WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Target Language: English as a Second Language	**Grade Level**: 2 and 3
Proficiency Level: Junior Novice Low – Junior Novice Mid	
Context and Storyline: A science class is learning about three states of matter. Students learn the concept of the three states of mater and how they change from one to another. Students then apply their learning in real life; including making ice cream.	
Enduring Understanding: Students will understand that matter can change its state as it interacts with energy such as temperature. (heat energy)	
Essential Questions: 1. What is matter? 2. How can we tell that matter can change its state? 3. What examples can we observe in our daily life that that show how temperature/heat energy affects the state of matter?	
Module Duration and Lessons: Depending on the length and frequency of classes per week, we suggest that the five lessons in this module could be taught during the period of three to five weeks. On the average, each lesson may be taught over a week, with 30-minute classes three to five times per week. Lesson 1 – *The Magic of Water* Lesson 2 – *Three States of Matter and Their Properties* Lesson 3 – *What Causes Matter to Change Its State?* Lesson 4 – *A Matter of Taste: Making Ice Cream* Lesson 5 – *This is the Matter with Ice Cream*	

Standards Targeted	
5C – World Language Standards	**5E – STEM Standards**
Communication • Students engage in brief exchanges about personal interests in the target language. (1.1.A) • Students understand spoken and written language on very familiar topics in the target language that promote the learning of basic linguistic structures. (1.2.A) • Students make short presentations and write simple communications on very familiar topics in the target language. (1.3.A)	**NGSS 2. Structure and Properties of Matter** Students who demonstrate understanding can: 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **Math Common Core: Measurement and Data 3.MD** • Solve problems involving measurement and estimation of intervals of time, liquid

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Cultures
Students identify and describe the products within the cultures studied. (2.1.A)

Connections

Students access new information and reinforce existing knowledge of other content areas through the target language. (3.1.A)

Comparisons

Students identify and compare the products, practices, and perspectives from the target cultures to their own. (4.2.A)

Communities
Students use and extend their language proficiency and cultural knowledge through face-to-face encounters and/or the use of technology both within and beyond the school setting. (5.1.A)

volumes, and masses of objects.

Knowledge: Students will know…	**Skills: Students can…**
Vocabulary (both linguistic and content areas) • Three states of water and their properties • States of matter • Properties of matter • Temperature change • Procedures and ingredients for making ice cream • Adjectives describing temperature and taste • Verbs expressing change Expressions and patterns • Express opinions with like/don't like • Ask and answer simple questions • Make simple statements	Students can • Identify matter as solids, liquids, and gases, and describe their properties. • Ask and answer questions about temperature changes. • Express temperature (melt, freeze, hot, cold). • Recognize and name ingredients for making ice cream. • Teach others how to make ice cream without a machine.

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Assessment Tasks

Interpretive Task: **State of Matter**
Students will listen to six statements that describe various properties of matter. They will identify if the statements are describing a solid, a liquid, or a gas. 1. *I am cold and hard.* 2. *I am in the air and have no definite shape.* 3. *I change my shape to fit my container.* 4. *I become this when water is boiled to 212 °F.(100°C)* 5. *I am sometimes large or sometimes small, but I have a definite shape.* 6. *First I am a solid, but when my temperature reaches 32°F (0°C), this is what I become.* **This assessment will be completed in Lesson 5 using Worksheet 5a.**

Presentational Task: *I'm a Little Scientist* Video
Students will select one state of matter and make a short video in which they explain: a. What is matter? b. How many states does matter have? c. What is the state of the matter that you chose? d. What properties does this matter have? e. Show the audience two examples of matter with signs labeled *solid, liquid*, or *gas* in the target language. **This assessment will be completed in Lesson 2.**

Interpersonal and Presentational Task: **Making Ice Cream**
1. Instruct students to complete **Worksheet 5b** independently. 2. In groups of three to five, students compare their notes and discuss their experiences. 3. Each group prepares its own cooking show the ingredients and directions for making ice cream. They can use the pictures of ingredients hold up the real items to demonstrate. Each student will perform at least one step. (This will depend on the size of the group.) **This assessment will be completed in Lesson 5.**

Materials/Resources
Lesson 1: • PowerPoint presentation - Lesson 1 • States of Matter song: http://www.youtube.com/watch?v=btGu9FWSPtc • chart paper to record student observations

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Materials/Resources

- a "snowman" made of a water bottle filled with frozen water (Decorate the water bottle so that it looks like a snowman. Make sure the decoration can withstand water.)
- cooler to store ice and snowman
- hot plate or other heating source for boiling water
- glass beaker or other heat-resistant glass container for boiling water
- thermometer
- clear plastic cups (one per student)
- ice cubes (one per student, plus additional ice for the cooler)
- outdoor thermometer or computer with internet access for displaying weather site with current temperature
- demonstration thermometer for visualizing the temperature when it is discussed (See examples at: http://www.deltaeducation.com/productdetail.aspx?Collection=Y&prodID=1493&menuID or http://www.schoolmart.com/demonstrationthermometer.aspx
- signs for stations: SOLID, LIQUID, GAS
- sandwich baggies (one per student)
- sealed container for collecting steam (jar or pot with lid)
- Permission Slip (with Teacher Resources)
- Worksheet 1a – *I Can Write!*
- Worksheet 1b – *Three States of Water Due to Temperature Changes*
- enlarged pictures from **Ppt. 1-6**

Lesson 2:

- PowerPoint presentation - Lesson 2
- Permission Slip for ice cream activity
- video camera (optional)
- snowman from Lesson 1
- chart paper to record student observations
- a clear glass or cup
- a bottle of colored water
- a clear flat container, such as a pie plate
- pocket chart
- index cards or sentence strips of the properties of liquids and gases (**Ppt. 2-10)**
- a platform scale or balance (for weighing small objects)
- a bath scale (for weighing the students)
- objects of various sizes such as a beach ball, a building block, a stuffed animal, and a toy car (to demonstrate rigidity and texture)
- visuals of solids, liquids, and gases
- Worksheet 2a – *I Can Write!*
- Worksheet 2b – *Matter in a Solid State and Its Properties*
- Worksheet 2c – *Matter in a Liquid State and Its Properties*
- Worksheet 2d – *Matter in a Gas State and Its Properties*

Lesson 3:

- PowerPoint presentation – Lesson 3

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Materials/Resources

- video camera
- paper of various colors, cut into 4" squares
- pencils with erasers or straws (one per student)
- thumbtacks or pins(one per student)
- scissors (one pair per student)
- rulers (one per student)
- bag of chocolate chips
- hair dryer
- several pieces of gold jewelry or pieces that resemble gold
- mothballs (camphor)
- examples of glass
- safety glasses
- pinwheel (made of sturdy material for teacher use)
- Worksheet 3a – Making Pinwheels
- Worksheet 3b – Chocolate Melts in My Hands
- Worksheet 3c – Not All Matter Changes in the Same Way
- Worksheet 3d – My Storyboard: Temperature Can Change the State of Matter
- directions for making paper pinwheels or windmills: http://frugalliving.about.com/od/frugalfun/ss/Pinwheel_3.htm
- video for melting gold: http://www.youtube.com/watch?v=sbbgWPt3G1Y
- video for melting glass: http://vimeo.com/30247302
- directions for making a mini-book: http://www.youtube.com/watch?v=21qi9ZcQVto

Lesson 4:

- PowerPoint presentation – Lesson 4
- students' videos from Lesson 3
- donations requested from parents:
  - small plastic bowls and spoons, one for each student
  - plastic spoons
  - milk
  - sugar
  - vanilla extract
  - ice cube trays
- water
- 1 instant-read thermometer (outdoor thermometer can be substituted)
- rock salt
- gloves (Students can bring their own winter gloves.)
- clear bowl
- measuring spoons
- paper towels
- **Worksheet 4a** – *I Can Write!*
- **Worksheet 4b** – *How to Make Ice Cream* (Directions)
- **Worksheet 4c** – *How to Make Ice Cream* (Literacy Activity)

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Materials/Resources

Lesson 5:
• PowerPoint presentation - Lesson 5
• video camera
• samples of:
  ○ sugar
  ○ milk or half & half
  ○ vanilla extract
  ○ rock salt
  ○ quart-size freezer bags
  ○ gallon-size freezers
• ice cubes
• measuring spoons and cups
• clear bowl
• **Worksheet 5a** – *The Three States of Matter* (2 per page)
• **Worksheet 5b** – *My Ice Cream Experiments*
• **Teacher Resource 5c** – Suggested Rubric

STEM Background for Teachers: Matter

Matter is the "stuff" of which all objects and substances are made. Since all matter takes up space and contains a certain amount of material (mass), all matter can be measured. Some types of matter can be easily observed with your senses. For example, you can see or feel things like rocks, trees, bicycles, etc. You can also see and smell things like smoke from a fire. Some matter is more difficult to detect. For example, air is the invisible gas that surrounds us and you cannot see it or smell it, but you know it exists because you can feel it when the wind blows.

All matter has physical properties that can be observed with our senses without changing the make-up, or identity, of the matter. Examples of physical properties are color, shape, size, and texture. Other examples of physical properties would be density, boiling point, melting point, and solubility.

Matter can exist in one of four conditions or states: solid, liquid, gas, or plasma. Even though we usually do not think of it as matter, plasma is the most common state of matter in the universe. Plasma is the gas-like mixture of particles found in the sun and other stars. However, the three more familiar states of matter are easier for us to observe and measure here on earth. When describing the physical properties of solids, liquids, and gases, these characteristics apply:

- Solids have a definite shape and volume.
- Liquids take on the shape of their container, and keep their same volume.
- Gases take on the shape and volume of their container.

Matter can be changed by heat energy. The temperature of an object determines how it is changed. For example, when a solid is heated to its melting point, the solid will change into a liquid. When a liquid is heated to its boiling point, the liquid will change into a gas. If enough heat is taken away from a liquid, the liquid will reach its freezing point and turn into a solid.

NOTE: The Celsius scale is used in most countries for measuring temperature. The Fahrenheit scale is used in the United States.

