

CLASSIFYING MATTER STUDY GUIDE
8th Grade Science

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) What are the three types of matter.
Elements, Compounds, and Mixtures
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).
- 3) How are the three types of matter related to one another?
Compounds are made of elements, mixtures are made of elements and/or compounds.
- 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 H₂O and NaCl [aka: saltwater]*) **MIXTURE**
 - c. Limestone Rock (*a rock made of calcium carbonate [CaCO₃]*) **COMPOUND**
 - d. Aluminum Can (*an object made of Aluminum [Al]*) **ELEMENT**
 - e. Spring Water (*a liquid consisting of H₂O*) **COMPOUND**
 - f. Steel Boat (*a solid object consisting mostly of iron [Fe], carbon [C], and other metals*) **COMPOUND**

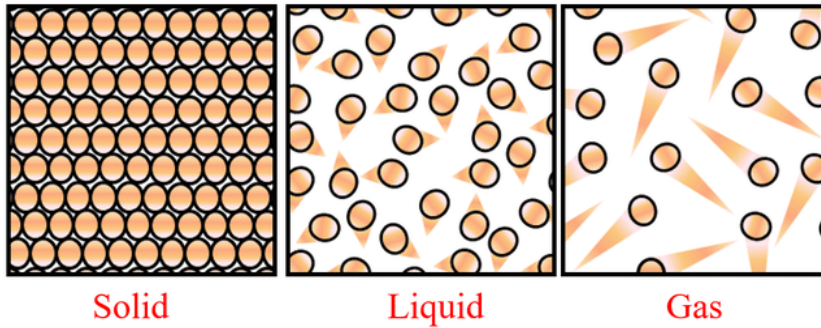
II. PROPERTIES OF MATTER

- 5) How do we observe physical properties?
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 above physical properties are independent of the sample size (they do NOT depend on the amount of the sample)?
Most physical properties do not depend on the amount of the sample, so all of the properties in #6 are independent of the amount.

III. STATES OF MATTER

- 8) Explain how the motion of the particles in a substance affects 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.
- 9) How is the shape and volume of a substance influenced by the state (solid, liquid, gas)?
- 10) **SOLID = Definite Shape, Definite Volume**
- 11) **LIQUID = Indefinite Shape, Definite Volume**
- 12) **GAS = Indefinite Shape, Indefinite Volume**

13) Explain how the diagram below communicates the ideas of solid, liquid, and gas states of matter.



POSITIVES:

- *The liquid and gas pictures do a good job of showing the motion of the particles (faster from left to right)*
- *The particles are spread farther apart as they move faster (left to right), and there is structure to the solid*

NEGATIVES:

- *There is no motion shown in the solid picture*
- *It appears that particles are lost from solid to liquid to gas*
- *It doesn't show that solids and liquids have a fixed volume since they take up the whole box in the diagram*

14) 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).