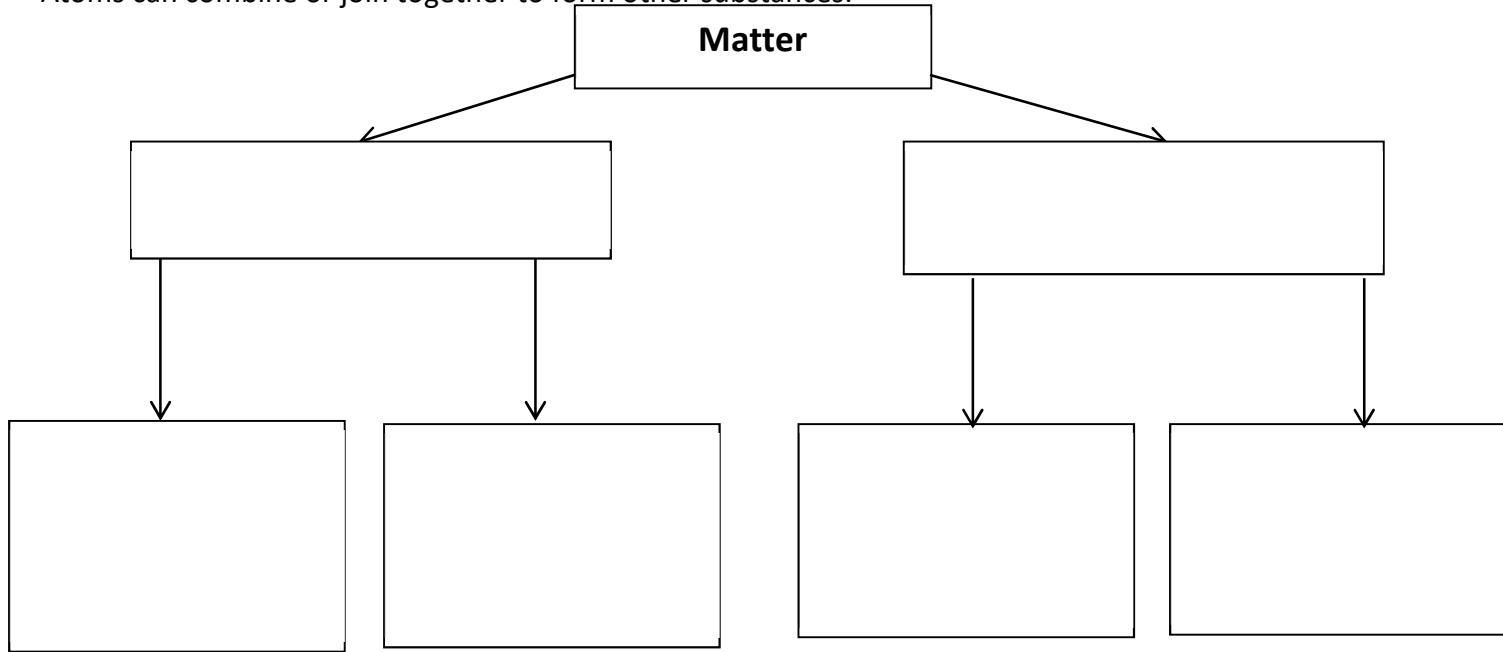


Chemistry is the study of the properties and interactions of matter

- **Matter**= _____
- **Atom**= _____

Atoms can combine or join together to form other substances:



Pure Substances=a substance that _____ be _____
_____. They can be separated by a chemical process ONLY

There are 2 types of pure substances: elements and compounds.