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Lesson 1- The Magic of Water

<table>
<tr><td colspan="2">Lesson 1 of 5 Duration: 30 Minutes</td></tr>
<tr><td>Objectives</td><td>I Can:
Oral Language:
• Ask and answer questions about three states of water.
• Talk about some properties of water in each state.
• Identify and tell at what temperature water changes into a solid, a liquid, or a gas.
Literacy:
• Water has three states: solid, liquid, and gas.
STEM and Other Subject Areas:
• Observe and label evidence that some changes of states can be caused by temperature changes.</td></tr>
<tr><td>Vocabulary and Expressions</td><td>Previously learned:
shapes, colors, numbers, days of the week, months of the year, some weather expressions (It is hot. It is cold.)
Content obligatory language:
• solid
• liquid
• gas
• steam
• vapor
• ice
• thermometer
• temperature
• degree
• Fahrenheit
• snow
• snowman
Content compatible language:
• cooler, hard, soft, wet, dry, cold, warm, hot
• like/don't like
• How does it feel/smell/sound/taste?
• What does it look like?
• What do you have? I have…
• use…to make…
• change into…
• melting point
• boiling point
• freezing point</td></tr>
</table>

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Lesson 1 of 5	Duration: 30 Minutes
Materials/ Resources	• PowerPoint presentation - Lesson 1 • Permission Slip (with Teacher Resources) • States of Matter song: http://www.youtube.com/watch?v=btGu9FWSPtc • chart paper to record student observations • a bottle of water that has been decorated to resemble a snowman. Place the bottle in the freezer the day before the lesson. • cooler to store ice and snowman • hot plate or other heating source for boiling water • glass beaker or heat-resistant container for boiling water • thermometer • clear plastic cups (one per student) • ice cubes (one per student, plus additional for the cooler) • outdoor thermometer or computer with internet access for displaying weather site with current temperature • demonstration thermometer for visualizing temperature when it is discussed (See examples at: http://www.deltaeducation.com/productdetail.aspx?Collection=Y&prodID=1493&menuID or http://www.schoolmart.com/demonstrationthermometer.aspx • signs for stations: *SOLID, LIQUID, GAS* • sandwich baggies (one per student) • sealed container for collecting steam (jar or pot with lid) • Worksheet 1a – *I Can Write!* • Worksheet 1b – *Three States of Water Due to Temperature Changes* • enlarged pictures from **Ppt. slide 1-6**

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Lesson 1 of 5	Duration: 30 Minutes
Lesson Storyline and Core Text	A group of students in a science class is learning about water and its three states. A snowman comes in to help students understand how water can change into another state due to temperature change. During several class periods, students experiment and observe at what temperature water changes from liquid to ice, back to liquid, and to gas. They will identify and talk about characteristics of water in different states. At the end, via various assessment instruments, students will demonstrate their understanding of the relationship between temperature, the three states of water, and the properties in each state. *Core Text:* *Hello, Class. My name is Snowman. How are you?* *Hi friends, do you know where I live?* *What is the temperature outside today?* *Can you make a snowman today?* *Let's find out what happens to water when the temperature is below 32°F(0°C).* *Today's temperature is __°F . Who can predict what will happen to the ice if we leave it in the cup?* *Ice is solid.* *Solid has shape.* *When the temperature is below 32°F(0°C),* *Water freezes into ice.* *It is solid again.* *Water is liquid* *Liquid has no shape.* *When the temperature is higher than 32°F (0°C),* *Ice becomes water.* *It is liquid again.* *Steam is gas.* *Steam has no shape.* *When the temperature is higher than 212°F(100°C),* *Water becomes gas.*

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
Engagement ● *Object, event or question used to engage*	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**. Prepare the snowman bottle and store in the cooler with ice.

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
students. ● *Connections facilitated between what students know and can do*	Opening Routine: • Begin the class with greetings. • Ask students how they are feeling today • Ask for the day of the week and the date. • Ask students about the weather: *Is it hot today or is it cold today?* **Use Snowman to introduce the concept of ice, cold, and solid.** T: *Hello, student. Look what I have today! I have a cooler. I also have ice. (Show students while saying it.)* T: *Look! Who is inside? (Bring out Snowman.)* **Note:** Act out the following conversation using a different voice for Snowman. (referred to as SN) SN: *Hello, Class. My name is Snowman. How are you?* Lead students in greetings and introductions with Snowman. (*How are you? I'm fine, thank you. My name is ____, etc.)* SN: (**Ppt. 1-1**) *Hi friends! See, this is me!* SN: *Do you know where I live?* SN: *I live in a place where it is very cold, where it snows. Do you like snow?* T: (**Ppt. 1-2**) *See, it's snowing. These children are making me, Snowman! When the snow is solid, people can make a snowman.* SN: *This is cold. Do you like cold weather? There is snow/ice. What do you see?* Students respond. SN: *These snowmen are all like me. They like very cold weather. Does Maryland have snow?* Students respond. SN: **(Ppt. 1-3)** *I can live here too. Is it cold or hot? Do you like this weather?* Students respond. SN: *When it's very cold, the rain becomes snow when the temperature falls below 32°F. It's almost like a magic temperature.* SN: **(Ppt. 1-4)** *Can I live here? Is it cold or hot? Do you like this weather? Can we make snowmen here?* Students respond. SN: *Why not? Do you think this is above or below the magic temperature?* Students respond. SN: **(Ppt. 1-5a)** *Look at my snowman friend. When the snow is solid, people can*

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	make a snowman. That makes me happy. What was the magic temperature? Students respond. SN: *Right! And 32°F is called the freezing point, because water freezes when the temperature goes below 32°F.* SN: **(Ppt. 1-5b)** *Now look at my friend. Is the temperature is above 32°F? What happens to my friend?* Students respond. SN*: Right! He is melting. That makes me very sad!* T: *Do you remember what Snowman told us? What is the magic temperature? What temperature is the freezing point?* Students respond. T: *What is the temperature when the rain becomes snow?* Students respond. SN: *What is the temperature today? Can you make a snowman today?* **Hold up the demonstration thermometer.** T: *This is a thermometer. We use it to tell the temperature. This thermometer is for measuring inside temperatures, so it will tell us the temperature in our room today.* Read the temperature and show students how to read it. Instruct students to tell Snowman the temperature reading in the room, and if they can make a snowman. Students respond. **Point to the outdoor thermometer or use an Internet-based weather site to display the current local temperature.** Have a student read the temperature. T: **(Ppt. 1-3)** *So, what do you think the weather is in these pictures*? *Students respond.* T: *What do we call 32°F? Do we call it a freezing point? Is this below 32°F? Or is it above 32°F?Is it cold?* Students respond. T: **(Ppt. 1-4)** *Snowman, so what would happen to you when you are here, in this kind of weather? When the temperature is high?* SN: (in a panic) *Oh, No, I'll MELT! When it is that warm, I'll melt. Please, help me, I'm melting!* T: (Turn to class) *What should we do to help the Snowman? Should we put him back to a cold place, like this bag of ice in the cooler?* Students respond.

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Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	SN: *Thank you, friends. You're very smart and nice. Thank you. Goodbye!* Students respond. T: *OK, now Snowman is safe! What is Snowman made of?* Students respond. T*: Right! So if he's made of ice and snow, let's talk about what would happen to him when the temperature is warm or hot.* Students respond. T: *When snow and ice melt, what do they become?* Students respond. T: *Right, when it is above 32°F, snow and ice will melt into water. What temperature is the melting point?* Students respond. T: *When it's below 32°F, is Snowman water or solid?* Students respond. T*: I'm glad we saved Snowman! Let's say it together: We saved Snowman!* Lead students to chant: *We saved Snowman. He likes it cold. He likes the temperature below 32°F.* **Literacy Activity**: Distribute **Worksheet 1a.** (Students will complete the first column 1 only in this segment.) Depending on your students' ability levels, instruct them to: • Write the word only in each box of column 1. • Write sentences using the word "*ice*," such as: o *Ice melts above 32°F.* o *Ice freezes below 32°F.* o *Ice is a solid.* • If time allows, students may draw a picture for one of the responses on a separate sheet of paper. They can then present their picture to classmates in small groups. Closing routine: Use a song to sing today's weather and to say goodbye.
Exploration ● *Objects and phenomena are explored.* ● *Hands-on activities, with guidance.*	**How water changes: from ice to liquid** Opening Routine: Use an outdoor or Internet-based thermometer or a large demonstration thermometer to read the temperature of the day. Record it on the class calendar. Model and guide students to do it during the first week, then invite students to do the calendar routine independently during the rest of the module. T: *Let's see, what day is it today? What day of the week is it today?* T: *What is the temperature today?* Students respond. T (or students): *It's____ degrees F.* T: *Let's write it down. (or, Who can write down the temperature on the calendar?)*

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	Note: On the first day or week, model how to read the thermometer. During the rest of this module, call on volunteers to read and write down the temperature. T: *Where is our Snowman? Do you think Snowman is frozen solid or melted into water?* Students respond. Bring out Snowman. T: *Snowman, how are you today?* SN: *I'm fine. I feel very good today because I am solid and cold.* T: *Can anyone tell us why Snowman feels so good today? Did he sleep in the ice?* Students respond. T: *Let's find out if the ice's temperature is below 32°F.* Put a thermometer inside the bag of ice and explain to students that they have to leave it there for a while before the thermometer can read the temperature correctly. T: *Snowman, you probably won't like what we do today because we want to learn how water changes when the temperature changes.* SN: *Oh, no! Then I should run back to the ice cooler. Goodbye.* Everyone: *Goodbye, Snowman!* T: *Before I put Snowman back, let's make sure the temperature in the ice cooler is below 32°F.* Remove thermometer, and have a volunteer read the temperature. T: *Is the temperature above or below 32°F.? Is it safe for Snowman?* Students respond. T: *Who remembers what the outside temperature is today? Is it higher or lower than the freezing point? What is the temperature in our classroom today?* (Consult the classroom thermometer.) After students respond, bring out another bag of ice cubes. Take two cubes of ice and put them into a clear plastic cup. T: *In our classroom temperature of ___ °F, what will happen to the ice if we leave it in the cup? What do you predict?* Students respond. T: *Let's see if it really happens. I'm going to pass a cup to each one of you. Come to me for ice, one at a time, and tell me: Ms. /Mr…., I'd like to have some ice, please.* Model the request and have the class repeat it a few times. Distribute the ice to each student. T: *Okay, let's keep it in the cup and see what happens.* T: *While we are waiting, let's try to feel the ice. How does it feel? Hot or cold?* T: *Is ice solid or soft?* T: *Can you see your ice?*

<table>
<tr><td>Key Elements</td><td>Lesson 1 – The Magic of Water Duration: 30 minutes</td></tr>
<tr><td></td><td>
T: Right, it is because ice has a shape. Can you see the shape of your ice?
T: This shape is a cube. Tell your partner the shape of your ice.
Students respond to a partner.
T: Is your ice melting?
T: How do you know it's melting? Is it turning into water?
T: When ice turns into water, we call the water liquid. Ice is solid, but water is liquid.
Have students repeat a few times. Ask them to check each other's' ice and describe it to each other. (solid, liquid)
T: Why did our ice change into water? Can anyone explain?
Students respond.

