States of Matter

Focus:

1. To be able to define the terms matter, mass, volume, heat, and thermal energy
2. To be able to explain the kinetic molecular theory
3. To be able to describe the different states and states of change

* Matter is anything that has mass and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mass is the quantity of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that a substance contains, measured in grams (g) or kilograms (kg)
* Volume is the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ taken up by a substance, measured in milliliters (mL), liters (L), or cubic centimeters (\_\_\_\_\_\_)

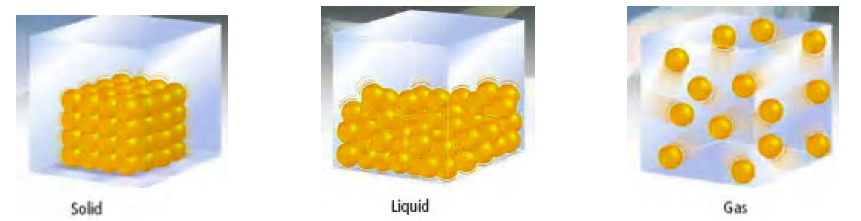
Think-pair-share

* Recall from earlier studies that there are 3 states of matter. Define the 3 state of matter and give examples of each:

The three familiar states of matter:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Fixed mass | Fixed Volume | Fixed Shape |
| Solid |  |  |  |
| Liquid |  |  |  |
| Gas |  |  |  |

The Particle Model of Matter



1. All \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is made up of very small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. There are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.)

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that make up matter are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to one another. (\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.)

Kinetic Molecular Theory

1. All matter is made up of very small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (atoms and molecules)
2. There is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ space between particles
3. Particles are constantly moving. The particles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with each other and the walls of the container
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ makes particles move. The more energy the particles have, the faster they can move and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ apart they can get.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solid | Liquid | Gas |
| Spaces between particles |  |  |  |
| Particle movement |  |  |  |
| Diagram |  |  |  |

Thermal Expansion and Contraction

* When you add \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy to a material, you increase the kinetic energy of the particles.
* As the temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the particles move faster, spreading over a larger region, resulting in thermal expansion of the material.
* Thermal contraction results when a material cools and the movement of the particles \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, taking up less space.

Heat and Temperature

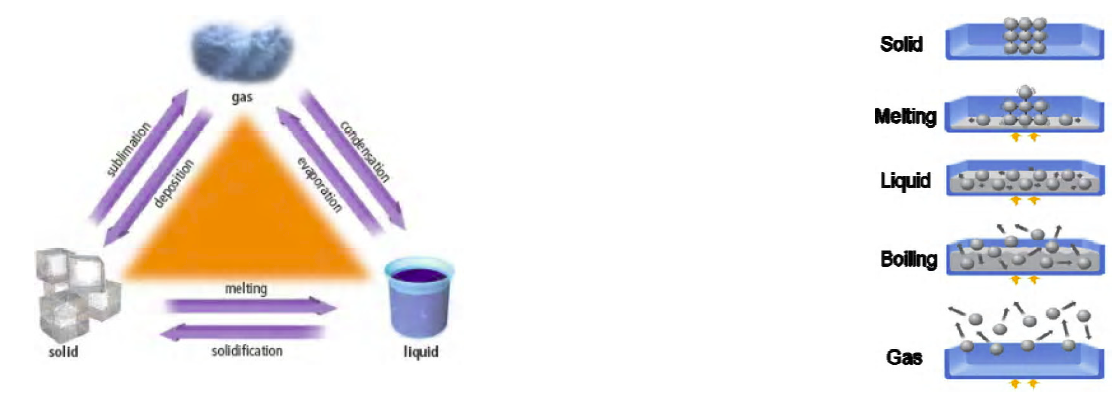
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy of all the particles of a substance is called thermal energy
* Heat is the energy transferred from one type of matter to another as a result of a difference in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Temperature is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kinetic energy of the particles in a substance.

Think-pair-share:

How does matter change as temperature increases? Decreases?

(Consider the behaviour of the particles and the space between particles.)

Changes of State



|  |  |  |  |
| --- | --- | --- | --- |
| Name | Change of State  (from \_\_\_\_ to \_\_\_\_) | Heat Gained | Heat Lost |
| Melting | Solid to Liquid |  |  |
| Evaporation |  |  |  |
|  | Gas to Liquid |  |  |
|  | Solid to Gas |  |  |
| Deposition |  |  |  |
| Solidification |  |  |  |