-I can describe that temperature is a measure of the average kinetic energy of particles of matter.

-I can explain the relationship between temperature changes and changes in the kinetic energy of matter.

W: How do you measure **temperature**? How do you measure **heat**?

Lab Instructions:

1. Set up your Lab Station:
   1. Fill one cup half way with water and add 5 ice cubes
   2. Bring another cup to your teacher and they will fill it half way with warm water.
2. Look closely at the parts of the thermometer.
   1. Look closely at your thermometer. The liquid inside is probably a type of alcohol that’s been dyed red.
   2. Read the temperature in °C by having your eye on the same level as the top of the red liquid. What is the temperature?
   3. Use a magnifier to look closely at the thermometer from the front and from the side. Look at the bulb and the thin tube that contain the red liquid.
   4. Put your thumb or finger on the red bulb and see if the red liquid moves in the thin tube.
3. Observe the red liquid in the thermometer when it is heated and cooled.
   1. 1. Place the thermometer in hot water and watch the red liquid. Keep it in the hot water until the liquid stops moving. Record the temperature in °C and observations in the chart below.
   2. Now put the thermometer in cold water. Keep it in the cold water until the liquid stops moving. Record the temperature in °C and observations in the chart below.
4. Clean up your station
   1. Empty your water cups into the sink
   2. Reset your area and wipe up spilled water.
   3. Answer the 2 observation questions on back of the page

|  |  |  |  |
| --- | --- | --- | --- |
| Cup | Temperature in ⁰C | Observations of Thermometer | Molecular Diagram |
| Warm |  |  |  |
| Cool |  |  |  |

Observation Questions:

1. Based on what you know about the way molecules move in hot liquids, explain why the liquid in the thermometer goes up when heated.
2. Based on what you know about the way molecules move in cold liquids, explain why the liquid in the thermometer goes down when cooled.

Animation Question:

1. As the liquid goes from room temperature to hot. Does the liquid EXPAND or CONTRACT? *(circle one)* Describe what you saw?
2. As the liquid goes from room temperature to cold. Does the liquid EXPAND or CONTRACT? *(circle one)* Describe what you saw?

Analysis:

1. What is temperature and how do you measure it?
2. What’s happening to the liquid in a thermometer as the kinetic energy increases?

Fill in the Chart

|  |  |  |  |
| --- | --- | --- | --- |
| Temperature Change | Kinetic Energy  (Increasing or Decreasing) | Thermal Energy  (Increasing or Decreasing) | Effect on Substance  (Expand or Contract) |
| Increasing |  |  |  |
| Decreasing |  |  |  |