Bring out the thermometer from the ice bag.
T: What is the temperature for ice? Is it below the freezing point? Let's check. Ask a student to read the temperature, and ask another student to write it down on the white board. Ask another student to read the temperature of the room. Write it down as well.
T: Which temperature is colder/higher?
Students respond.
T: Right, our room temperature is higher than the freezing point. So at this temperature, ice melts into water. Ice changes into water because it takes up heat energy from the room. So, is the state of water now solid or liquid?
Show Ppt. 1-6a for students to respond.
(Ppt 6b) Review the three states of water by asking students to complete the following sentences:
Ice is_____.
Water is_____.
Steam is_____.

T: (Ppt. 1-7) Now let's check the properties of water. How does it look, feel, smell, sound, and taste?
Display a chart similar to the one below. Repeat similar questions for checking ice. Lead students to summarize the comparison of water in solid vs. liquid.
<table>
<tr><th colspan="2">What's the Matter? Water</th></tr>
<tr><th>Solid</th><th>Liquid</th></tr>
<tr><td>Ice
Below 32°F
Has a shape
Cold</td><td>Water
Above 32°F
Has no shape
Cold or warm</td></tr>
</table>
Teach students the following chant, using call and response. (Students repeat each line after the teacher.)
Ice is solid.
Solid has shape.
</td></tr>
</table>

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	Temperature below 32 degrees, *Water freezes into ice.* *It is solid again.* *Water is liquid.* *Liquid has no shape.* *Temperature above 32 degrees,* *Ice becomes water.* *It is liquid again.* Repeat the chant several times. As students are doing the chant for the last time, model and collect the water in each student's cup into a glass or plastic container to be used for the next day. **Literacy Activity**: Distribute **Worksheet 1a** from the Engagement segment of this lesson**.** (Students will complete the second column.) Depending on your students' ability levels, instruct them to: • Write the word only in each box of column 2. • Write sentences using the word "water," such as: o Water is liquid. o Liquid has no shape. o The temperature is above 32°F. • If time allows, students may draw a picture for one of the responses on a separate sheet of paper. They can then present their picture to classmates in small groups. Closing routine: • Do the chant one more time. • Do the goodbye routine/song.
Explanation ● *Students explain their understanding of concepts and processes.* ● *New concepts and skills are introduced as conceptual clarity and cohesion are sought.*	**How does water change from liquid to gas?** **Note: This segment requires a demonstration of boiling water with a hot plate or other heating source**. **Before beginning this activity, review with the students the necessary safety precautions for this activity.** Opening Routine: Ask calendar-related questions. Read the temperature and record it on the class calendar. Bring out the Snowman, prompt students to tell Snowman what they observed and learned yesterday. T: *Now we can tell Snowman why/when he will melt into water.* Students explain to Snowman that when temperature is higher than 32°F, it will cause him to melt. They will also explain the characteristics of water in each state. They advise Snowman of the best temperature for him to stay solid.

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Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	Ask Snowman if he wants to stay and watch a new experiment in which water changes into another state. Snowman refuses and decides to go back to ice. Pass Snowman around to say goodbye to everyone. The last student puts Snowman back. T: (Show the container of water collected from the students in the previous segment.) *What do we have here? What state is it called?* (Ask a few questions about the properties of liquid.) Students respond. T: *Would you like to see another experiment? Do you want to see liquid change into something else?* Students respond. Transfer the water to a beaker or heatproof glass container. Set up the hot plate or other heating source to heat the glass container. T: *Watch carefully. When the water is boiling, it will bubble. When the temperature is above 212°F, the bubbles rise, and become steam. Can you tell me when the water boils? Tell me when you see bubbles and steam, OK?* T: *The water is very hot. Do you see steam? See, steam looks white in the air. Do you see steam in the air? Does it look white?* Students respond. T: *Steam is gas. We know water is liquid and ice is solid. Steam is another state of water. This state is called gas. Tell your partner what you see now.* Students respond to each other. T: *Very good! It's gas. Steam is in the state of gas. Air is in the state of gas. So what does water change into?* Students respond. T: **(Ppt. 1-6)** *Excellent! So water changes into ice, ice changes into water, and water changes into gas. I will write that on the chart.* T: *What is boiling point for water? It is the temperature when water changes from liquid to gas.* Place a thermometer into the water. Read the temperature. T: *It's 212 °F. (100°C) So the boiling point for water is 212°F. (100°C) Does anyone remember the freezing point when water changes into ice?* Ss: *32°F (0°C)* Write this down or invite a student to do so. T: *Great. Let's observe some more magic.* T: *When water boils, it becomes water vapor/ steam/ gas. Do you see it?* Students respond. T: *Let's see if steam/gas is water. I have a plastic jar here. Let's collect the steam*

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	in here. Can anyone predict what will happen next? What will you see? Students respond. Collect the steam in the jar or pot and seal it. Wait a few seconds and show students. By now they should see some water. The lid of the pot will also have water drops. T: *What do you see now?* S: Students respond. T: *What just happened now? What is the state of water now?* Students respond. T: *Why did gas change into water? What's the temperature in the room now?* Facilitate student responses, relating their responses to the temperature of boiling water and the room temperature. Distribute a baggie to each student. T: *Let's try to blow air into the bag. I will open it and blow.* (Hold the open bag in front of your mouth and breathe into the bag. Then quickly seal it to keep the air inside). *I will close it tightly so air won't come out.* T: *Ready to do it just like I did? Here we go.* T: *Can you see what's in there now? Is it gas or ice?* S: *Gas.* T: *That's right. Gas fills the bag. And there is water vapor in the bag, too. That's why the bag looks puffy. Air is gas, water vapor is gas in the air, and air fills up the space in there.* *T: Let's try to touch some air! S*tretch your arms in the air and direct students to do the same. T: *You can't feel it. Air is everywhere! But we can see the water vapor in the air turn into liquid in the sandwich bag.* **(Ppt. 1-8)** In a similar way, ask a series of questions about the properties of gas. After students discuss the properties of gas, add a new verse to the chant: *Ice is solid.* *Solid has shape.* *Temperature below 32 degrees,* *Water freezes into ice.* *It is solid again.* *Water is liquid.* *Liquid has no shape.* *Temperature above 32 degrees,* *Ice becomes water.* *It is liquid again.* *Steam is gas.* *Steam has no shape.*

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	Temperature above 212 degrees, *Water becomes gas.* Literacy Activity: Distribute **Worksheet 1a** from the previous segment of this lesson**.** (Students will complete the third column.) Depending on your students' ability levels, instruct them to: • Write the word only in each box of column 3. • Write sentences using the word "gas," such as: o Gas is steam. o Steam has no shape. o The temperature is above212°F. • If time allows, students may draw a picture for one of the responses on a separate sheet of paper. They can then present their picture to classmates in small groups. Closing routine: • Do the chant one more time. • Do the goodbye routine/song.
Elaboration *Activities allow students to apply concepts in contexts, and build on or extend understanding and skill.*	**Summarize the three states of water and their properties.** Before class begins, set up three stations. • Label each station with a large sign: SOLID, LIQUID, or GAS. • Place the props at each station. (a bowl of ice for SOLID, a container of water for LIQUID, and the hot plate or other heat source with a beaker or glass heatproof container with water in it for GAS.) **Note: Before beginning this activity, review with the students the safety precautions necessary for the GAS station. Stay near this station to supervise.** Opening Routine: • Ask calendar-related questions. • Read the temperature and record it on the class calendar. • Invite students to practice the entire chant and to write key words: *ice, water*, *gas* on the board. Do this a few times to allow more students to demonstrate their writing. Bring back Snowman. T: *Hello Snowman! Welcome back to our classroom today!* (To students) *Snowman is back. Let's say "Welcome" to Snowman!* Everyone: *Welcome, Snowman*. *How are you, Snowman*? T: *Snowman, we want you to know we're getting ready for a big performance for you. So we will see you tomorrow.* Class says goodbye to Snowman.

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What's the Matter with Ice Cream

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	T: *Today we will prepare for our big performance. You will visit three stations. One is the solid station, another is the liquid station, and another is the gas station. Each group will go to every station. At the stations, you will take notes on this work* **Worksheet 1b**, *and will fill out the answers on the worksheet as you go through all of the stations.* (Model how to do this.) *After you have finished the worksheet, we will talk about tomorrow's presentation for Snowman.* Model what to observe and instruct students to complete the worksheet as they go through the stations. After all groups have completed this activity, instruct them to work in their small groups and peer-edit their findings. Check for accuracy, neatness, and completeness of the worksheets. T: *Let's see what you discovered.* • *When water is frozen, what does it become?* • *What is the freezing point when water to turn from liquid to solid?* • *Based on what you see at the station, what are the properties of water in its solid state? Its liquid state? Its gas state?* T: *So, let's talk about our performance tomorrow for Snowman. We're not just going to tell him about one of the three states of water, we will be acting it out also. Pretend that you are a solid, a liquid, or a gas. How would you act that out?* Practice one of the states with the students. T: *Your group will need to practice all three states, because you don't know which one you will perform until tomorrow! I'm going to give you a chance right now to practice. Find your group partners and decide what you will say and do tomorrow to help Snowman understand the three states of water.* Assist groups as needed. Remind students that they can refer to **Worksheet 1b** if needed. After sufficient practice time has elapsed, bring students together as a whole class. T: *The class will also perform the chant for Snowman tomorrow. Let's practice our chant!* Lead students in practicing the chant. *Closing: Do the chant again. Say goodbye to one another.*
Evaluation *Students assess their knowledge, skills and abilities. Activities permit evaluation of student development and lesson effectiveness.*	**Preparation and Presentation** Place various pictures of the three states of water in the front of the class. (These can be enlarged from **Ppt. 1-6**.) Instruct students to sit with their group. Give each group one of the states that they will perform. Remind them that they need to talk about what they learned as well as act it out and use the appropriate pictures in the front of the room. They can refer to **Worksheet 1b**, if needed, but they cannot use it during the presentation. Allow a few minutes for the groups to practice their presentation. Bring out Snowman. Instruct students to say hello to Snowman and ask how he

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What's the Matter with Ice Cream

Key Elements	Lesson 1 – *The Magic of Water* Duration: 30 minutes
	feels. Call each group to the front of the room one at a time to perform. After all groups have presented, instruct the whole class to perform the chant to Snowman. Closing: Snowman will tell students how well they have done. Snowman tells the class that he will return to a cold place, and that he will miss them. The class and Snowman say goodbye to one another.

