**Unit 4 Objectives and Study Guide Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ P \_\_\_\_\_**

 (4.01) I can distinguish between a pure substance and a mixture
 (4.02) I can apply the properties of matter to identify or describe substances
 (4.03) I can evaluate lab techniques used to separate mixtures
 (4.04) I can separate the components of a mixture based on their properties using lab techniques
 (4.05) I can differentiate between elements and compounds
 (4.06) I can identify the names or symbols of common elements
 (4.07) I can predict the chemical formula of a compound and the ratio of its combining elements

1. You’re conducting an experiment with a mixture of two liquids, liquid A and liquid B. You find the boiling point of liquid A to be 95oC and the boiling point of liquid B to be 110oC. Both are colorless liquids. Liquid A has a noticeable odor while liquid B has no odor. Liquid A melts at 5oC while liquid B melts at -75oC.
	1. Describe the method you would use to separate the two liquids? Name this separation technique. What property is used to separate the liquids?
	2. Sketch a graph of temperature vs. time that supports the property used to separate liquid A and B.

2) Be sure to review **all** vocabulary terms and separation techniques discussed on the note pages. When would you use each separation technique?

1. Draw a particle representation for each of the following

|  |  |
| --- | --- |
| A mixture of lead (Pb) and oxygen(O) | A compound of lead (Pb) and oxygen (O) |
|  |  |



Use the pictures above and the definitions discussed in class and from the notes to help you…

1. Define/describe the difference between *element* and *compound.*
2. Define/describe the difference between *pure substance* and *mixture.*
3. Suppose one volume of gas A reacted and combined with three volumes of gas B to form one volume of product at the same temperature and pressure. Sketch particle diagrams for gas A, B, and the product assuming gas A and B are *mono*atomic.



 Gas A Gas B Product

1. How would the amount of product formed in the above question change if the gases were diatomic?

**Pure Substance vs. Mixture Application**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Substance** | **Pure Substance or Mixture** | **If pure…Element or Compound** | **If mixture…Homogeneous or Heterogeneous** | **Particle Picture****Choose *any 6* you like and label them** |
| **Copper** |  |  |  |  |
| **Carbon** |  |  |  |
| **Saline (salt) solution** |  |  |  |
| **Carbon dioxide – CO2** |  |  |  |
| **Water – H2O** |  |  |  |
| **Wax – C6H14** |  |  |  |
| **Sugar – C12H22O11** |  |  |  |
| **Air** |  |  |  |
| **Steel** |  |  |  |
| **Salt - NaCl** |  |  |  |
| **Iron oxide – FeO** |  |  |  |
| **Dirt** |  |  |  |

# Separating Mixtures

Directions: Explain in detail how you would separate the following mixtures in the most efficient way.

|  |  |  |
| --- | --- | --- |
| (1) Sand + Salt + Iron filings | (2) Ethanol + Water | (3) 5mm BBs + 8mm BBs + 10mm BBs |
| (4) Rice + Salt + dried mixed beans | (5) Styrofoam peanuts + ping pong balls + loose gravel + sand | (6) Salt and water but keep the water |