

Unit 3: Connecting Places, Connecting People

WEEK 5 Lesson 1

Science and Engineering: Physical Science

Matter and Its Interactions: Reversible and Irreversible Changes (Condensation)

S & E Big Ideas	Matter changes states when it is cooled or heated. Some changes of matter are reversible and some are not.
S & E Guiding Questions	How can water change? Can a gas be changed back into a liquid?
Content Objectives	I can observe what happens to water vapor inside a cup. (2-PS1-4) I can make some inferences about what makes a change happen. (2-PS1-4)
Language Objective	I can report my observations and my thinking. (SL.3.2.a)
Vocabulary	condensation: the process of gas changing to liquid
Materials and Preparation	<ul style="list-style-type: none">● Images of Condensation slides, including video● projector and screen● Roles Cards● ceramic mugs, one for each group● clear plastic cups, one for each group● very hot water, in an insulated container, about 3 cups● magnifiers, one for each group (optional)● Science and Engineering packets● writing and drawing tools● Changing States of Matter chart, from previous weeks <p>Note: Condensation occurs when there is a difference in temperature between water and the surrounding air. In summer, the difference in temperature between a cold drink and warm air causes the air around the glass to condense. In winter, the phenomenon that occurs on windows is a similar one, but the warm air is inside; the water condenses when it touches the cold windows (and then sometimes freezes).</p>
Opening	<i>Last week we looked at how water evaporated into the air. We said</i>

<p>4 minutes</p> <p>Images of Condensation slides</p>	<p><i>that the water changed from liquid to gas, becoming water vapor. This can be a difficult idea to understand!</i></p> <p><i>Here's something else to think about: Have you ever noticed what happens to the mirror in the bathroom when you take a bath or shower?</i></p> <p><i>Also, sometimes when I get inside my car or onto the bus, the windows are wet and I can draw on them. Have you ever noticed that?</i></p> <p>Give children a moment to respond with their own experiences.</p> <p><i>Let's watch a short video of something else you might have seen.</i> Show the video on slide 2.</p> <p><i>What do you think is happening? Where does this water on the outside of the glass come from? What makes you think that?</i> Show the images on slides 3-7 as useful for supporting this conversation.</p> <p><i>Today we will investigate what happens to water that evaporates: where it goes when it changes its state. We will also investigate whether we can make it return to a liquid state.</i></p> <p>Have children organize into small groups, and distribute Roles Cards. Send groups to their work spaces with their Science and Engineering packets and writing tools. Have children choose roles, and then invite a Materials Manager from each group to collect a mug and a plastic cup.</p>
<p>Investigation</p> <p>15 minutes</p>	<p>Explain the procedure step by step and have groups work simultaneously according to these directions:</p> <ol style="list-style-type: none"> <i>1. Place your mug in the middle of the table.</i> <i>2. Touch the inside of the plastic cup to make sure it is dry.</i> <p>Circulate to pour hot water into the mugs, to about two-thirds full. Then place the plastic cups upside down on top of the mugs. Warn children that the water is very hot and to not touch the mugs.</p> <ol style="list-style-type: none"> <i>3. Watch the plastic cup for a couple of minutes. Use magnifiers to look at the sides and top of the cup. Do not touch or tip the cups.</i> <i>4. Materials Managers: Carefully remove the plastic cup and let each member of the group touch it. [The cup should feel wet.]</i> <i>5. Materials Managers: Now place the plastic cup gently back on top of the mug of water.</i>

	<p>In their groups, children first discuss and then record their observations in their packets. [Indicate the first line of Changing Gas to Liquid.] Encourage children to use class discussion prompts as they exchange ideas.</p>
<p>Discussion 10 minutes</p>	<p>Gather children on the rug to discuss their observations. <i>Remember that when water evaporates and turns into a gas, that gas is called “water vapor.” It is often difficult to see.</i></p> <p>Ask Recorders to report the findings of each small group.</p> <p><i>Do we all agree that the inside of the plastic cup felt dry at the beginning of the investigation?</i> <i>How did the inside of the plastic cup feel at the end of the investigation?</i> <i>Where do you think that water inside the plastic cup came from?</i></p> <p>Harvest children’s ideas.</p> <p><i>When a gas turns into a liquid we call that change condensation.</i></p> <p><i>How might we record this change on our chart?</i></p> <p>See the example below.</p> <div data-bbox="496 1031 1373 1367" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Changing States of Matter</p> <pre> graph LR solid[solid] -.-> melting liquid[liquid] liquid -.-> evaporation gas[gas] gas -.-> condensation liquid </pre> </div>
<p>Closing 1 minute</p>	<p><i>Today we learned that we can change a gas into a liquid, and that we call that process condensation.</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. What language do children use to describe their observations?</p>

	Do children make connections between this investigation and everyday phenomena and experiences?
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