

Unit 3: Connecting Places, Connecting People

WEEK 4 Lesson 2

Science and Engineering: Physical Science
Matter and Its Interactions: Reversible and Irreversible Changes (Ice)

S & E Big Ideas	Matter changes states when we cool it or heat it. Some changes of matter are reversible, some are not.
S & E Guiding Questions	How can water change? Can a liquid be changed back to a solid?
Content Objective	I can refer to personal experiences and work with others to plan an investigation to change liquid water to a solid. (2-PS1-4, Practice 3)
Language Objective	I can describe the investigation my group designed and explain the reasons for our design. (SL.3.2.a)
Vocabulary	freeze: to turn a liquid into a solid as a result of extreme cold reversible: able to be returned to a previous state
Materials and Preparation	Unless specific changes are indicated, children will work in the same small groups of 4-5 children as in Weeks 2 and 3. <ul style="list-style-type: none"> ● Science and Engineering packets ● writing tools ● chart paper and marker Title the chart paper, Materials for investigations. ● Changing States of Matter chart, from previous lessons <p>On the whiteboard write: Can we turn a liquid back into a solid?</p>
Opening 3 minutes	<i>So far, we have observed how ice can melt and change to liquid water. We also investigated to see what happens to liquid water when it is left out in open air—it evaporates. Today we will investigate whether we can turn water back to ice, a liquid to a solid.</i>

	<p style="text-align: center;"><i>Have you ever seen water turn to ice? When?</i></p> <p>Allow a few minutes for children to share their experiences.</p>
<p>Investigation 15 minutes</p>	<p>Refer to the question on the whiteboard.</p> <p style="text-align: center;"><i>Can we turn a liquid back into a solid? More specifically, how could we turn water—a liquid—back into an ice cube—a solid?</i></p> <p style="text-align: center;"><i>The challenge for your groups today is to come up with as many ideas as you can for ways to turn water into ice.</i></p> <p style="text-align: center;"><i>You will work in your groups again. When you have an idea about how to turn water into ice, explain to your group members why you think it's a good idea. You need to record three of the group's ideas in your packets. [Indicate the corresponding page in the packet.] Today you are just planning investigations; you will conduct these investigations in the Discovery Studio this week.</i></p> <p>While children work in groups, circulate to listen in. Encourage children to be specific, to articulate reasons for each approach, to use established classroom discussion prompts to share and listen to each other's ideas, and to record their ideas in their packets.</p> <p>Some ideas might include leaving water in containers on the windowsill or outside overnight, or putting the filled ice cube tray in the freezer. Collect all ideas without offering judgment about what will be more or less successful. Children will try and evaluate all feasible ideas during Studios.</p>
<p>Discussion 10 minutes</p>	<p>Bring the children back to the whole group. Refer back to the question on the whiteboard.</p> <p style="text-align: center;"><i>It seems that you all think that we <u>can</u> turn liquid water back into solid ice—we can freeze water—and you have ideas about how to do this!</i></p> <p>Add to the Changing States of Matter chart.</p> <div style="border: 1px solid black; padding: 10px; text-align: center; margin: 10px auto; width: fit-content;"> <p>Changing States of Matter</p> <pre> graph LR solid[solid] -- melting --> liquid[liquid] liquid -- freezing --> solid liquid -- evaporation --> gas[gas] </pre> </div>

	<p><i>What are some of the ways we might freeze water, turning it from a liquid to a solid?</i></p> <p>Invite children to share some of the investigations they want to conduct. Encourage them to make some predictions without eliminating any ideas. (For example: <i>This is interesting: one idea is to put the ice cube tray in the refrigerator for a long time, instead of in the freezer for a shorter time. What do you think will happen? Why do you think that?</i>)</p> <p><i>You will try your ideas and observe your results in Studios this week. We will be sure to have a conversation about the results of your investigations.</i></p> <p><i>Let's make a list of all the materials you will need for your investigations. I'll get these ready for the Discovery Studio.</i></p> <p>Have children read out all materials their groups have identified for their investigations, and list them on the chart paper. Before the next Studios session, collect these materials and add them to the Discovery Studio.</p>
<p>Closing 4 minutes</p>	<p>Refer back to the Changing States of Matter chart. <i>Let's look carefully at this chart. What do you notice?</i></p> <p>Gather several observations, and facilitate a brief discussion about the experiences in each lesson and the changes in states of matter children have enacted.</p> <p><i>There was water present in all our investigations, but in different states: the water changed from a solid to a liquid, and from a liquid to a gas. Let's see what happens when we try to change the water from a liquid back to a solid!</i></p>
<p>Standards and Practices</p>	<p>SL.3.2.a Describe people, places, and things, tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.</p> <p>2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p>
<p>Ongoing assessment</p>	<p>Reflect on the class discussions.</p> <p>What language do children use to describe freezing situations in everyday life?</p> <p>What ideas do they come up with to freeze water?</p>