- **Element**=a substance that is made up of _____

Elements _____ be broken down into _____

All the elements that we know of are organized in the _____

| 1 1.0079 | H | 2 IIA |
|-----------|------------|-----------|
| 3 6.941 | Li | 4 9.0122 |
| LITHIUM | | BERYLLIUM |
| 11 22.990 | Na | 12 24.305 |
| SODIUM | | MAGNESIUM |
| 13 10.811 | B | 14 IVA |
| BORON | C | 15 VA |
| 6 12.011 | NITROGEN | 16 VIA |
| CARBON | OXYGEN | 17 VIIA |
| 7 14.007 | FLUORINE | |
| NITROGEN | NEON | |
| 8 15.999 | NEON | |
| OXYGEN | | |
| 9 18.998 | | |
| FLUORINE | | |
| 10 20.180 | | |
| HELIUM | | |
| 13 26.982 | Al | 14 28.086 |
| ALUMINUM | SILICON | 15 30.974 |
| | PHOSPHORUS | 16 32.085 |
| | SULPHUR | 17 35.453 |
| | CHLORINE | 18 39.948 |
| | CL | Ar |
| | ARGON | |

**All element symbols

- **Diatomict Elements**= _____

(H₂, N₂, O₂, F₂, Cl₂, Br₂, I₂..."7-UP")

- **Compound**= a substance that is made up of _____. Therefore, a compound is made up of _____ in a specific ratio.
- Compounds can be _____ into the elements that make it up.

Practice: Element or Compound?

| Object | What types of atoms are found in this object? | Element or Compound? |
|---|--|----------------------|
| Penny (Cu)  | Cu  Copper atoms | Element |
| Water (H_2O)  |  Hydrogen and oxygen atoms | Compound |
| Pencil Lead (C)  | | |
| Table salt (NaCl)  | | |
| Vinegar ($\text{C}_2\text{H}_4\text{O}_2$)  | | |
| Lithium battery (Li)  | | |

Mixtures=a combination of _____ that can be _____

Mixtures can be made up of elements, compounds, or both.



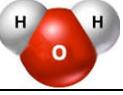
Mixture Can be physically separated into its individual parts without changing what they are
 Mixtures can be classified as either homogeneous or heterogeneous

- **homogeneous mixture**=a mixture in which the particles are _____
 the individual substances making up the mixture _____
 (Ex: sugar dissolved in water; atmospheric air);
 *most common type is a _____!
- **heterogeneous mixture**=a mixture in which the particles are _____
 the individual substances making up the mixture _____
 (Ex: chocolate chip cookie, sand in water)

Practice: Pure Substance or Mixture?

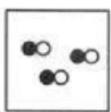
-If it is a pure substance, indicate whether it is an element or compound

-If it is a mixture, indicate whether it is a homogeneous or heterogeneous mixture

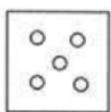
| | | |
|---------------------------------------|--|--|
| M&M's |  | |
| sugar ($C_{12}H_{22}O_{11}$) | | |
| Lemonade (sugar + water + lemon) |  | |
| Iron nails (Fe) |  | |
| Air (nitrogen + oxygen + other gases) | | |
| Limestone ($CaCO_3$) |  | |
| Magnesium (Mg) | | |
| Pure Water (H_2O) |  | |
| Tap Water | | |

Practice Questions

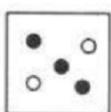
1. Which particle diagram(s) represent a mixture?



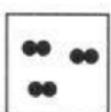
(1)



(3)

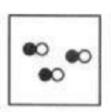


(2)

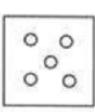


(4)

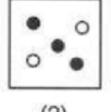
2. Which particle diagram(s) represent a pure substance?



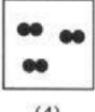
(1)



(3)

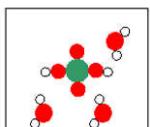


(2)

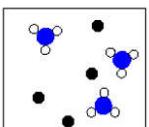


(4)

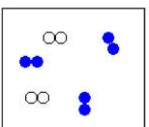
3. Which of the following particle diagrams represents a mixture of one compound and one element?



(1)

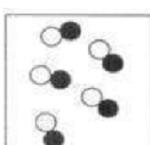


(2)

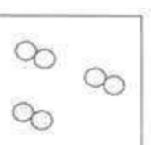


(3)

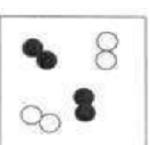
4. Which particle diagram represents a diatomic element?