Teacher Reflection: Lesson 1- *The Magic of Water*	
What worked well?	
What did not work well?	
What would I do differently?	
Other comments or notes	

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What's the Matter with Ice Cream

Lesson 2 – *The Three States of Matter and Their Properties*
(Title in target Language)

Lesson 2 of 5	Duration: 30 Minutes
Objectives	***I Can:*** **Oral language:** Ask and answer simple questions about three states of matter and their properties. **Literacy:** Read and write words describing properties of each state of matter. **STEM and Other Subject Areas:** Recognize three states of matter and their properties.
Vocabulary and Expressions	**Content obligatory language:** • *matter* • *texture* • *property* • *rigid* • *size* • *bendable* • *space* • *hard* • *volume* • *soft* • *shape* • *flow* • *mass* **Content compatible language :** • *describe* • *stuff* • *everywhere* • *ounce* • *own* • *pound*
Materials/ Resources	• PowerPoint presentation - Lesson 2 • Permission slip for ice cream activity • video camera (optional) • Snowman from Lesson 1 • chart paper to record student observations • a clear glass or cup • a bottle of colored water • a clear flat container, such as a pie plate • index cards or sentence strips of the properties of liquids and gases (**Ppt. 2-10**) • pocket chart • a platform scale or balance (for weighing small objects) • a bath scale (for weighing the students) • objects of various sizes such as a beach ball, a building block, a stuffed animal, and a toy car (to demonstrate rigidity and texture) • visuals of solids, liquids, and gases • Worksheet 2a – *I Can Write!* • Worksheet 2b – *Matter in a Solid State and Its Properties*

	• Worksheet 2c – *Matter in a Liquid State and Its Properties* • Worksheet 2d – *Matter in a Gas State and Its Properties*
Lesson Storyline and Core Text	In Lesson 1, students learned how water changes its state due to temperature change. Building upon water as an example, students continue to explore the concept of matter and various properties associated with the states of solid, liquid, or gas. Core Text: *What is matter? What is matter?* *Matter is everything,* *Matter has mass.* *Matter takes up space.* *Matter makes up all things.* *Matter can be in three states: solid, liquid, or gas.* *Matter has basic properties: volume, mass, and shape.* *Shape is the form of matter: its look.* *Volume is the amount of space that matter takes up: its size.* *Mass is the amount of matter an object has: its weight.* *Solids have a definite shape and volume.* *Solids take up space and have mass.* *Liquids do not have a definite shape,* *Liquids flow and take the shape of their container.* *Liquids have a definite volume.* *Liquids take up space and have mass.* *Gases do not have their own shape or size.* *Gases take the shape of their container.* *Gases can fill up the room.* *Gases take up space and have mass.*

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
Engagement ● *Object, event or question used to engage students.* ● *Connections facilitated between what students know and can do*	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**. **Complete the permission slips with your signature and the due date. Distribute at the end of the lesson.** **What is matter?** Opening Routine: Review the calendar by asking students for the day of the week and the date. Talk about the weather. (temperature) Prompt students to talk about Snowman, then review water, its three states,

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	and their properties. T: *Water has three states: solid, liquid, and gas.* T: (**Ppt. 2-1a**, teacher looks confused.) *Is water matter?* T: *Matter…that's a new word. What is matter?* Students respond. T: (**Ppt. 2-1b**) *This says: Matter is everything around you, including people. Do you think it means: "Everything is made of matter"?* Students respond. T: (Point to or hold up several objects, one at a time, and test the statement.)*This object is here. Is it matter?* Students respond. T: *Student's name is here. Is he/she matter?* Students respond. Use more objects and students as examples to deepen students' understanding about matter. T: (**Ppt.2-2**) *Let's find out more about matter.* Invite students to read the slide together. *Matter takes up space. Matter has volume or size.* T: W*hat is volume? Volume is the amount of space that matter takes up. Let's find out what that means.* T: (moving hands around) *Space is around us.* T: (Hold up a glass/cup, turning and touching it.) *Does this glass take up space?* Pass the glass for students to touch and determine that it takes up a space. T: (Ask student A to sit on a chair. Then ask the class,) *Can I ask student B to sit on the same chair?* Students respond. T: *Why not?* Students respond. T: *Right, because student A takes up the space on that chair, so student B can't sit there.* Illustrate more examples of *taking up space* until students understand it. T: (Direct two other students to stand side by side separated with space between them. Ask them, *Can you make more space between you?* (The students demonstrate this.) *Can you stand closer to each other? Now you have less space between you.* Divide the class into pairs, and have them demonstrate more or less space. Bring out two objects and think out loud. For example, T: *I have two ____here. Which one takes up more space?* (Point to the larger object.) *Does this one take up more space?* Students respond.

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	T: *Yes, you're right. This one takes up more space; it is bigger. So we say this matter has more volume. Tell me which object has more volume? Which one has less volume?* Repeat this procedure several times, each time using two different objects of different sizes. Divide students into pairs and instruct them to find their own examples of objects that take up space and decide which one has more volume and which one has less volume. Ask several student volunteers to present their findings. For example: *This is a pencil. The pencil is matter; it takes up space. It has less volume. This is a marker. The marker is matter; it takes up more space. It has more volume.* Instruct students to form a single line. Lead them in a march around the classroom as you point to an object and recite the chant: *Matter takes up space. Matter has mass. Matter has volume.* **Literacy Activity**: Distribute **Worksheet 2a** and guide students to complete each section. In Part 1, they should write only *volume* and *mass.* (*Matter* will be written in the Exploration segment of Lesson 2.) Depending on your students' ability levels, instruct them to: • Part 1: Write each word three times in the boxes. • Part 2: Check the boxes to practice *more volume and less mass.* • Write sentences using the words *volume, mass.* Closing: Do the closing routine. As students walk out, lead them in reciting the matter chant: *Matter takes up space. Matter has mass. Matter has volume.*
Exploration ● *Objects and phenomena are explored.* ● *Hands-on activities, with guidance.*	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**. **Properties of Matter** Opening routine: Review the calendar by asking students for the day of the week and the date. Review the vocabulary that has been learned about matter so far. Invite a few students to pick up examples of matter and do the chant together. T: (**Ppt. 2-2**) *What did we learn yesterday? Yes, we learned that matter takes up space. Matter has volume or size. Volume is called a property of matter. Let's discover the other two properties of matter.* T: *Recite with me: "Matter has shape. Mass has volume. Matter has mass." What does it mean? Can anyone tell me?* Students respond.

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What's the Matter with Ice Cream

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	Bring out the platform scale or balance. **Note:** There is a scientific way to measure mass, but the goal of this lesson is to connect the concept of mass to something children are able to understand. T: (Place an object on the scale.) *Let's see how much matter there is in this object. How much does it weigh?* Invite a student to read the scale. T: *It weighs ___ ounces/pounds.* Divide students into pairs and ask each pair to select an object to measure. Each pair will come up to weigh and record the weight of their object on the whiteboard. At the end, the class can infer which objects have the most mass, which have the least; or rank the objects by mass. T: *Who would like to find out the mass in their body?* Call on volunteer students to weigh themselves and tell their weight. (Be sensitive to children who may have weight problems.) T: (After each student tells their weight, hold up a different object for each volunteer.) *Do you think you have more mass or less mass than this object?* Using objects in the classroom or visuals, ask students to identify if the object has a definite shape. Make sure to show solids, liquids and gases. (More details about liquids and gases will be introduced in later in Lesson 2.) T: *Matter can have shape, but some matter does not have a definite shape.* T: (**Ppt. 2-3**) *Let's review what we know about matter. Let's read this together.* (**Ppt. 2-4**) Use the tune of *Oh My Darling, Clementine* to teach the Matter song. *What is matter? What is matter?* *Matter is all around and everything.* *Matter has mass and* *Matter takes up space.* *Matter makes up just everything.* **Literacy Activity**: Direct students' attention to **Worksheet 2a**, and guide them to practice writing *matter* in the third column of Part 1. Depending on your students' ability levels, instruct them to: • Part 1: Write *matter* three times in the boxes. • Part 2: On the back of the worksheet, invite students to draw their own examples of pairs of objects that illustrate *more matter* and *less matter.* • Write sentences using the word *matter.* Closing: Sing the Matter song again. Say goodbye to everyone.
Explanation ● *Students explain their*	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**.

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
understanding of concepts and processes. ● *New concepts and skills are introduced as conceptual clarity and cohesion are sought.*	**The Three States of Matter: Solid, Liquid, and Gas** Opening Routine: Review the day of the week, the date, and the temperature. Record it on the class calendar. Using **Ppt. 2-3,** facilitate student review: *Matter has basic properties: volume, mass, and shape.* *Shape is the form of matter: how it looks.* *Volume is the amount of space that matter takes up: its size.* *Mass is the amount of matter an object has: its weight.* T: *Now we know matter is all around us. Everything is made up of matter. Can anyone tell me how many states matter has?* Students respond. Point to the appropriate visuals on the slide as you ask, *Can matter be solid? Can matter be liquid? Can matter be gas?* (**Ppt. 2-4**) Sing the Matter Song with the students. T: *Matter can be in three states: solid, liquid, or gas.* T: (**Ppt. 2-5**) *Now let's find out about the solid state. Let's play a memory game. What does the slide say? (Lead students to read the text.)* Ask comprehension check questions to review the concepts. T: **(Ppt. 2-6)** *Solids have definite shape and volume. Solids take up space and have mass. Which of these objects is a solid?* Use several real objects to introduce and practice the properties of matter. For example, give a beach ball to a student and ask, • *Does it take up space?* • *What is its size? Is it large or small?* • *Does it have a definite shape?* • *Does it smell?* • *Does it have texture? Is it hard or soft?* • *Is it rigid or bendable? (*Display **Ppt. 2-7** to explain rigid/bendable.) • *Can we measure it?* • *What is its color?* **Literacy Activity**: Distribute **Worksheet 2b -** *Matter in a Solid State and its Properties* • Read the directions. • Model by drawing one picture on the board and asking students the questions on the worksheet about its properties. • Instruct students to draw their three pictures of solids in the boxes. • After a few minutes, pair the students. Have them take turns asking each

