

## Ice Cube Demonstration

<b>Lesson Concept</b>	Heating or cooling (adding or taking away energy) may cause a physical change. Matter changes physically during phase change, however, it remains the same substance.
<b>Link</b>	When matter changes state, it is still the same substance. As water changes state, its physical properties change.
<b>Time</b>	One-two class periods
<b>Materials</b>	<u>Whole class</u> Hot plate Frying pan Tea-kettle Metal baking tray (9 x 13in) 3 lb. ice cubes Water <u>Individual</u> Science notebooks Glue Scissors Changing States of Matter work sheet
<b>Advance Preparation</b>	1. Gather materials. 2. Practice both demonstrations before class. 3. Prepare a large version of the Changing States of Matter work sheet.
<b>Procedure:</b>	
<b>Engage</b>	<b><i>(15 minutes) Heating or cooling (adding or taking away energy) may cause a physical change. Matter changes physically during phase change, however, it is still the same substance.</i></b>
1.	Melt the ice cube in the frying pan using the hot plate. The ice cube will go from solid to liquid to gas (vapor).

2. Ask students: What do you observe? What is happening? What happened to the ice cube? Where did it go? What happened to the water? Is there a way to make the ice cube come back?

**Explore**                      ***(20 minute) When any solid changes to a liquid, it is called melting. When any liquid changes to a solid, it is called freezing. When any liquid changes to a gas, it is called evaporation or vaporization (depending on the method.) When any gas changes to liquid it is called condensation.***

3. Explain to students that now we will change water vapor into liquid water.
4. Boil water in a tea-kettle on the hotplate.
5. Have students observe the steam as it comes out of the kettle spout and goes into the air. Explain to students that this is called evaporation.
6. Place some ice in a metal baking tray.
7. Position the tray over the steam and watch the droplets form on the bottom of the pan. This is condensation.
8. Have students observe the drops of water forming on the bottom of the metal tray. As the drops grow in size, they will become heavier and start to fall. This is precipitation. Explain to students that they have made it rain in the classroom!

**Explain**                      ***(20 minutes) When any solid changes to a liquid, it is called melting. When any liquid changes to a solid, it is called freezing. When any liquid changes to a gas, it is called evaporation or vaporization (depending on the method.) When any gas changes to liquid it is called condensation.***

9. Have students record the steps they observed in the “rain making” demonstration. Encourage students to draw pictures and diagram how water changes from a liquid to a vapor back to a liquid. Have students complete the following prompts in their notebooks: Water changes from a liquid to a vapor because\_\_\_\_\_ (heat is added). Water vapor changes to a liquid because\_\_\_\_\_ (heat is taken away).

**Extend/Evaluate**        ***(15 minutes) Heating or cooling (adding or taking away energy) may cause a physical change. Although matter may change physically, however, it is still the same substance.***

10. Distribute the Changing States of Matter work sheet. Students cut out the arrows (melting, freezing, evaporating, condensing) and vocabulary word/pictures. Have students work in pairs to decide where to glue each piece. Have students individually glue the pieces in their science notebook.
11. Check for understanding: Call on students to place larger versions of the arrows on the class diagram. Retain this chart as a reference as unit progresses.