

Classifying Matter

Model 1- Pure Substances vs. Mixtures

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 ₂
Water	Compound	H ₂ O
Table Salt	Compound	NaCl
Glucose	Compound	C ₆ H ₁₂ O ₆
Salt water	Homogeneous Mixture	H ₂ O and NaCl
Air	Homogeneous Mixture	N ₂ , O ₂ , CO ₂ , Ar, etc...
Muddy water	Heterogeneous Mixture	H ₂ O (l) and other stuff...



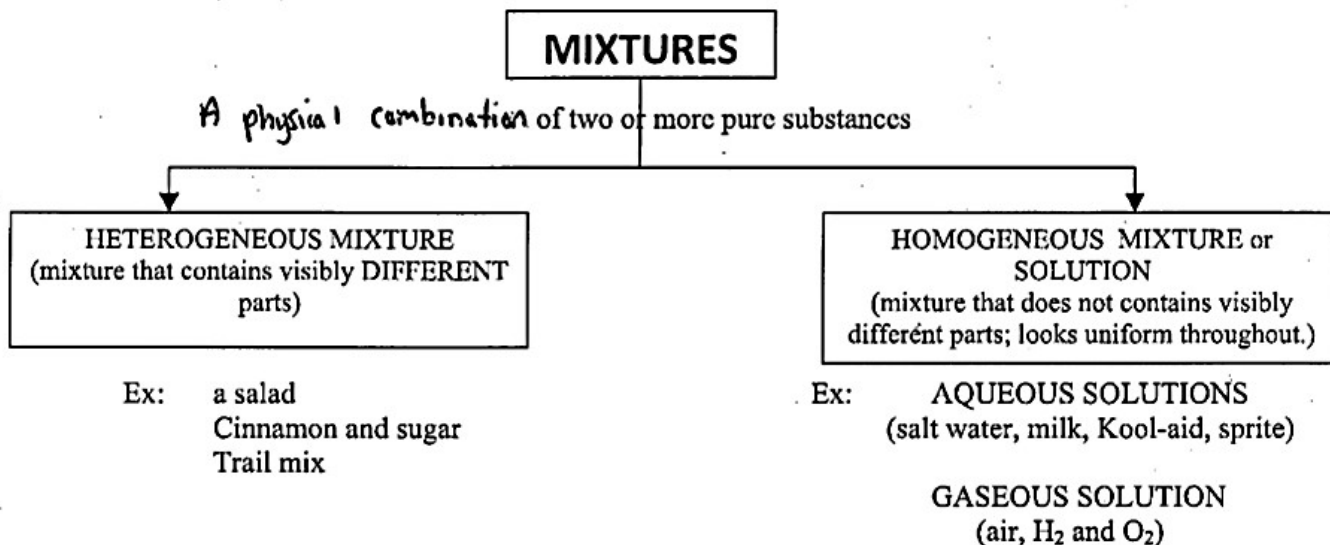
Subscript (shows how many of each element)

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. ~~state~~ which of the following are compounds.



Model 2- Types of 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

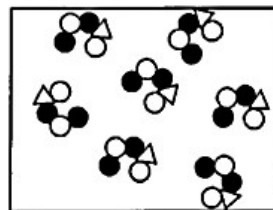
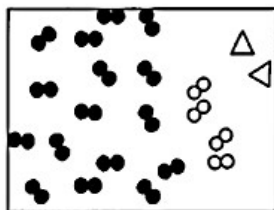
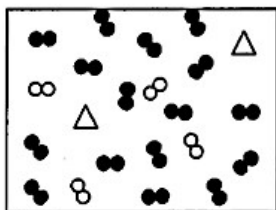
LUCKY CHARMS CEREAL

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

4. Complete the following definition for an aqueous solution.

Aqueous solution – homogeneous mixture involving _____.

6. Air is an example of a homogeneous mixture. The composition of air is about 78% N₂, 21% O₂ and 1% CO₂, H₂O, etc. Which illustration below do you think best illustrates what a sample of air would look like if you could see it? **EXPLAIN WHY** and explain why the other boxes are not good representations.