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	other about their drawings using the questions in the first column, and instruct them to record their partner's responses under each picture. • Summarize the activity by asking one or two volunteers to display their worksheet on the document camera and review it with the class. T: **(Ppt. 2-6)** *Let's look at these objects. As I point to them say, "That is a solid!" or "That is not a solid!"* Extension: If there is time, Use **Ppt. 2-7 & 2-8** to reinforce *rigid/bendable.* Closing routine: • (**Ppt. 2-9)** Review the properties of solids. • Preview the next lesson by asking, *Today we learned about solids. What other states of matter do we need to explore next?* (Remind them by asking what happens to ice when it melts.)
Elaboration ● *Activities allow students to apply concepts in contexts, and build on or extend understanding and skill.*	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**. **Liquids and Gases** Do the opening routine, calendar, and temperature of the day. Talk about the weather and if it will rain or snow. T: *In our last class, we discovered some of the properties of a solid.* Hold up several objects and review solids and their properties. T: *Is ice a solid? What happens to ice when it melts?* Students respond. *T: Right! It becomes a liquid. Think about the properties of solids that we learned in our last class. Do you think a liquid has the same properties? Does it have a shape? Does it have a texture?* (Ask about the other properties learned yesterday.) Pick up a clear, empty glass and the bottle of colored water. T: *Look at this bottle of (color) water and this glass. Do the bottle and the glass have the same shape?* Students respond. T: (Tilt the bottle back and forth.) *Does the water have the same shape as the bottle?* Students respond. T: *I'm going to show you a very special property of liquids that is new to us. We say that liquids* ***flow.*** T: *Watch what happens when I pour water from the bottle into the glass.* (Pour the water into the glass.) *As you can see, the water flows into the glass. What happened to the water? Does it have the same shape that it had in the bottle?*

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	Students respond. T: *So, the water changed its shape by taking the shape of its container, right?* Students respond. Hold up the glass pan. T: *What do you think will happen when the water flows into this glass pan?* Students respond. *Who would like to make the water flow from the glass into the pan? Class, let's tell (name) what to do. Repeat after me: "Flow, flow, make it flow."* T: *What happened to the water? Now what shape does the water have? Is it the shape of the bottle, or the pan, or the glass?* Students respond. T: *Did the amount of water change when it flowed into the glass or into the pan?* Students respond. T: *Right! The amount of water did not change; it stayed the same. The amount of liquid in a container is called* ***volume.*** T: (**Ppt. 2-10)** *So, we have new properties for liquids.* Chorally repeat: • *Liquids do not have a definite shape.* • *Liquids flow and take the shape of their container.* • *Liquids have a definite volume.* • *Liquids take up space and have mass.* T: **(Ppt. 2-11)** *Let's review the properties of a liquid with a partner.* • Model one example. Point to the glass of milk. Ask: • *Is this a solid or a liquid?* • *Does it have a definite shape?* • *Does it flow?* • *Does it take the shape of its container?* • *Does it have a definite volume?* • *Does it take up space and have mass?* Optional activity: • Distribute visuals of various solids and liquids to pairs of students. Instruct them to ask each other the questions on the slide. • A few minutes later: o T: *What did you decide? Who can tell us which is liquid?* o Call on volunteer students to show their visual to the class and ask them to provide reasoning by stating one property. Chorally repeat their responses. (Example: *Juice takes the shape of its container.*)

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What's the Matter with Ice Cream

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	Literacy Activity: • Write each sentence of the properties of liquids (from **Ppt. 2-10)** on a separate card for a pocket chart. • Place them in the pocket chart one at a time; reading it aloud and having students repeat it. • Review by reading through it one more time, inviting students to read with you. • Then read the strips in random order and invite five students to come to the chart and remove the strip that was repeated. • Continue until all strips have been removed. • Lead the students in choral repetition of the properties of liquids. As each sentence is repeated, have students with the corresponding strip return it to the chart. **Literacy Activity:** Distribute **Worksheet 2c -** *Matter in a Liquid State and its Properties* • Read the directions. • Model by drawing one picture on the board and asking students the questions on the worksheet about its properties. • Instruct students to draw their three pictures of liquids in the boxes. • After a few minutes, pair the students. Have them take turns asking each other about their drawings using the questions in the first column, and instruct them to record their partner's responses under each picture. • Summarize the activity by asking one or two volunteers to display their worksheet on the document camera and review it with the class. T: **(Ppt. 2-12)** *What do you remember about gases?* Ask the following questions and chorally repeat each answer after students respond. • *Do gases have their own size?* • *Do gases take the shape of their container?* • *Do gases have their own shape?* • *Do gases take up more space or less space than solids or liquids?* • *Do gases have mass?* **Literacy Activity:** • Write each sentence of the properties of gases (from **Ppt. 2-12)** on a separate card for a pocket chart. • Place them in the pocket chart one at a time; reading it aloud and having students repeat it. • Review by reading through it one more time, inviting students to read with you. • Then read the strips in random order and invite five students to come to the chart and remove the strip that was repeated. • Continue until all strips have been removed.

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	• Lead the students in choral repetition of the properties of gases. As each sentence is repeated, have students with the corresponding strip return it to the chart. **Literacy Activity:** Distribute **Worksheet 2d -** *Matter in a Gas State and its Properties* **NOTE: It is suggested that this worksheet be divided into two segments. For the first segment, students can draw their pictures and answer only the YES/NO questions. The remaining questions will be completed in the Evaluation segment of this lesson.** • Read the directions. • Model by drawing one picture on the board and asking students the questions on the worksheet about its properties. • Instruct students to draw their three pictures of gases in the boxes. • After a few minutes, pair the students. Have them take turns asking each other about their drawings using the questions in the first column, and instruct them to record their partner's responses under each picture. • Summarize the activity by asking one or two volunteers to display their worksheet on the document camera and review it with the class. Closing routine: Sing the Matter Song. Review the three states of matter.
Evaluation • *Students assess their knowledge, skills and abilities.*	**Review and Assessment** Opening: Do the opening routine, calendar, and temperature of the day. Review the properties of liquids. (Refer to **Worksheet 2c,** if necessary. Use **Worksheet 2d** to review the following YES/NO questions about the properties of a gas: • *Does it take up space?* • *Does it have a definite shape?* • *Does it smell?* • *Can we measure it?* Divide students into pairs and instruct them to work together and identify the remaining properties of gases on **Worksheet 2d**. • Have them take turns asking each other about their drawings using the questions in the first column, and instruct them to record their partner's responses under each picture. • Summarize the activity by asking one or two volunteers to display their worksheet on the document camera and review it with the class. (**Ppt. 2-13)** Invite pairs of students to identify the states and properties of water in each picture. Invite student pairs to talk about one picture from the slide.

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What's the Matter with Ice Cream

Key Elements	Lesson 2 – *The Three States of Matter and Their Properties* Duration: 30 Minutes
	(Ppt. 2-14) Divide students into groups of three. • Instruct the groups to select one of the numbers on the slide. • Instruct students to answer the questions about properties. One student in each group is responsible for each state. (You may want to display the questions from **Worksheet 2d** for reference.) However, do not allow them to use their worksheets. • Encourage the students to be creative and use gestures to portray the states. • Help the groups that need more assistance. • Each group will identify and present their examples of a solid, a liquid, and a gas. **NOTE: Before students leave, distribute the permission slips for the ice cream activity in Lesson 4. Explain to the students about the importance of returning the permission slip ahead of time, and that you would like their help in providing some of the ingredients and materials needed.** **SUGGESTIONS FOR ASSESSMENT:** • **Consider videotaping the presentations so that students can document their CanDo statements at a later time.** • **To assess listening, show various objects or visuals of objects and ask students to point to a solid, liquid, or gas.**

Teacher Reflection: Lesson 2 – *The Three States of Matter and Their Properties*	
What worked well?	
What did not work well?	
What would I do differently?	
Other comments or notes	

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Lesson 3 – Temperature Can Cause Matter to Change Its State
(Title in Target Language)

<table>
<tr><td colspan="2">Lesson 3 of 5 Duration: 30 Minutes</td></tr>
<tr><td>Objectives</td><td>I can:
Oral language:
• Tell others how some matter changes its state because of temperature (heat energy) change.
Literacy:
• Write basic information about what kind of temperature (heat energy) causes a change in certain matter.
STEM and Other Subject Areas:
• Describe the change of state caused by temperature (heat energy).</td></tr>
<tr><td>Vocabulary and Expressions</td><td>Content obligatory language:
• heat
• energy
• ingredient
Content compatible language:
• hard
• soft
• wet
• dry
• gold
• mothballs (camphor)
• similar
• different
• pinwheel
• blow
• glass</td></tr>
<tr><td>Materials/ Resources</td><td>• PowerPoint presentation – Lesson 3
• video camera
• paper of various colors, cut into 4” squares
• pencils with erasers or straws (one per student)
• thumbtacks or pins(one per student)
• scissors (one pair per student)
• rulers (one per student)
• bag of chocolate chips
• hair dryer
• several pieces of gold jewelry or pieces that resemble gold
• mothballs (camphor)
• examples of glass
• safety glasses
• pinwheel (made of sturdy material for teacher use)
• Worksheet 3a – Making Pinwheels
• Worksheet 3b – Chocolate Melts in My Hands
• Worksheet 3c – Not All Matter Changes in the Same Way
• Worksheet 3d – My Storyboard: Temperature Can Change the State of</td></tr>
</table>

	Matter • directions for making paper pinwheels or windmills: http://frugalliving.about.com/od/frugalfun/ss/Pinwheel_3.htm • video for melting gold: http://www.youtube.com/watch?v=sbbgWPt3G1Y • video for melting glass: http://vimeo.com/30247302 • directions for making a mini-book: http://www.youtube.com/watch?v=21qi9ZcQVto
Lesson Storyline and Core Text	Having learned about the three states of matter, students continue to learn through some examples about how temperature (heat energy) can cause matter to change its state. Core Text: *What is gas?* *Does gas has its own size?* *Does gas has its own shape?* *Does gas has texture? Is it rough or soft?* *Does gas takes up the space?* *Can we break or bend gas?* *Can you tell why something melts?* *Are our hands warm?* *Why does chocolate melt in our hands?* *You will soon have a chance to be a scientist.* *You will show how matter changes its state,* *and the temperature that causes it to change.* *We will make a movie of your performance.* *Your movie will show how temperature will cause matter to change its state.*

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
Engagement ● Object, event or question used to engage students. ● Connections facilitated between what students know and can do	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context**. **Collect permission slips. Remind those students who have not returned their slips of the due date.** **Review properties and states of matter. Students will make pinwheels to experience gas in the air.** Opening routine: Practice calendar vocabulary and the weather. Review what students remember about the states and properties of matter. T: *Does anyone remember our song about matter* (Begin to sing): *What is matter, what is matter?*

