Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block:\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_ ChemThink

To understand matter it is important to form pictures in your mind of what is happening on the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.

**Element:** a substance made up of only\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

What is happening inside the copper penny (hint: how are the atoms moving)?

**Pure Substance**: the smallest individual particles (atoms) are **the same/different**

**Molecule:** \_\_\_\_\_\_\_ or more atoms are **chemically/physically** joined together

A water molecule has\_\_\_\_\_\_\_\_\_hydrogen atoms and \_\_\_\_\_\_\_\_\_\_oxygen atoms.

The chemical formula for water is :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Draw the water molecule

Subscripts in a chemical formula tell us \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

No subscript next to a chemical symbol = that there **are none/is one** of the atom present.

A **compound** is:

How do liquid molecules move:

What is written after the formula for water to represent that it is a liquid?\_\_\_\_\_\_\_\_

Draw a nitrogen molecule: Write the formula for nitrogen\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 How many atoms of nitrogen are present in a nitrogen molcule:\_\_\_\_\_\_

Draw the CO2 molecule: What elements are present in the CO2 molecule?\_\_\_\_\_\_\_ and\_\_\_\_\_\_

 How many oxygen atoms are present in CO2 molecule?\_\_\_\_\_

Draw oxygen molecule:

 Oxygen is an example of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_because there is more than

 one atom bonded\_\_\_\_\_\_\_\_\_\_.

What is written after the formula for nitrogen, carbon dioxide, and oxygen to represent that they are gases?\_\_\_\_\_\_\_\_

How do gas molecules move:

**Mixture** is:

How can you tell the molecules are not chemically bonded?

Write the formula for the mixture of nitrogen, carbon dioxide, and oxygen: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Summary:

1. Atoms or molecules of a solid are arranged \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and they move by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Indication of a solid is done so by adding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Atoms or molecules of a liquid have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Indication of a liquid is done so by adding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Atoms or molecules of a gas move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Indication of a gas is done so by adding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Now you try: What is the formula for: a solid water molecule\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ,a liquid bromine (Br2) molecule \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and a gaseous carbon dioxide molecule \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*

**Draw the picture of:**

 Copper (Cu) Oxygen (O2) water (H2O) carbon dioxide

**Draw the picture of:**

Mixture of carbon dioxide & argon

 The formulas for this mixture are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pure substance & an element mixture of an element & a compound

To describe how many atoms or molecules are present, place a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in front of the chemical formula.

*Now you try it*: Using coefficients, describe how many of the atoms and molecules are present in each box below

 \_\_\_\_\_He \_\_\_\_\_CO \_\_\_\_F2

Using the figures above for He, CO, and F2, indicate which element and compound are present in below image. Include coefficients.

 \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

**Now…. “try the questions”.** Complete the **Question Set** forthe Particulate Nature of Matter. This is graded. Finish questions successfully, you will need to answer 10 questions correctly before missing 3 questions! Follow the directions. Read carefully, Note: If you have to redo the question set more than 3 times, you need to:

 ●Read the notes you have taken ● redo the tutorial ●see your teacher for help

**Conclusion Questions: The three states of matter**

1. **Describe** the movement of

solids \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

liquids \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

gases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Identify the letters used to indicate the 3 states of matter, solid \_\_\_, liquid \_\_\_, and gas \_\_\_.
2. In each of the following formulas, underline the **coefficients** and circle the **subscripts**.

 3 Al(OH)3 4 NaCl NO3 2 Mg3(PO4)2

Use your ChemThink notes or textbook to summarize the definition of each of the following:

1. Element: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Molecule:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Compound:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Pure Substance:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Mixture:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Subscript:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Coefficient:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_