**States of Matter Experiment**

**This activity supports the following unit and course objectives:**

(CLO4) Demonstrate knowledge of basic laboratory skills and operations in the areas of safety, measurement, chemical and physical properties of matter, atomic and molecular structure, chemical reactions, reactivity, structure, periodicity, and bonding.

Phases and Classification of Matter (1.2)

* (1.2.1) Describe the basic properties of each physical state of matter: solid, liquid, and gas (CLO3)

**In addition to the unit and course objectives, this activity supports the following activity objectives:**

* How the molecules in a solid, liquid and gas compare to each other (1.2.1)

**Procedure:**

* Open the “[States of Matter](https://phet.colorado.edu/en/simulations/states-of-matter)” Simulation and hit the “play” button

**Investigation:**

1. Predict what the molecules of a solid, liquid and gas look like. Illustrate your prediction with a drawing.

Solid Liquid Gas

1. Complete the table below by exploring the “Solid, Liquid, Gas” tab in the simulation. **Test**your predictions and record your observations by recording the temperature and illustrations of each substance in the three states of matter.

|  |  |  |  |
| --- | --- | --- | --- |
| **Substances** | **Observations** | | |
|  | **Solid** | **Liquid** | **Gas** |
| **Neon** | Temperature:  Illustration: | Temperature:  Illustration: | Temperature:  Illustration: |
| **Argon** | Temperature:  Illustration: | Temperature:  Illustration: | Temperature:  Illustration: |
| **Oxygen** | Temperature:  Illustration: | Temperature:  Illustration: | Temperature:  Illustration: |
| **Water** | Temperature:  Illustration: | Temperature:  Illustration: | Temperature:  Illustration: |

1. Sketch a graph of Kinetic Energy vs. Temperature. Use this graph to describe the relationship between the two concepts.
2. Write a summary paragraph, which includes drawings, to demonstrate you have mastered the learning goal. Be sure to incorporate both concepts of the learning goal:

* How the molecules in a solid, liquid and gas compare to each other.
* How temperature relates to the kinetic energy of molecules.

**Extension:** In your small groups, answer questions 5-6.

1. Explain how a change in temperature affects the pressure inside a container.
2. Explain this phase diagram by relating what you know about temperature, states of matter and pressure.

