Matter Packet   Name_____Per_____

In chemistry, matter is defines as anything that has mass and takes up space. Almost everything is or contains matter. *(The exception is energy. Energy is not necessarily matter.)* Classification of matter is very important in chemistry. All matter can be classified as wither a substance (AKA: *pure substance*, which is either an element or a compound), or a mixture. A mixture contains 2 or more pure substances. A mixture can either be a heterogeneous mixture or homogeneous mixture depending on the size and behavior of the particles that make up the mixture.

Directions: Fill in the matter chart below.

(Word bank: Mixture, element, homogeneous mixture, matter, pure substance, compound, heterogeneous mixture.)
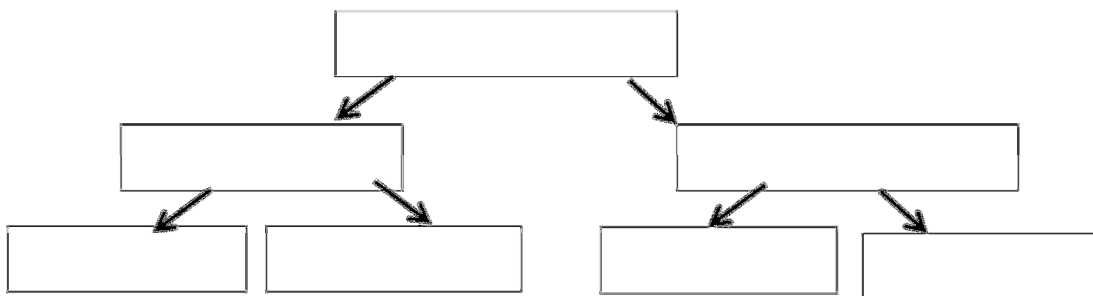
Directions: In the chart below: Classify the matter at either a pure substance or a mixture. Mark and "X" in the correct column. A pure substance is matter for which a chemical formula can be written. A pure substance can be an element or a compound represented by a chemical formula. A mixture is 2 or more pure substances in any proportion and the parts are not chemically bonded.

Type of Matter	Substance	Mixture
1. chlorine		
2. water		
3. soil		
4. sugar water		
5. oxygen		
6. carbon dioxide		
7. rocky road ice cream		
8. alcohol (C_2H_5OH)		
9. pure air		
10. iron		
11. vanilla ice cream		
12. salt water		
13. sugar cube ($C_{12}H_{22}O_{11}$)		
14. sodium		
15. cake batter		
16. vegetable soup		
17. blood		
18. table salt (NaCl)		
19. Milk		
20. Cola		

Pure Substances

A pure substance is a category of matter for which a formula can be written. For example, oxygen (O) and hydrogen (H) are elements and they can combine to make water (H_2O). Pure Substances cannot be separated by physical means, only by a chemical change. Elements (the simplest form of matter) cannot be separated any further and are represented on The Periodic Table of Elements, and compounds are combinations of elements in whole number ratios.

Directions: Classify the following pure substances as elements or compounds by marking an "X" in the column.

| Type of Substance	Element	Compound
1. Lead (Pb)		
2. Water (H_2O)		
3. Sodium Chloride (NaCl)		
4. Alcohol (C_2H_5OH)		
5. Iodine (I)		
6. Table Salt (NaCl)		
7. Phosphorus (P)		
8. Ammonia (NH_3)		
9. Sodium Hydroxide (NaOH)		
10. Platinum (Pt)		
11. Argon (Ar)		
12. Potassium Hydroxide (KOH)		
13. Iron (Fe)		
14. Iron (III) Oxide (Fe_2O_3)		
15. Aluminum (Al)		
16. Tin (Sn)		
17. Ammonium Hydroxide (NH_4OH)		
18. Magnesium Chloride ($MgCl_2$)		
19. Silver (Ag)		
20. Mercury (Hg)		

Mixtures:

A mixture is a combination of 2 or more pure substances that are mixed together but are not chemically combined. Mixtures can be separated by physical means; sorting, filtering, evaporation, distillation, etc. Mixtures that have particles so small that you cannot see the different parts are said to be homogeneous mixtures. A homogeneous mixture is uniform in appearance and it completely mixed at the molecular level. Another type of mixture is a heterogeneous mixture. A heterogeneous mixture had larger particles that can be seen or observed. In a heterogeneous mixture, you can see and distinguish the different substances in the mixture. Mixtures can have properties different than the individual substances that make them up.

Direction: Classify the following mixtures as either homogeneous or heterogeneous. Place a check or "X" in the correct column.

Mixture	Homogeneous	Heterogeneous
1. flat soda pop		
2. cherry vanilla ice cream		
3. Italian salad dressing		
4. Soil (AKA dirt)		
5. black coffee		
6. coffee with sugar and creamer		
7. sugar water		
8. city air (think smog)		
9. paint		
10. beach sand		
11. spaghetti sauce		
12. Dr. Pepper		
13. Salt water		
14. Kool Aid		
15. Bird seed		

The cups below each contain a mixture. Label the mixture as homogeneous or heterogeneous below each cup.

_____   _____   _____
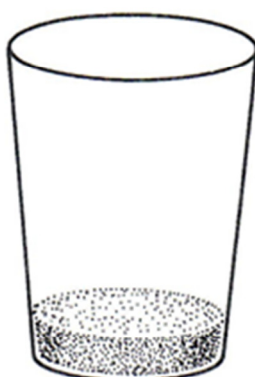
More Mixtures

We know that mixtures can be either homogeneous or heterogeneous. More specifically, mixtures can be classified as a solution, a colloid, or a suspension.

1. A _____ has large particles, which settle out on standing, or if it is left alone for a long time. You would typically shake this type of mixture up before using it. Since you can see the particles, it is a type of _____ mixture.
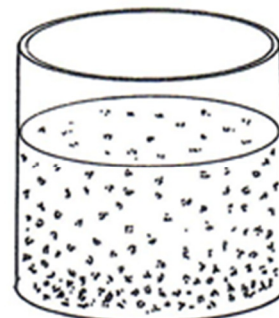
    Examples: _____

2. A _____ has medium size particles, and also settles out on standing. After it is shaken up, it will scatter light *(this is called the Tyndall Effect).*   Since you can see the particles, this is also a type of _____ mixture.

    Examples: _____
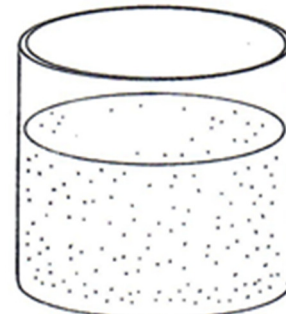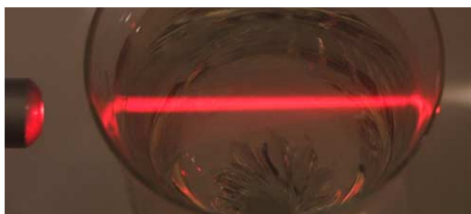
3. A _____ has very small particles what do not settle out upon standing. The particles are mixed uniformly at the molecular level. Since you cannot see the individual particles, this is a type of _____ mixture.

    Examples: _____