

Force, Motion, Energy, and Matter: Know H₂O

Overview: Water is the universal solvent. Water is a unique combination of hydrogen and oxygen. It is important for students to know that water takes form in three different phases. Water can be a solid, liquid, or gas. Students will come into contact with all three phases during their daily lives.

Procedure:

- Introduce the lesson by setting up a display of the following; a bucket filled with ice, a pitcher filled with water, and an operating humidifier.
- Allow students to take turns observing and touching the water, ice, and steam.
- Ask the students, “What are the similarities and differences between water, ice, and steam?” Write their responses on the chalkboard, whiteboard or Smart Board.
- Using a camera, take pictures as students complete the following steps of creating the three phases of water.
 1. Fill an ice tray with water and place in the freezer.
 2. (The next day) Remove the ice tray and place the ice cubes into a saucepan on the stove.
 3. Heat the ice and observe the steam that rises above the boiling water.
- Print pictures from the previous activity of creating the three phases of water along with real world pictures of the phases of water. Place the pictures on the table and have students work independently or with a partner to sort the pictures under the correct category of ice, water and steam.
- Wrap up this lesson by having students work independently or with a partner to complete *The Many Phases of Water* worksheet.

ASOL covered in this activity:

5S-SI 1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations which

- b) objects or events are classified and arranged according to characteristics or properties.

5S-FME 5 The student will investigate and understand that matter is anything that has mass, and takes up space; and occurs as a solid, liquid, or gas. Key concepts include

- a) Distinguishing properties of each phase of matter.
- b) The effect of temperatures on each phase of matter.

8S-FME 3 The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment.

Key concepts include

- b) properties of water in all three phases

8S-FME 5 The student will investigate and understand the nature of matter. Key concepts include

- c) solids, liquids and gases.

Materials:

- Humidifier
- Bucket filled with ice
- Pitcher filled with water
- The Many Phases of Water* worksheet (below)
- Camera and pictures from the melting ice activity
- Real world pictures of phases of water

Instructional Setting: This activity is best taught in the general education science classroom. It can be taught in the resource room, but it is best practice to have typical peers involved.

It could also be taught in a kitchen setting so that the teacher and students have access to a freezer and stovetop.

Community Connections and/or Peer Interactions: Peer interaction involved by completing partner work and experiment with a typically developing peer.

Functional Activity/Routine:

- Understanding of this concept will expand students' knowledge and language as they interact with the three phases of water in everyday life.
- Cooking activities to document the changes.

Strategies to collect evidence:

- Caption photos of the student completing the picture sort or glue the sort on paper.
- Voice output device programmed with phases of water and examples of each phase can be used with a data sheet to record student responses.
- Assessment including pictures to be sorted, circled or otherwise indicating correct student response.
- Completed *The Many Phases of Water* worksheet.

Specific options for differentiating this activity:

- Modify the worksheet by providing choices for the students to circle.
- Complete sorting activity using a Smart Board or iPad.

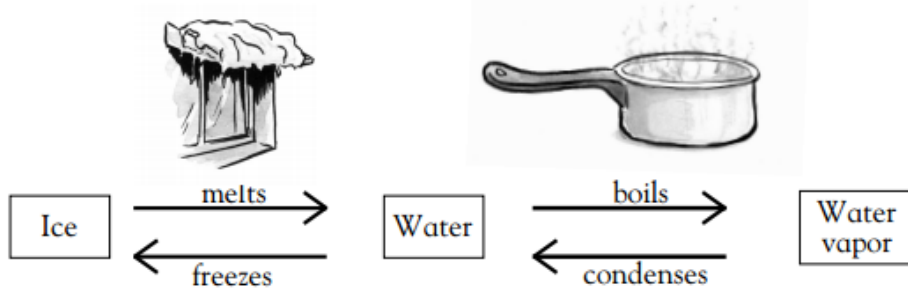
Resources:

Great Schools. Dorling Kindersley Limited, 2012.

The Many Phases of Water

Background knowledge

When ice is warmed, it melts to form water. When water is heated further, it boils to form *water vapor*, a colorless, odorless gas. These changes from solid to liquid to gas can be reversed by cooling water vapor. The water vapor will condense to form liquid water, and if cooling continues the water will eventually freeze.



Science activity

Explain what is happening to the water in each picture.

.....
.....



.....
.....

.....
.....

