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

**Chemistry Boot Camp - Classification of Matter POGIL**

Chemistry studies matter and the changes it undergoes. The first thing we must understand is what matter is. Matter is defined as anything that has mass and takes up space. Everything around us is matter, and since matter represents such a large amount of “stuff” scientists have separated types of matter into categories. These categories include **pure substances** and **mixtures**. Pure Substances include matter that has a uniform composition and cannot be broken down physically. Pure Substances are separated into two categories, **elements** and **compounds**. Elements are pure substances that contain only one type of atom and cannot be broken down by physical or chemical methods. Compounds are pure substances that are made from two or more types of atoms bonded (connected) together. Compounds can be broken down into the elements that make them through chemical methods, but not physical methods. Mixtures contain two or more substances that can be separated by physical methods. The mixture category is further broken down to include heterogeneous mixtures and homogeneous mixtures. In this POGIL you will explore the various types of matter and learn to draw and interpret what are Called Particle Diagrams that Model Matter.

**Vocabulary:** Define the following vocabulary words from your Homework Notes on Page 3&4 of your Boot Camp Packet.

1. Substance: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Element: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Compound: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Mixture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Homogeneous Mixture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Heterogeneous Mixture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**In a POGIL you are asked to look at or create a scientific model and then analyze it. For the first model, you will need to get some colored pencils or markers (a green one and a yellow one). You should draw and color you models in so that they are easier to understand.**

**Model 1:** Particle Models of Elements, Compounds and Mixtures

You will use vials 1-4 to answer the following questions. Assume that each bead represents a single atom. Different colored beads will represent different atoms.

Draw particle diagrams of what you see in vial #1-#4, Color Code your Particle Diagrams.

Vial #4

Vial #3

Vial #2

Vial #1

Use the vocabulary terms from page 1 to explain your answers to the questions.

1. Which of the vials contents cannot be broken down into simpler parts? Explain.
2. Which of the vials could be physically separated to include different substances? Explain.
3. If each colored bead represents a single atom which vial represents a pure element? Explain.
4. If each colored bead represents a single atom which vial represents a compound? Explain.
5. If each colored bead represents a single atom which vial represents a mixture? Explain.
6. Both vial #3 and vial #4 represent a mixture. How are the two mixtures different? Explain.

**Application Questions:** Classify each of the following as an element, compound, heterogeneous, or homogeneous mixture.

1. Kool-aide: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Sand and Water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Copper (Cu): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Table Salt (NaCl): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Aluminum (Al): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Mouthwash: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Copper Sulfate (CuSO4): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Air: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Muddy water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. Coffee: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Application Activity:** Make a set of particle diagrams using your own key and colors to show the following:

Key: = \_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_

A Compound

A mixture of Elements

A Pure Element

A mixture of Compounds

Mix of Element and Compound

Summary of Particle Diagrams

|  |  |  |
| --- | --- | --- |
| Type of Substance | How You will Remember the Particle Diagram | An Example of this type of Substance |
| A Pure Element |  |  |
| A Pure Compound |  |  |
| A Mixture of Two Elements |  |  |
| A Mixture of Two Compounds |  |  |
| A Mixture of an Element and a Compound |  |  |

Which diagram represents a mixture?

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |