

**CLASSIFYING MATTER STUDY GUIDE****Physical Science Honors**

Respond to the following prompts on your own sheet of notebook paper:

**I. TYPES OF MATTER**

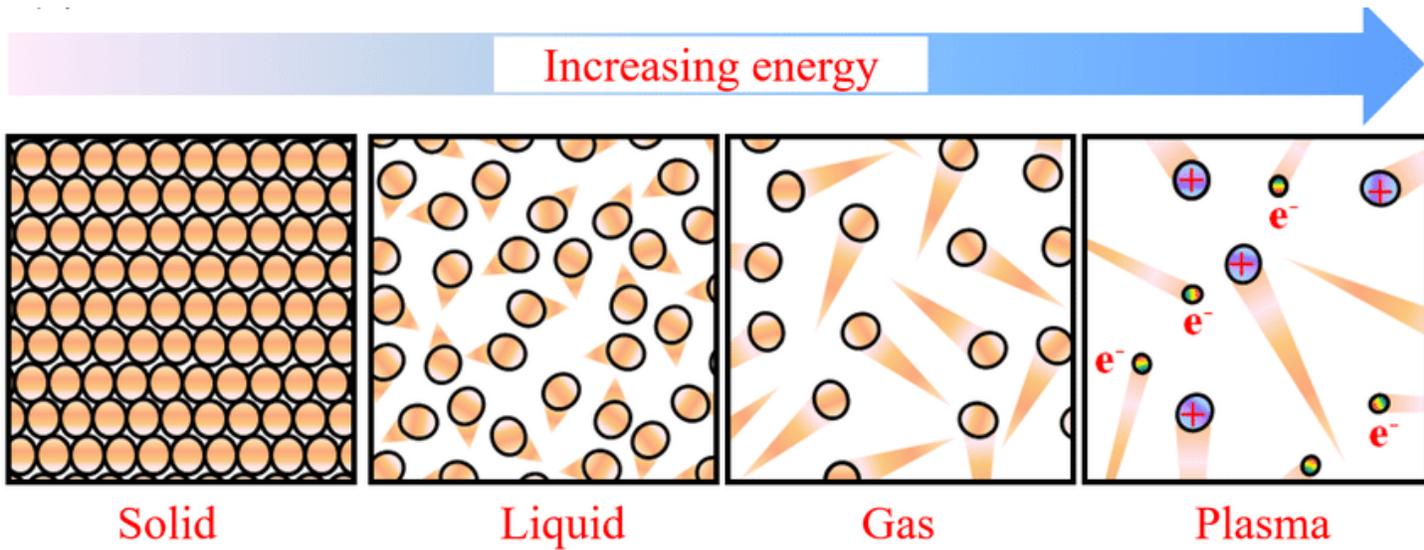
- 1) Why do we say that “everything” is made of “matter”? What role do atoms play? ***Everything is made of atoms, which have mass and take up space. Therefore, everything is considered “matter”.***
- 2) Identify the three types of matter. ***Elements, Compounds, and Mixtures***
- 3) Compare the three types of matter. (How are they similar? How are they different?)  
***Elements are the most basic form of matter, consisting of specific types of atoms. They cannot be broken down into any other substance.***  
***Compounds are made of multiple elements that are chemically combined in a specific ratio. Compounds have different properties from the elements that make them up.***  
***Mixtures include multiple elements and/or compounds that are together in the same place but are not chemically combined. Each substance retains its original properties, and can be separated back out of the mixture through physical means (without a chemical reaction).***
- 4) Identify the following examples as one of the three types of matter:
  - a. Beach Sand (a collection of small particles of various kinds of rock & sediment) **MIXTURE**
  - b. Ocean Water (a solution of H<sub>2</sub>O and NaCl [aka: saltwater]) **MIXTURE**
  - c. Limestone Rock (a rock made of calcium carbonate [CaCO<sub>3</sub>]) **COMPOUND**
  - d. Aluminum Can (an object made of Aluminum [Al]) **ELEMENT**
  - e. Spring Water (a liquid consisting of H<sub>2</sub>O) **COMPOUND**
  - f. Steel Boat (a solid object consisting mostly of iron [Fe], carbon [C], and other metals) **COMPOUND**

**II. PROPERTIES OF MATTER**

- 5) How are the physical properties of a substance observed? ***Physical properties can be observed using the five senses without changing the chemical structure (identity) of the substance***
- 6) Describe the following physical properties:
  - a. Conductivity (thermal or electrical) ***the ability of a substance to allow energy to flow through it***
  - b. Solubility ***the ability of a substance to dissolve in a solution***
  - c. Magnetism ***the ability of a substance to attract or repel iron***
  - d. Melting Point & Boiling Point ***the temperature at which a substance undergoes a phase change, from a solid to a liquid (melting) or from a liquid to a gas (boiling/vaporization)***
- 7) Which of the properties above do NOT depend on the amount of the sample (how much of the substance you are observing)? ***Most physical properties do not depend on the amount of the sample, so all of the properties in #6 are independent of the amount.***
- 8) How are chemical properties of substances observed? ***Chemical properties can only be observed through a chemical reaction.***
- 9) Describe the following chemical properties:
  - a. Flammability ***the ability of a substance to ignite (catch on fire)***
  - b. Reactivity ***the ability of a substance to react chemically with other substances***

**III. STATES OF MATTER**

- 10) Explain how the motion of the particles in a substance influences the state/phase of matter. ***The energy of the particles in a substance determines its state. Moving faster or slower MAY change the state of matter.***
- 11) Compare the characteristics of shape and volume among solids, liquids, gasses and plasmas.  
***SOLID = Definite Shape, Definite Volume***  
***LIQUID = Indefinite Shape, Definite Volume***  
***GAS = Indefinite Shape, Indefinite Volume***
- 12) Draw a diagram that illustrates the motion of the particles in a solid, liquid, gas, and plasma; as well as the relative shape and volume of each state. Indicate the role of energy in determining the phases.



13) How can you use the term, "viscosity," to describe a liquid? *Viscosity refers to a liquid's resistance to flowing. Liquids with a low viscosity will flow freely and easily (such as water); liquids with a high viscosity will flow slowly (such as honey).*