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	Review the properties of solids, liquids, and gases, pointing out objects and asking about them. For example: *Does it have mass? Does it flow? Does it have a shape of its own? Does it take up space?* Have students find examples of solids, liquids, and gas in the room, and then justify their choice by stating one or more of its properties. Review the properties of liquids and gases using the sentence strips and the pocket chart from the previous lessons and/or **Ppt. 2.** T: (Show a pinwheel to arouse students' curiosity and interest.) *Class, does anyone know what this is called?* Students respond. T: *Is it a solid, a liquid, or a gas?* Students respond. T: *Can you tell me some of its properties? Does it smell? Can we touch it?* Expand questions to include other properties of matter. T: *What will happen to the pinwheel when we blow it? Do you think it will move?* Demonstrate. Walk around and give several students the opportunity to blow on the pinwheel. T: *What causes it to move?* Students might answer breath, wind, or air. T: *Right, it will move because our breath is air. When we blow, the air moves; and that makes the pinwheel move. Is air a gas, or a liquid, or a solid? Let's figure it out!* • *Does air have its own size?* • *Does air have its own shapes?* • *Does air take up space?* • *Can we break or bend air?* T: *So, air must be a…* (Wait for students to respond, *Gas.)* *Now, look this Pinwheel, when I blow the air (gas) harder. The harder I blow the air, the faster the pinwheel turns.* T: *Today, you are going to make you own pinwheel! Then you will conduct your own experiment and make your own pinwheel move.* **Literacy and Crafts Activity:** Have the following materials in a bin for each groups of students: • a 4"x4" square of construction paper • rulers • scissors • a hole punch • thumb tacks or pins

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	• pencils with erasers or straws • **Worksheet 3a** • **Ppt. 3-2 – 3-5** To make the pinwheel: • Distribute **Worksheet 3a** to each student. (These directions should also be displayed using **Ppt. 3-2 – 3.5** as you direct students through each of the steps. • Model each of the following steps: o Step 1: **(Ppt. 3-2)** Distribute one square of construction paper to each student. o Step 2: **(Ppt. 3-3)** ● Draw two diagonal lines that connect the opposite corners of the square. ● Mark the center of the square with a dot where the lines intersect. ● Punch a large hole in the dot using the tip of a pencil. ● Mark an additional dot on the right side of each line at each corner. ● Write *gas* and your name on two different sections of the pinwheel. o Step 3: **(Ppt. 3-4)** ● Cut on the lines toward the center of the square, but **not directly to the center hole**. ● Using a pin or thumbtack, instruct students to carefully punch a hole in each of the dots. o Step 4: **(Ppt. 3-5)** ● Line the dots on the outer edge of your pinwheel up with the hole in the center. ● Push a pin or thumbtack through the dots to hold everything together. ● Then, push the pin into the side of a pencil eraser, leaving space between the pin and the eraser. When the pinwheels have been assembled, allow students to demonstrate blowing on them to make them turn. Collect the pinwheels. Allow students to take **Worksheet 3a** home and encourage them to make a pinwheel at home. Remind students to return the permission slip for the ice cream activity. Closing routine.
Exploration ● Objects and phenomena are explored. ● Hands-on	**What matter around us will change its state when the air/temperature is hot or cold?** **NOTE: In preparation for this lesson, practice the hair dryer demonstration ahead of time. If the force of the air is too strong for the paper windmill,**

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
activities, with guidance.	**consider purchasing a sturdier windmill.** **NOTE: In this lesson, students will be given chocolate chips to eat. Determine before the class begins if any students have allergies the ingredients in chocolate chips.** Opening: Do the calendar and weather routines. Distribute the pinwheels. T: *Let's make our pinwheels turn.* Blow on your pinwheel, and allow time for students to do the same. T: *Is this pinwheel solid, liquid, or gas?* Students respond. T: *What happens when we blow air on the pinwheel?* Students respond. T: *What happens if we blow faster and faster and with more air?* Model and motion students to demonstrate this. T: *If we blow more air and blow faster, will the pinwheel turn into liquid or gas?* Students respond. T: (**Ppt. 3-6)** *How do you know?* (Bring out a hair dryer) *Let's find out.* Set the hair dryer to lowest speed and temperature first, then to faster speeds and higher temperatures. Tell students what temperature and speed you are using each time. Ask students to comment on what happens to the pinwheel by asking, *Does the windmill turn into a liquid or a gas?* Students respond. T: *So, now we know that higher temperature and more air will not turn the paper/pinwheel into liquid or gas.* Hold up a bag of chocolate chips. T: *I really like chocolate! How many of you like chocolate?* Pour a few pieces of chocolate out onto a shallow glass pan or plate. Then walk around the class showing the chocolate to everyone. T: *Look at the chocolate. Is the chocolate on this plate in a liquid, solid, or gas state?* Instruct students to place a piece of paper on their desks. As you distribute several pieces of chocolate to each student, say: *I'm going to give you each a few pieces of chocolate to put on your paper. Do not eat this chocolate right now. We are going to use it for some experiments.* T: *Remember when we blew on the pinwheel? What happened to it? Did it change its state?* Students respond. T: *What do you think will happen if we blow on the chocolate?* Students respond. T: *Let's try it!* Model blowing on the chocolate. T: *Did the chocolate change its state? I wonder what would happen if we used*

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	the hair dryer. Let's try it. Do you think the chocolate will change its state? Students respond. Use the hair dryer to heat the chocolate at various temperatures and speeds. At a higher temperature, the chocolate should melt. Hold it up for the students to see, and ask, *Did the chocolate change its state? What is its state now?* Students respond. T: *Let's try something else with our chocolate. Let's see if we can do the same thing without a hair dryer.* T: *I would like you to take one piece of the chocolate and place it in the palm of your hand. What do you think will happen to the chocolate after one minute? Will it stay a solid, or will it change into a liquid or a gas?* Instruct students to place a piece of chocolate in their hands. Set a timer for one minute. Students may rub the chocolate morsel between their hands. Note: Chocolate chips melt best at temperatures between 104°F and 113°F. The melting process starts at around 90°F (32.22°C) when the cocoa butter in the chocolate starts to heat. T: *Raise your hand and show us what happens to your chocolate.* T: *Tell us if it is still solid or if it has changed its state.* Students tell the class/each other what happened. T: *So tell us what happens to chocolate when we hold it in our hands?* Students respond. T: *Can you tell why it melts? Are our hands are warm or cold?* Students respond. T: So, *now we know chocolate melts in our hands. It takes the heat energy from our hands and starts to melt.* T: *Let's line up and wash our hands. When we come back, we'll write about our experiment with chocolate.* Students wash their hands. Distribute a few more chocolate chips to each student. Direct them to put one piece into their mouths but not to bite on it so that they can pay attention to what happens to the chocolate chip in their mouths. T: After one minute ask, *What is happening to the chocolate in your mouth?* Students respond. T: *So, do you think chocolate melts easily?* Students respond. T: *Yes, chocolate has a lower melting point. The companies that make them want them to melt in our mouths. Now you may eat the rest of your chocolates, but we will also write down what we've learned today.* Use the Language Experience Approach to lead students to write a story about what they did today with chocolate. Write the story on the board as you recite

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	each line. Ask the class to chorally repeat. Possible text may be: *Today we put chocolate chips in our hands.* *We rubbed on them to make them warm.* *The chocolate chips melted into our hand.* *They were solid before.* *They had a shape.* *When they melted, they didn't have a shape anymore.* *They became like liquid.* Invite students to make contributions to the writing on the board. After the story is finished, chorally repeat the story. Then, pair students and direct them to read together with their partner, taking turns reading each line. Distribute **Worksheet 3b** –*Chocolate Melts in My Hand.* Read the directions and model the first sentence. These will become their mini-books that can be exchanged with partners or in small groups, if time permits. Closing routine: • Review what happens to a pinwheel when air is blown on it. • Invite students to chorally repeat the story on **Worksheet 3b**.
Explanation ● Students explain their understanding of concepts and processes. ● New concepts and skills are introduced as conceptual clarity and cohesion are sought.	**Not All Matter Changes in the Same Way** Opening routine: Practice calendar vocabulary and the weather. Review what students remember about the states and properties of matter. Review what they learned yesterday. Play with and talk about the pinwheels. Invite a few students to read their own or their classmates' mini-books. T: *Today we will have some more fun with matter. You will be scientists as you record and compare different things. The big question for you to answer today is this:* ***Do different kinds of matter change in the same way?*** *By the end of the class, you should be able to answer this question*. Write down the question on the board. T: *As we discuss different kinds of matter, let's write down some key ideas.* T: *Now let's start with water. We learned about the state of water and its changes. Who remembers what we call water in its solid state?* T: *What is the melting point of ice? (32°F*) T: *What does ice become when it melts?* (water/liquid) T: *When water boils, what does it change into?* (gas) T: *What temperature can make water change into gas? (*212 °*F*) Write student responses on the board in a logical order as they answer each question. T: *How about chocolate? Does it melt in our hands and mouths?* T: *The melting point of chocolate is about 90°F.* (Write this on the board.) T: *Does anyone know what our normal body temperature is? Do you think it*

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	would need to be higher than 90°F? (You may wish to demonstrate this with a real thermometer.) Students respond 98.6°F. *(*37°C) Write the temperature on the board. T: *So, if the melting point of chocolate is about 90°F, which is higher – the melting point of chocolate or our normal body temperature?* Write the temperature on the board. T: *So which has the higher melting point, ice or chocolate?* Students respond. T: *But then what state do they change into?* Have students compare and discuss the changes of state between water and chocolate. Show students few pieces of gold or gold-like jewelry and ask students to identify what it is and its state. Ask students to predict what would happen to gold at a high temperature. Ask students to think about how high the temperature needs to be to melt gold. T: *Do you think it would be the same melting point as ice? As chocolate? Let's find out!* Show the video: http://www.youtube.com/watch?v=sbbgWPt3G1Y Suggestions for viewing the video: • Show the video in its entirety once. • Show it again and stop at various points and invite students to comment the state of gold, predict what temperature it might be, etc. **NOTE:** This video show what happens when scrap gold is melted and processed into a gold bar. Students might ask if gold would evaporate into gas. Scientists believe that if the temperature is really high, it will. However, it is not likely the temperature could reach that high under normal circumstances. Melting points of some metals and alloys are indicated in the table below: Gold, 24K Pure | 1063°F(573°C) | 1945°F(1063°C) Silver, Sterling | 893°F(478°C) | 1640°F(893°C) Source: http://www.engineeringtoolbox.com/melting-temperature-metals-d_860.html Another good example is glass. Follow similar procedures as used for showing and teaching about gold. Video: http://vimeo.com/30247302 This is a video made by Jam Factory in Adelaide, South Australia. Two drawings were selected from many collected from children at a Family Day held at the Studios and gallery. The video follows the design process, and the kids were present to watch their glass piece created.

