**What’s the Matter Unit Study Guide Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Complete the following questions, using your ISN.**

**Objective 1:** All matter is made up of atoms and atoms with the same properties are the same elements.

Use the following chart to answer questions 1-6:

|  |  |
| --- | --- |
| A | 50g Gold |
| B | 25g Gold |
| C | 25g Aluminum |
| D | 50g Aluminum |

1. Describe which substances have the same mass.
2. Describe which substances would be made of identical atoms.
3. Substance A has a melting point of 1064°C. What is its freezing point? Why?
4. Which other substance would have the same melting and freezing point as Substance A? Why?
5. Substance C has a density of 2.7 g/mL. Using that information, what is true about the density of Substance D?
6. Substance D has a boiling point of 2519°C, which other substance has that same boiling point? Why?
7. Name any SOLID object \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Describe the atoms that make up your object (how do they move, how would you describe their shape, volume):

What would happen if ALL of the atoms in your object were removed?

Fill in the chart with examples of matter for each question 8-15. Also, in the last column, decide whether each of your examples is a solid, liquid, gas, or plasma.

**Examples of Matter**

|  |  |  |
| --- | --- | --- |
|  | **Your example** | **Solid/Liquid/Gas/Plasma** |
| 1. Something that is **living.** |  |  |
| 1. Something that is **non-living.** |  |  |
| 1. Something that **makes a sound.** |  |  |
| 1. Something that **does not make a sound.** |  |  |
| 1. Something that **takes up space.** |  |  |
| 1. Something that **can be seen with the naked eye.** |  |  |
| 1. Something that **cannot be seen with the naked eye.** |  |  |
| 1. Something that **has mass.** |  |  |

1. Write a definition of matter in general that addresses all of the criteria used in questions 8-15.

**Objective 2:** Know how heat affects the motion of atoms and what happens to particles during a change in phase.

1. Draw a representation of a solid, liquid and a gas. These drawings should reflect the relative positions of the atoms.

Solid Liquid Gas

1. What happens to atoms of a substance when the substance is heated? Be sure to explain energy, the relative speed of atoms and the relative distance between the atoms.
2. What happens to atoms of a substance when the substance is cooled? Be sure to explain energy and the relative distance between the atoms.
3. Describe what happens to a cup of cold water as it warms up to room temperature. In your responses, include what happens to the size of the molecules, the distance between the molecules and the relative energy level of the molecules.

**Objective 3**: Physical properties such as density, solubility, melting point, boiling point, and freezing point do not depend on how much of the material is present.

1. You are cooking for your family and decide to make two different types of pasta. You put two different pots on the stove to cook the two types of pasta. The larger pot holds five times more water than the smaller pot. The smaller pot of water boils at 100 C. At what temperature does the larger pot boil? Explain your reasoning.
2. Looking at the 5 mystery substances in the table, which 2 substances could be the same? Explain why.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Mass** | **Freezing Point** | **Density** | **Flammable** |
| **Substance 1** | 10g | 0oC | 1.0 g/cm3 | No |
| **Substance 2** | 10g | -5oC | 1.5g/cm3 | Yes |
| **Substance 3** | 100g | 0oC | 1.0 g/cm3 | No |
| **Substance 4** | 100g | -5oC | 1.5g/cm3 | No |
| **Substance 5** | 10g | -3oC | .75g/cm3 | Yes |

1. The densities of 4 objects are listed above. Which object will sink in water? Why?

|  |  |
| --- | --- |
| **Object** | **Density** |
| **A** | 3.5g/mL |
| **B** | 0.5g/mL |
| **C** | 1.0g/mL |
| **D** | 0.7g/mL |

1. Look at the 4 containers below. List two containers that have a different amount of matter (the dots = molecules in a closed container). Explain your reasoning.

Compare the densities of container C to container D. Explain your reasoning.

B

A

D

C