Mr. Dehne AMSAT Chem 1H

Name: _____

Date: _____

Per#:___

Matter Topic #3

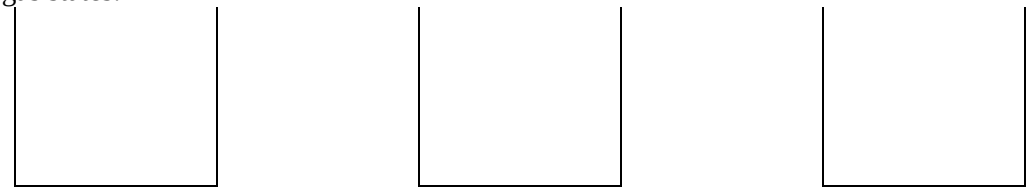
WS#1: Chemistry is a Physical Science

1. Technological development of a chemical product often
   a. lags behind basic research on the same substance.
   b. does not involve chance discoveries.
   c. is driven by curiosity.
   d. is done for the sake of learning something new.
2. The primary motivation behind basic research is to
   a. develop new products.
   b. make money.
   c. understand an environmental problem.
   d. gain knowledge.
3. Applied research is designed to
   a. solve a particular problem.
   b. satisfy curiosity.
   c. gain knowledge.
   d. learn for the sake of learning.
4. Chemistry is usually defined as
   a. a biological science.
   b. a physical science.
   c. a social science.
   d. a computer science.
5. Define the six major branches of chemistry.
6. For each for each of the following types of chemical investigations, determine whether the investigation is *basic research, applied research,* or *technological development*. More than one choice may apply.
   a. A laboratory in a major university surveys all the reactions involving bromine.
   b. A pharmaceutical company explores a disease in order to produce a better medicine.
   c. A scientist investigates the cause of the ozone hole to find a way to stop the loss of the ozone layer.
   d. A pharmaceutical company discovers a more efficient method of producing a drug.
   e. A chemical company develops a new biodegradable plastic.
   f. A laboratory explores the use of ozone to inactivate bacteria in a drinking-water system.
7. Give examples of two different instruments routinely used in chemistry.
8. What are microstructures?
9. What is a chemical?
10. What is chemistry?

WS#2: Matter and Its Properties

1. Classify each of the following as a *physical* (P) or *chemical* (C) property.
   a. blue color
   b. density
   c. flammability
   d. solubility
   e. reacts with acid to form H_2
   f. supports combustion
   g. sour taste
   h. melting point
   i. reacts with water to form a gas
   j. reacts with a base to form water
   k. hardness
   l. boiling point
   m. can neutralize a base
   n. luster
   o. odor
2. Classify each of the following as a *physical* (P) or *chemical* (C) change.
   a. ice melting
   b. paper burning
   c. metal rusting
   d. gas pressure increasing
   e. liquid evaporating
   f. food digesting
3. Classify each of the following as *homogeneous (HM)* or *heterogeneous (HT)* substance.
   a. iron ore
   b. quartz
   c. granite
   d. energy drink
   e. oil-and-vinegar salad dressing
   f. salt
   g. rainwater
   h. nitrogen
4. Compare a physical change with a chemical change.
5. Compare and contrast each of the following terms:
   a. *mass* and *matter*
   b. *atom* and *compound*
   c. *physical property* and *chemical property*
   d. *homogeneous mixture* and *heterogeneous mixture*

6. Using circles, to represent particles, draw a diagram that compares the arrangement of particles in the solid, liquid, and gas states.



7. How is energy involved in chemical and physical changes?

WS#3: Elements

1. A horizontal row of elements in the periodic table is called a(n)_____.
2. The symbol for the element in Period 2, Group 13, is _____.
3. Elements that are good conductors of heat and electricity are _____.
4. Elements that are poor conductors of heat and electricity are _____.
5. A vertical column of elements in the periodic table is called a(n) _____.
6. The ability of a substance to be hammered or rolled into thin sheets is called _____.
7. Is an element that is soft and easy to cut cleanly with a knife likely to be a metal or a nonmetal>
   _____
8. The elements in Group 18, which are generally unreactive, are called _____.
9. At room temperature, most metals are _____.
10. Name three characteristics of most nonmetals.
11. Name three characteristics of metals.
12. Name three characteristics of most metalloids.
13. Name two characteristics of noble gases.
14. What do elements of the same group in the periodic table have in common?
15. Within the same period of the periodic table, how do properties of elements close to each other compare with the properties of the elements far from each other?
16. You are trying to manufacture a new material, but you would like to replace one of the elements in your new substance with another element that has similar chemical properties. How would you use the periodic table to choose a likely substitute?
17. What is the difference between a family of elements and elements in the same period?
18. Complete the table by filling in the spaces with correct names or symbols.

Name of Element	Symbol of Element
	Al
calcium	
manganese	
	Ni
	K
	Co
silver	
hydrogen	

WS#4: Problem Solving WS

Part A – Identifying Types of Elements

Identify the type of element as either a metal (m), nonmetal (nm), or metalloid (ml).

1. beryllium
2. phosphorus
3. antimony
4. molybdenum
5. strontium
6. boron
7. gallium
8. tellurium
9. scandium
10. iodine

Part B – Utilizing the Periodic Table to Locate Elements

Identify the element represented by the period number and group number or identify the period number and group number of the given element.

1. period 5, group 4
2. period 7, group 2
3. period 3, group 16
4. period 1, group 18
5. period 4, group 10
6. silver
7. bismuth
8. aluminum
9. nitrogen

10. magnesium

WS#5: Mixed Review

1. Classify each of the following as a homogeneous or heterogeneous substance.
   a. sugar
   b. iron filings
   c. granola bar
   d. plastic wrap
   e. cement sidewalk
   f. cooking oil
2. For each type of investigation, select the most appropriate branch of chemistry from the following choices: *organic chemistry*, *analytical chemistry*, *biochemistry*, *theoretical chemistry*. More than one branch may be appropriate.
   a. A forensic scientist uses chemistry to find information at the scene of a crime.
   b. A scientist uses a computer model to see how an enzyme will function.
   c. A professor explores the reactions that take place in a human liver.
   d. An oil company scientist tries to design a better gasoline.
   e. An anthropologist tries to find out the nature of a substance in a mummy's wrap.
   f. A pharmaceutical company examines the protein on the coating of a virus.
3. For each of the following types of chemical investigation, determine whether the investigation is *basic research*, *applied research*, or *technological development*. More than one choice may apply.
   a. A university plans to map all the genes on human chromosomes.
   b. A research team intends to find out why a lake remains polluted to try to find a way to clean it up.
   c. A science teacher looks for a solvent that will allow graffiti to be removed easily.
   d. A cancer research institute explores the chemistry of the cell.
   e. A professor explores the toxic compounds in marine animals.
4. Use the periodic table to identify the name, group number, and period of the following elements:
   a. Cl b. Mg c. W d. Fe e. Sn
5. What is the difference between extensive and intensive properties?
6. Consider the burning of gasoline and the evaporation of gasoline. Which process represents chemical change and which represents physical change? Explain your answer.
7. Describe the difference between heterogeneous mixture and a homogenous mixture, and give an example of each.
8. Construct a concept map that includes the following terms: matter, atom, element, compound, pure substance, mixtures, homogenous, heterogeneous, polonium, glucose, chemical combination of carbon, hydrogen, and oxygen, lava, blood, 84 protons, 84 electrons, and 125 neutrons.