

Phases of Matter Demonstration Document

The following demonstration is intended for 6th grade students and correlates with the SEEd standard: Standard Grade 6.2.2: Develop a model to predict the effect of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating). This standard will be fulfilled using the molecule of water to explain phase changes by utilizing a physical example that is easy to perform and inexpensive to produce. Students or teachers can perform the demonstration depending on the situation.

Materials

The following materials are required for the demonstration and can be purchased at a local grocery store or from materials already present in most homes and commercial buildings, such as liquid water.

- A minimum of 2 ice cubes per demonstration
- A container to hold liquid water
- Liquid water (no specific quantity, but enough for phase changes to be clearly seen.)
- A heating plate or stovetop that can produce enough heat to evaporate or even boil water.
- 2 clear cups

Instructions

1. Place a container of water on top of a heating plate or stovetop and give it time to heat or boil.
2. As it is heating, pick up an ice cube and explain its properties as a solid on the molecular level to the students.
3. After the water has been heated to the point of releasing visible water vapor, drop the ice cube into the water container and watch it rapidly melt. Explain melting to the students as the solid turns into a liquid state.
4. Take one of the plastic cups and pour some of the hot water into it.
5. Turn the other plastic cup upside down and place it on top of the cup containing the hot water.
6. Explain the process of evaporation as the gaseous water vapor begins to coat the inside surface of the upside down cup.

7. Place another ice cube on top of the upside down cup and leave it for a minimum of 90 seconds.
8. Remove the ice cube and observe the water droplets coating the inside surface of the upside down cup.
9. Explain condensation to students as the gaseous water vapor condenses back into a liquid state.

Safety

- The demonstration contains materials that will reach hot temperatures so the possibility of burns exists. Exercise caution when handling the heating plate, stove, boiling water, or the cup of hot water.

Disposal

- Water can be safely disposed of in any standard household drain.