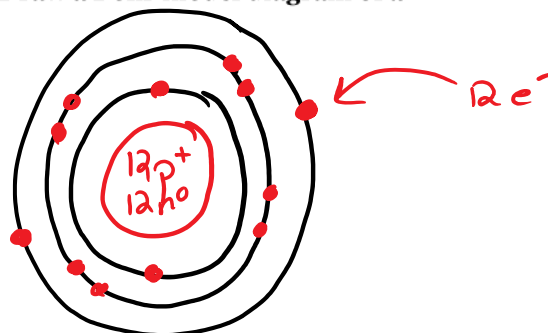
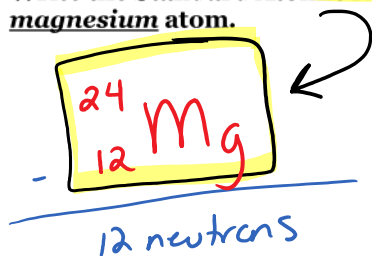


Atomic # = 3  
 Atomic Mass = 7  
 # of Protons = 3  
 # of Neutrons = 7-3=4  
 # of Electrons = 3

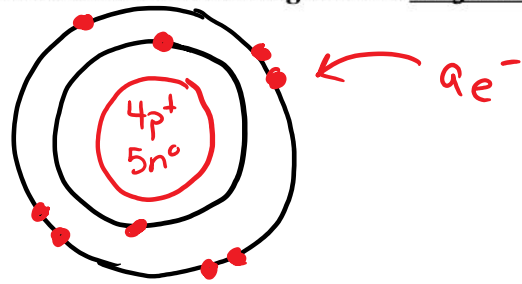
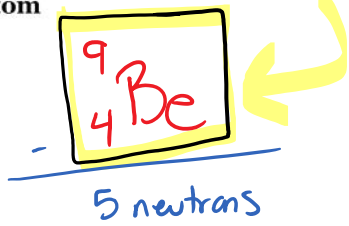
Complete the following table.

Element Name	Element Symbol	Number of Electrons if Neutral	Atomic Number	Group #	Number of Protons	Average Atomic Mass	Period #	eriod #
Phosphorus	P	15	15	15	15	31.0	3	
Zinc	Zn	30	30	12	30	65.4	4	
Barium	Ba	56	56	2	56	137.3	6	
Strontium	Sr	38	38	2	38	87.6	5	
Chlorine	Cl	17	17	17	17	35.5	3	
Titanium	Ti	22	22	4	22	47.9	4	

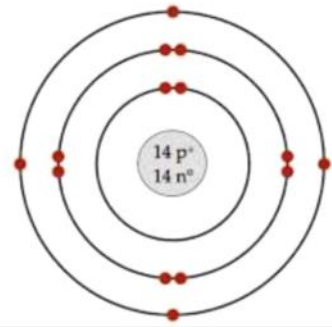
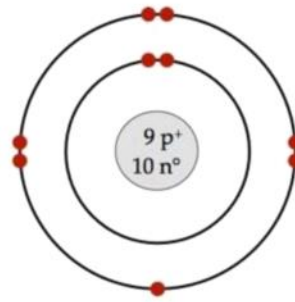
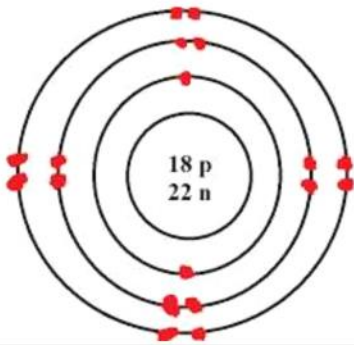
14. Write the **Standard Atomic Notation** & Draw a Bohr model diagram of a **magnesium atom**.



15. Write the **Standard Atomic Notation** & Draw a Bohr model diagram of a *beryllium* atom



16. Write the name of the Atom shown in each Bohr Diagram in the box below:



Argon (Ar)	Fluorine (F)	Silicon (Si)
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17. Identify the number of electrons in the valence shell of the following atoms.

potassium 1

aluminum 3

hydrogen 1

oxygen 6

argon 8

chlorine 7

boron 3

beryllium 2

18. Which family of elements has atoms with **filled valence shells**? What does this mean for their reactivity?

The Noble Gases have full valence shells. This means they DO NOT react (inert gases).