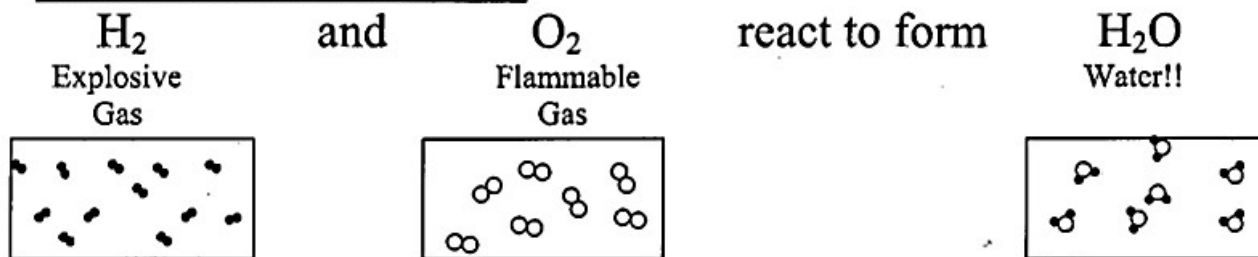


● = N
○ = O
▽ = CO₂, H₂O, etc

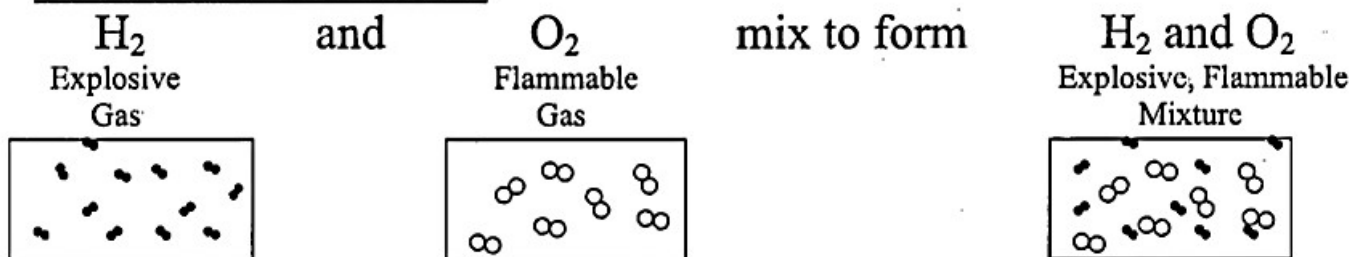
Model 3: Compounds vs Mixtures

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?

one

2. In Model 3, what is difference between the formation of a mixture and formation of a compound?

one

3. In which example (compound formation or mixture formation) did a CHEMICAL reaction take place? Explain how you know *by looking at the products.*

4. Based on Model 2, which of the following statements below is true? Circle one.

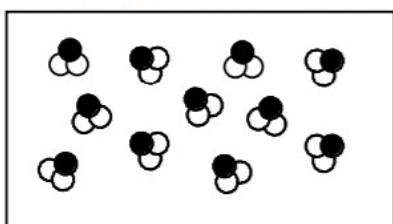
CHOICE 1: Properties just blend when a compound is formed whereas in a mixture, the properties change drastically.

CHOICE 2: Properties change drastically when a compound is formed whereas in a mixture, the properties just blend.

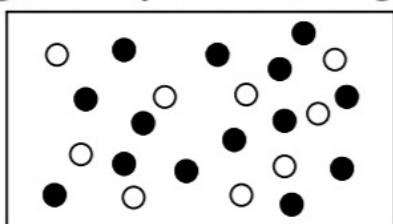
Practice Problems

1. Classify each of the pictures below by placing the correct label in the blanks below:
- A= Element
 B= Compound
 C= Mixture of elements
 D= Mixture of compounds
 E= Mixture of elements and compounds

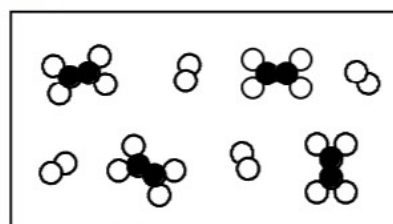
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



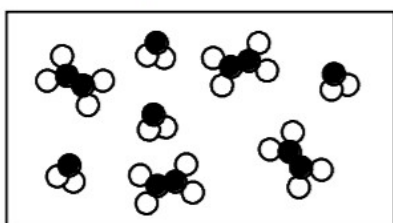
1) _____



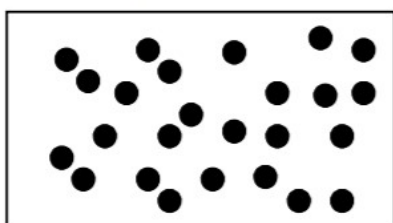
2) _____



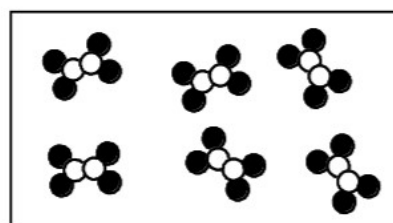
3) _____



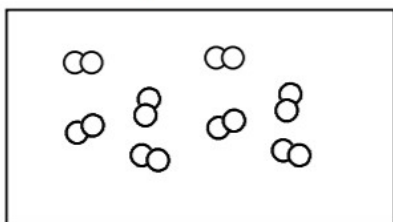
4) _____



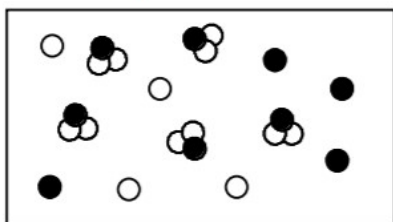
5) _____



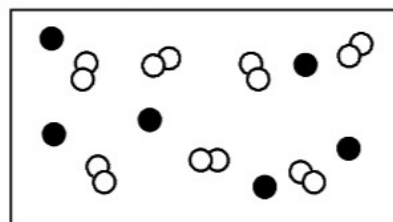
6) _____



7) _____



8) _____



9) _____

2.

Two atoms are given below.

Atom X: ○

Atom Y: ●

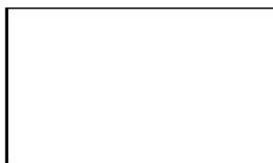
Draw particle diagrams to represent each type of matter given in numbers 35 through 37.

35. Diatomic element X



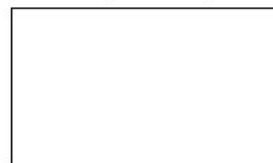
Draw at least three units

36. Compound X_2Y_2



Draw at least three units

37. A mixture of diatomic element Y and compound X_2Y



Draw at least three units