

# WHAT IS MATTER???

Name: \_\_\_\_\_

## Model 1: Matter...

**Matter** – any thing that has mass and takes up space (volume).

All matter is composed of atoms. Matter can be classified as a....

### PURE SUBSTANCE

- an element
- a compound

or

### MIXTURE

- a homogenous mixture (or solution)
- a heterogeneous mixture

### Examples of various types of matter:

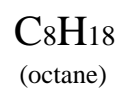
Item	Classification	Formula (or Formulas)
Aluminum	Element	Al
Hydrogen	Element	H <sub>2</sub>
Water	Compound	H <sub>2</sub> O
Table Salt	Compound	NaCl
Glucose	Compound	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>
Salt water	Homogeneous Mixture	H <sub>2</sub> O and NaCl
Air	Homogeneous Mixture	N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> , Ar, etc...
Muddy water	Heterogeneous Mixture	H <sub>2</sub> O (l) and other stuff...



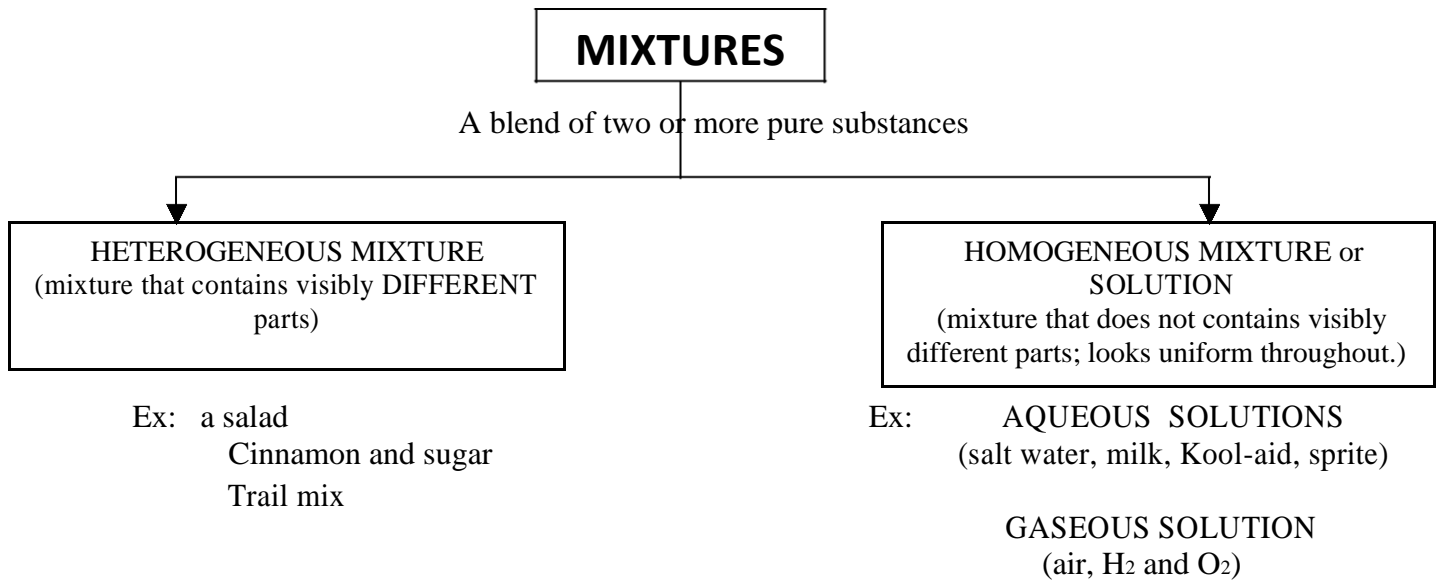
**Subscript** (shows how many of each element)

### Critical Thinking Questions:

1. Consider Model 1. How does the formula of an element differ from that of a compound?
2. An element consists of only a single type of atom. How would you define a compound?
3. How does a pure substance (element or compound) differ from a mixture? Describe?
4. A compound is two or more different element chemically bonded in a FIXED RATIO. In Model 1, how do the examples of compounds show fixed ratios? Describe.
5. Circle which of the following are compounds.



**Model 2: Mixtures**



**Critical Thinking Questions:**

1. Describe the difference between a heterogeneous mixture and a homogeneous mixture.

2. Label the following as a heterogeneous mixture or a homogeneous mixture. Explain why.

**RED PAINT**

**LUCKY CHARMS CEREAL**

3. Complete the following definition for an aqueous solution.

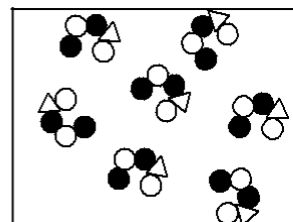
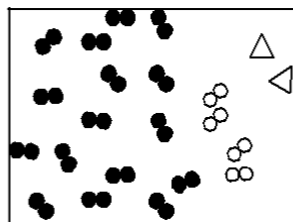
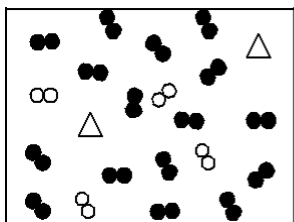
Aqueous solution – homogeneous mixture involving \_\_\_\_\_.

4. Consider the examples of an aqueous solution. What substance do they all have in common???

5. Name three additional examples of an aqueous solution

6. Air is an example of a homogeneous mixture. The composition of air is about 78% N<sub>2</sub>, 21% O<sub>2</sub> and 1% CO<sub>2</sub>, H<sub>2</sub>O, etc.

Which illustration below do you think best illustrates what a sample of air would look like if you could see it? **CIRCLE** your choice and **EXPLAIN WHY** why the other boxes are not good representations.



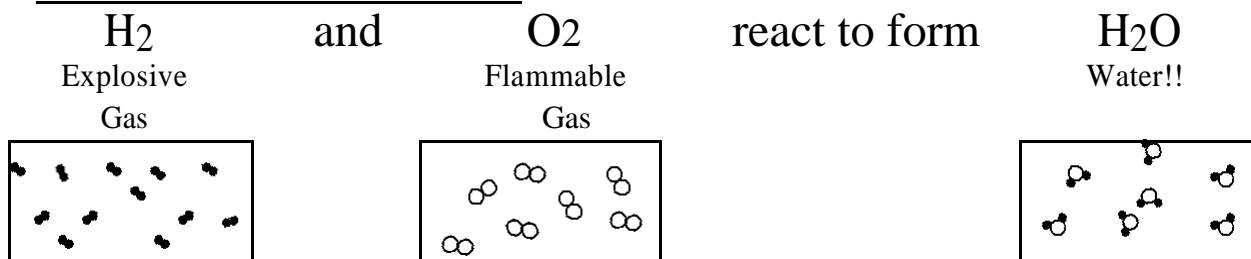
● = N  
○ = O  
▽ = CO<sub>2</sub>, H<sub>2</sub>O, etc

7. Alloys are a special type of mixture that involved only metals. Consider the alloy Brass. Brass is made up of copper and zinc metal. The two metals are heated until they melt and then blended together.
- Based on what you read about alloys, do you think alloys are HETEROGENEOUS or HOMOGENEOUS? Explain your reasoning.
  - Copper is a reddish metal. Zinc is a silvery metal. BRASS is a gold-ish blend. How does this color information also provide evidence that brass is a \_\_\_\_\_ (answer to a) mixture?
8. For the following:
- Label each as an ELEMENT, COMPOUND, HETEROGENEOUS MIXTURE or HOMOGENEOUS MIXTURE.
  - Put a star by those that are aqueous solutions.
- apple juice: \_\_\_\_\_
  - helium: \_\_\_\_\_
  - gold: \_\_\_\_\_
  - tap water: \_\_\_\_\_
  - soil: \_\_\_\_\_
  - chocolate chip ice cream: \_\_\_\_\_
  - Silicon dioxide, SiO<sub>2</sub>: \_\_\_\_\_
  - Iron Sulfide, FeS: \_\_\_\_\_

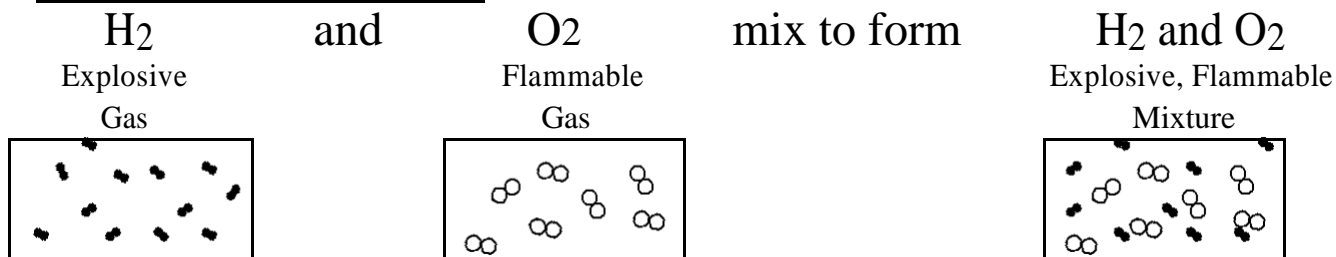
### **Model 3: Compounds vs Mixtures**

Below, examples are given of how a mixture and a compound are formed.

#### **FORMATION OF A COMPOUND:**



#### **FORMATION OF A MIXTURE:**



#### **Critical Thinking Questions:**

1. In Model 3, what is similarity between the formation of a mixture and formation of a compound???
2. In Model 3, what is difference between the formation of a mixture and formation of a compound???
3. In which example (compound formation or mixture formation) did a CHEMICAL reaction take place? Explain how you know.
4. Based on Model 2, which of the following statements below is true? Circle one.  
**CHOICE 1:** Properties just blend when a compound is formed whereas in a mixture, the properties change drastically.  
**CHOICE 2:** Properties change drastically when a compound is formed whereas in a mixture, the properties just blend.