(1)



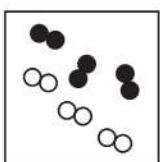
(2)



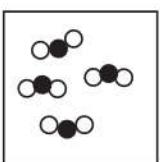
(3)

5. Which particle model diagram represents only one compound composed of elements X and Z?

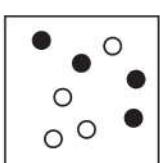
| Key |
|-----------------------|
| ● = atom of element X |
| ○ = atom of element Z |



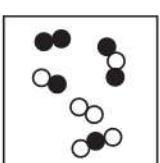
(1)



(3)

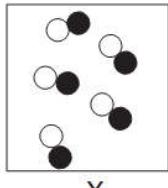


(2)

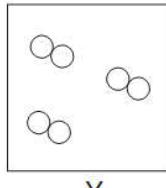


(4)

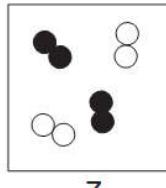
6.



X



Y



Z

| Key |
|-----------------------|
| Atom of element A = ○ |
| Atom of element B = ● |

Which diagram or diagrams represent a mixture of elements A and B?

- (1) X, only
(2) Z, only

- (3) X and Y
(4) X and Z

Classification of Matter HW:

I. Vocabulary: Match the words up with their definitions

| | | | | |
|-----------------------|--|----------------|--------|---------|
| Heterogeneous Mixture | Element | Compound | Matter | Mixture |
| Homogeneous Mixture | Atoms | Pure Substance | | |
| 1. _____ | A physical combination of two or substances. Each substance maintains its original properties. | | | |
| 2. _____ | The smallest piece of an element (smallest unit of matter). | | | |
| 3. _____ | A mixture that has uniform (even) composition. | | | |
| 4. _____ | Made of only one type of matter and cannot be physically broken down any further. Can be an element or a compound. | | | |
| 5. _____ | Made of only one type of atom. Ex. Gold, oxygen, carbon, sulfur. | | | |
| 6. _____ | A chemical combination of two or more types of atoms. Has a definite chemical composition. | | | |
| 7. _____ | Anything that has mass and takes up space. All solids, liquids and gases. | | | |
| 8. _____ | A mixture that does not have uniform composition. | | | |

II: For each of the following substances, determine whether it is an element (E), a compound (C), a Heterogeneous Mixture (HetM), or a Homogeneous Mixture (HoM)

1. _____ Steam (H_2O gas)
2. _____ Salt Water
3. _____ Pencil lead (C)
4. _____ Dirt
5. _____ Silver (Ag)
6. _____ A burrito
7. _____ Italian Dressing
8. _____ Chicken Soup
9. _____ Lemonade

III: Multiple Choice Questions

1. Which terms are used to identify pure substances?
- an element and a mixture
 - an element and a compound
 - a solution and a mixture
 - a solution and a compound
2. Which statement describes a characteristic of all compounds?
- Compounds contain one element, only
 - Compounds contain two elements, only
 - Compounds can be decomposed by chemical means
 - Compounds can be decomposed by physical means
3. Which substance can *not* be decomposed into simpler substances?
- Ammonia (NH_3)
 - Aluminum (Al)
 - Methane (CH_4)
 - Methanol (CH_3OH)
4. An example of a heterogeneous mixture is
- Soil
 - Sugar
 - Carbon monoxide (CO)
 - Carbon dioxide (CO_2)
5. Which substance represents a compound?
- C
 - Co
 - CO
 - O_2
6. Which particle diagram represents a mixture of element X and element Z, only?
- | |
|---------------|
| Key |
| ● = atom of X |
| ○ = atom of Z |
- (1) (3)
- (2) (4)
7. Which particle diagram represents a sample of one compound, only?
- | |
|---------------------------------|
| Key |
| ○ = atom of one element |
| ● = atom of a different element |
- (1) (3)
- (2) (4)
8. Which particle diagram represents one pure substance, only?
- (1) (3)
- (2) (4)