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	Note: Glass has different melting points depending on the actual composition of the glass. Standard soda lime glass (the most common kind of glass) melts at about 2,700°F(1482°C), while silicon oxide has a glass melting point in excess of 4,200°F(2316°C) **(Ppt. 3-7)** Ask students questions that compare the melting points of chocolate, gold and glass. Closing Routine: Using the various temperatures that were written on the white board as clues, ask students what each temperature refers to. Have the class do a quick summary of what they learned today: water, chocolate, gold, and glass. Encourage them to talk about different states of these kinds of matter and how they change. Point to the big question at the beginning of the class: **Do different kinds of matter change in the same way?** Invite a few students to respond.
Elaboration ● Activities allow students to apply concepts in contexts, and build on or extend understanding and skill.	**Temperature can cause some kinds of matter to change their state. Not all matter has the same freezing or melting points. Not all matter goes through the states in the same order.** **Note: Mothballs (camphor) fumes can be very dangerous, especially to children. Be sure to handle them carefully and do not let children hold or handle them. Keep them safely secured when not in use.** Opening routine: Ask students what they learned yesterday; talk about the changes of state and the temperature points that cause the change. T: (**Ppt. 3-8)** *But, you know, not everything changes its state from solid to liquid. Bring out a sealed plastic bag of mothballs*. T: *This is a bag of mothballs. Many people use them in their drawers to keep the moths out of their clothes. I'm going to open the bag quickly and you can probably smell them right away!* (Open and close the bag just long enough for some fumes to escape.) T: *Did you smell that? Did you see the camphor in the air?* Students respond. T: *They smell because camphor balls change from solid to gas. What you smell is the gas state of camphor. At room temperature, camphor balls change from a solid state to a gas state.* (Optional): T: *I want to tell you a story my mother told me. When she was a little girl, her mother put all their winter clothes in a big trunk and she put mothballs between the coats and scarves and mittens, to keep the moths away. The next winter she opened the trunk to take out the clothes. She could smell*

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
	the mothballs, and she wanted to put them away to use again. But she looked and looked—under the coats, in the mittens, everywhere. But the mothballs were gone! Now that you know about mothballs, can you tell me what happened? Students respond. T: *What is the room temperature today? Let's write down the room temperature.* T: *Now let's divide into groups of four.* Students get into their groups. Distribute **Worksheet 3c.** T: *Each group will work on this worksheet about the temperatures that make different kinds of matter to change.* Model one example using the document camera. T: *Work with your partners to find the answers. Afterwards, we'll have some more fun.* Review the responses using a document camera. Instruct students to peer editing within each group. **NOTE: This worksheet may be modified into a mini-book that can easily be made from one sheet of plain paper. For directions on how to fold paper into a mini-book, view :** http://www.youtube.com/watch?v=21qi9ZcQVto **There will be eight pages in the mini-book. On the title page, students will write *How Matter Changes* by_____(name.) On the inside of the mini-book, each page will be devoted to one type of matter (water, chocolate, gold, glass, mothballs) with the same information that is on the worksheet (name of the matter, a picture, the melting or boiling point, and what it changes into.)** Share worksheets/mini-books and read them aloud. Ask students to practice reading as many books as possible because they will be asked to read for the class. Closing: Review by holding up visuals of chocolate, mothballs, water, gold, and glass and ask students to tell you what it changes into at different temperatures. Preview the next segment of this lesson by telling them that they will be asked to do a science video like the ones they watched during this lesson.
Evaluation ● Students assess their knowledge,	**Evaluate students' mastery of new vocabulary.** **Worksheet 3d and Ppt.** Do a quick review of this lesson. Conduct a Question and Answer session to assess students' comprehension and understanding.

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 3 Procedures - *What Causes Matter to Change Its State*
skills and abilities. Activities permit evaluation of student development and lesson effectiveness.	Interpretive and presentational assessment: Depending on the size of the class, students will select a book written by of their peers and read it to the entire class or to their small group. Interpersonal and presentational assessment: Divide the class into pairs. Distribute objects or pictures of gold, water, ice, gas, glass, chocolate, and moth balls. (Have enough objects or pictures so that each group has a different one.) T: *Our next project is for you to be the scientists who make videos like those we watched about gold and glass. In your video, you will explain to your audience about the matter you are showing. Show how this matter can change its state, and the temperature that causes it to change. Each pair will come up to select one kind of matter, either the real thing or a picture. Discuss with your partner what you want to show on the video, what to say, and how to do it. You will have some time to decide and plan your show.* Allow students sufficient time to discuss and prepare the presentations. Monitor students' use of the target language and redirect when necessary. Provide each pair of students with safety glasses before their performance to emphasize the importance of safety. **NOTE: Before students leave the classroom ensure that all permission slips for the ice cream activity have been submitted.**

Teacher Reflection: Lesson 3 – *Chemical Changes*	
What worked well?	
What did not work well?	
What would I do differently?	
Other comments or notes	

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

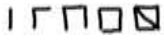
Lesson 4 – A Matter of Taste: Making Ice Cream
(Title in Target Language)

Lesson 4 of 5	Duration: 30 Minutes
Objectives	**NOTE: Throughout the lessons in this module, use choral repetition for the new vocabulary as you present it in context.** ***I Can:*** **Oral language:** • Tell others the basic ingredients for making ice cream. • Show and explain to others how to make ice cream without a machine. **Literacy:** • Recognize labels for basic ingredients of ice cream. • Write signs for ice cream. **STEM and Other Subject Areas:** • Explain why we need salt in making ice cream by hand. • Explain why we need to shake the bags when we make ice cream by hand.
Vocabulary and Expressions	**Content obligatory language:** • *milk* • *stir* • *salt* • *mix* • *sugar* • *shake* • *vanilla* • *cup* • *ice cream* • *tablespoon* • *semi-solid* • *teaspoon* **Content compatible language :** • *hard* • *large* • *soft* • *small* • *hot* • *like/don't like* • *cold* • *plastic bag* • *ingredient* • *fat*

Materials/Resources	• PowerPoint presentation – Lesson 4
	• students' videos from Lesson 3
	• donations requested from parents:
	  ○ plastic bowls one per student
	  ○ plastic spoons, one per student
	  ○ milk
	  ○ sugar
	  ○ vanilla extract
	  ○ ice cube trays

	• water • 1 instant-read thermometer (outdoor thermometer can be substituted) • rock salt • gloves (Students can bring their own winter gloves.) • clear bowl • measuring spoons • paper towels • **Worksheet 4a** – *I Can Write!* • **Worksheet 4b** – (Directions) *How to Make Ice Cream* • **Worksheet 4c** – (Literacy Activity) *How to Make Ice Cream*
Lesson Storyline and Core Text	**Students make ice cream and experiment how a liquid can be made into a solid. They will also learn that salt can lower temperature, which helps milk turn into ice cream.** Core Text: *Why do you say ice cream is solid?* *I like your explanations.* *Shall we learn more about ice cream?* *Do you want to know what we need to make ice cream?* *Or better yet, shall we make ice cream?* *We will learn what we need to make ice cream.* *Can you guess what we need?* *Do you think we need milk?* *How does it taste? Is this sugar?* *Have you smelled this before?* *It's called vanilla. Ice cream needs vanilla.* *I place the ice cubes in a jar.* *I pour the water to cover the ice.* *I place the thermometer in the jar.* *Then I read the temperature.* *Now I add the rock salt to the ice water.* *I stir it with a spoon,* *And I place the thermometer in again.* *Oh, my, the temperature is much lower now!* *Salt can make ice even colder!* *We love our own ice cream!*

Key Elements	Lesson 4 Procedures – *A Matter of Taste: Making Ice Cream*
Engagement ● *Object, event or question used to*	**Is ice cream solid, liquid, or gas?** **Collect permission slips. Students who have not returned them may not eat the ice cream.** **NOTE: Advise students to bring a pair of winter gloves for the Exploration**

Key Elements	Lesson 4 Procedures – *A Matter of Taste: Making Ice Cream*
engage students. ● *Connections facilitated between what students know and can do*	**segment of this lesson.** Opening routine: Review the calendar and temperature. **Review**: Quickly ask students what they learned in the previous lesson: • Discuss the pinwheel and the point that more gas may not change the state of solid into liquid or gas. • How temperature may cause some matter to change its state. • Different kinds of matter have different melting points; e.g., water, gold, gas. • Not all matter changes its state in the same way. (e.g., Mothballs/camphor changes their state from solid to gas.) **Note**: **Show selected student videos each day during this lesson as part of either the opening or closing activity. Students will feel rewarded that their performances are enjoyed by the audience. Keep these videos as part of the summative assessment evidence.** T: (Quickly review the **Ppt. Lesson 3**.) *During our last lesson, we learned about the melting points of some matter like gold, glass, and water. Would you like to know more about freezing points?* T: **(Ppt 4-1)** *What are some examples of things that are frozen?* T: **(Ppt 4-2)** *Ice cream! That's a great example. Do you think ice cream is solid, liquid, or gas?* Students respond. T: *Why do you say ice cream is a solid?* Guide students to use the properties of solids from Lesson 2. T: *Yes, the properties of ice cream are like a solid, but it is not really a solid. Do you think it is a liquid then?* T: *No? Why not?* Students respond. T: *Who thinks ice cream is a gas?* Students respond. Discuss. T: *Let's take a poll. Raise your hand if you think ice cream is a solid? A gas? A liquid? All of them?* Record the numbers of vote for each category. **Note**: This is an excellent opportunity to write down the number in a culturally authentic way. For example: ● in English:  ● in Chinese: 正 ● in Spanish:  T: *I like your explanations. Let's learn more about ice cream. We will find out if ice cream is solid, liquid, or gas, or maybe even all three states.*

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 4 Procedures – *A Matter of Taste: Making Ice Cream*
	T: *Has anyone ever made their own ice cream?* Students respond. T: *Does anyone know what we need to make ice cream? Or better yet, shall we make our own ice cream?* Students respond. T: *We will make our ice cream tomorrow. But today, we will learn what we need to make it.* **(Ppt. 4-3)** Use choral repetition and real items or visuals of the ingredients for ice cream. Used tiered questioning to practice in context, Examples: • *Is this ice cream?* • *Do you like ice cream?* • *Is this milk or sugar?* • *Do you like milk?* • *Is vanilla a solid, liquid, or gas?* **Literacy Activity**: • After students have had practice with the new vocabulary, distribute **Worksheet 4a** for writing practice. Students may complete the first two words. **NOTE: This worksheet may be completed in the Exploration segment.** • Students may draw pictures in the last column. Closing routine. **NOTE: Remind students to bring a pair of winter gloves for the Exploration segment of this lesson.**
Exploration ● *Objects and phenomena are explored.* ● *Hands-on activities, with guidance.*	**What We Need to Make Ice Cream** Opening routine. Review the calendar and temperature. T: (**Ppt 4-2)** *Can you guess what we need?* Use the real items, **Ppt.4-3**, or visuals to review what students learned yesterday about the ingredients in ice cream. T: (Show a container of milk) *Do you think we need milk?* S: Students respond. T: *Right, we need milk, or sometimes cream.* T: (Hold up the sugar.) *Do you think we need sugar?* Pass out small plastic spoons for each student. Pass sugar around. Encourage students to taste a little bit by using their plastic spoon. T: *How does it taste? Is it sweet?* Students respond. T: S*ugar will make the ice cream sweet. But it will taste even better if we use another ingredient.*

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

<table>
<tr><th>Key Elements</th><th>Lesson 4 Procedures – A Matter of Taste: Making Ice Cream</th></tr>
<tr><td></td><td>
T: (Hold up the bottle of vanilla extract.) Do you know what this is?
Students respond.

Open a bottle of vanilla extract and invite student to smell it.
T: Have you smelled this before? It's called vanilla. Vanilla makes things taste good and smell good. So, it will make the ice cream taste better.
Note: Vanilla has alcohol that acts as antifreeze.

T: (Display Ppt. 4-3: milk, sugar, and vanilla extract) So what do have so far?
Students respond.
Write these three ingredients on the board.
Also ask students to talk about the state of these ingredients. Write their responses next to each ingredient as students respond.
<table>
<tr><th>Ingredient</th><th>State</th></tr>
<tr><td>milk</td><td>liquid</td></tr>
<tr><td>sugar</td><td>solid</td></tr>
<tr><td>vanilla</td><td>liquid</td></tr>
</table>
Display Ppt. 4-4: ingredients for ice cream

1/2 cup milk
1 tablespoon sugar
1/4 teaspoon vanilla

T: Now we have the ingredients. Let's put them together.
Show cup, tablespoon and teaspoon. Direct the students to chorally repeat the measurements while you measure them and place in a clear bowl or larger measuring cup. Stir the ingredients with a spoon.
These are the ingredients for ice cream. So…Does it look like ice cream?
Students respond.
T: What is the state of this mixture—solid, liquid, gas?
Students respond.
What do we need to do to make it ice cream?
Students respond.
T: If we freeze this mixture will we get ice cream?
S: Students respond.
T: Who says No? Why? Don't we need to freeze it to make it solid?
S: Students respond.
T: Shall we find out?
Students respond.
T: What should we do? I think we should experiment with it. What do you think?
Students respond.
T: Let's put the mixture into this ice cube tray. Later I'll put it in the freezer of our
</td></tr>
</table>

WORLD LANGUAGE-STEM MODULE COVERSHEET
What's the Matter with Ice Cream

Key Elements	Lesson 4 Procedures – *A Matter of Taste: Making Ice Cream*
	cafeteria. Tomorrow we'll find out if we have ice cream. Let's predict again if the mixture will become ice cream. Take a Yes/No vote. Invite a student to count, and another student to record the results on the board. **Literacy Activity:** Instruct students to complete **Worksheet 4a.** Do the closing routine. Review the new vocabulary. Optional: Review the Matter song from previous lessons.
Explanation ● Students explain their understanding of concepts and processes. ● New concepts and skills are introduced as conceptual clarity and cohesion are sought.	**Did it turn to ice cream? What else is needed?** Opening routine: Review the calendar and temperature. Hold up the ice cube tray from previous segment containing the ice cream mixture. Remove the cubes. T: C*lass, look what I have in my hand! I just took it out of the freezer.* T: *Is it Ice cream? What do you think?* (Tap surface with a spoon) Students respond. T: *Is this solid or liquid?* Students respond. T: *But ice cream is not as solid like this*, r*ight? So what can we say about ice cream? Is it pure solid? We call it* ***semi-solid****.* ***Semi*** *means half.* T: *But the problem is, how can we make ice cream if we can't freeze it directly? Sometimes we use an ice cream maker, but we don't have one here. How can we make ice cream? Let's find a recipe that teaches us how to make it.* Display **Worksheet 4b.** Read the ingredients, acting surprised. T: *Oh, fantastic! It says we can make it without an ice cream maker. Do you believe it? Shall we try the recipe?* Distribute, **Worksheet 4b.** Divide the class into pairs. Ask each pair to read the ingredients in the recipe. T: *Class, do you think we have everything it says?* Work with the class to identify everything they need. T: *So far we have milk, sugar, and vanilla. But it says we also need…* Hold up the ingredients/materials on the table and chorally repeat: • rock salt • 2 small freezer bags • 1 large freezer bag • ice cubes • paper towels **Students learn the function of rock salt in taking away heat energy and lowering down temperature.**

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	T: *Why do we need salt? Isn't ice cream sweet? Let me read again.* T: (Read the instructions of the recipe aloud.) *Fill the large bag half full of ice, and add the rock salt. Close the bag, squeezing out the air. Shake it to make sure ice is covered with salt.* T: *Oh, now I remember. When I was a student in science class, my teacher told us salt will lower the temperature of ice. Let's find out how that works.* T: *Repeat after me, and do the actions with me.* • *First, I place the ice cubes in the bowl.* • *I pour in water to cover the ice cubes.* • *Next, I place the thermometer in the bowl.* • *Then I wait 30 seconds.* (Set a timer.) • *I read the temperature and write it down.* Invite a student to read the temperature aloud, and another to record the temperature on the board. T. *Here is the next step.* • *I add the rock salt to the water and stir with a spoon.* • *I place the thermometer in the water.* • *I wait 30 seconds* • *I read the temperature and write it down.* Before Inviting a student to read the temperature, have students to predict whether it will be higher or lower. For example, T: *Who can predict what will happen to the temperature of the water?* *Will it be higher* (gesture a thumbs up) *or lower?* (gesture a thumbs down) *If you think it will be higher, say, "I predict it will be higher," and point your thumbs up.* *If you predict it will be lower, say, "I predict it will be lower," and point your thumb down. Ready?* T: *Now, I need a volunteer to look at the temperature. Let's see which prediction is correct.* After reading and recording the temperature: T: *What did we find out? Did the salt make the ice water warmer or colder?* Students respond. T: *Yes, salt makes ice water even colder. Let's talk more about this tomorrow.* *Now, let's just review what we did in the experiment. Let's tell the salt story with actions:* *I place the ice cubes in the bowl.* *I pour in water to cover the ice cubes.* *I place the thermometer in the bowl.* *I wait 30 seconds.*

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	I read the temperature and write it down. *I add the rock salt to the water and stir with a spoon.* *I place the thermometer in the water.* *I wait 30 seconds.* *I read the temperature and write it down.* *Oh, my, the temperature is much lower now!* *Salt can make ice even colder!* *Repeat a few times.* **Literacy Activity**: If time permits, invite students to create a mini-book *How to Make Ice Cream.* On each page, they will write the name of the ingredient and illustrate what happens with the ingredient in each step of the process. For directions on how to fold paper into a mini-book, view : http://www.youtube.com/watch?v=21qi9ZcQVto Closing routine: T: *What did we learn today? Did we learn about the ingredients for making ice cream? What are they? Are you ready to making ice cream?* Students respond. T: *Yes, we'll make it tomorrow. You need to remember what ingredients we need so you can make it.* Closing routine. **NOTE: Remind students to bring a pair of winter gloves tomorrow for handling the bag of ice.**
Elaboration Activities allow students to apply concepts in contexts, and build on or extend understanding and skill.	**Notes about preparation for this activity:** • If feasible, it is helpful to enlist a parent or fellow teacher to help out during this class period. The process may be chaotic and messy, so classroom management is critical. • Divide the class into small groups in tables. • Prepare the following ingredients/equipment for each table: ○ individual containers of milk, sugar, vanilla, and rock ○ a bag of ice that contains 3 cups for each student in the group ○ a one-cup measuring cup, a tablespoon, and a teaspoon ○ 2 quart-size and 1 gallon-size bags for each student ○ a spoon and a bowl for each student ○ paper towels Do the opening routine. T: *Yesterday, we did an experiment. Who remembers what we did?* Students respond. T: *We put salt onto ice cubes and water. What happened? How did the temperature change?*

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	Students respond T: *Let's tell the salt story with actions again.* Repeat the series with the students, with actions. T: *Are you ready to make ice cream? Let me model one time for you because it could be messy if you don't follow the instructions.* Display **Ppt 4-7.** Read the steps one by one, following the procedures to make ice cream. As you model each step, direct students to pantomime each step. Reinforce the ingredients and measurements using choral repetition as you demonstrate each step. T: (Step 1) *How much ice and rock salt do I need?* Fill the large bag half full of ice, and add the rock salt. Close the bag, squeezing out the air. Shake it to make sure the ice is covered with salt. T: (Step 2) *How much milk, vanilla, and sugar do I need?* Put milk, vanilla, and sugar into the small bag, squeezing out the air. Place this bag in another small bag. Close tightly, squeezing out the air. Mix the ingredients. T: (Step 3) *Now I will place the ingredients into the bag of ice.* Place the small bag inside the large one, and close the large bag again carefully, squeezing out the air. T: (Step 4) *Let the magic begin! What do you think will happen?* Shake the bag until the mixture turns into ice cream, which takes about five to eight minutes. You may wish to invite students to shake the bag also. During this time period, you may wish to chorally repeat the ingredients and the steps again. T: (Step 5) *I can't wait to taste it!* Open the big bag. Take out the doubled small bag. Open the inside small bag and scoop the ice cream into a bowl. Taste the ice cream. T: *Mm, it's yummy. Are you ready to make your own ice cream?* Divide the class into pairs. Tell students to review **Worksheet 4b,** and call up pairs of students to get the materials. Having a container with the ingredients/materials ready for each group will help to expedite this step. (See **Notes about preparation for this activity** at the beginning of this segment of the lesson.) Before they begin, remind students to: • Measure the ingredients carefully. • Squeeze out as much air as possible when they seal the bags. This will help keep the bags from opening.

Key Elements	Lesson 4 Procedures – *A Matter of Taste: Making Ice Cream*
	• Wear their gloves because the bag will get very cold. After five to eight minutes: T: *Now let's stop! Look at the milk and sugar in your small bag. What does it look like now? Does it feel like ice cream? What state is it?* Students respond. T: *Let's open it and try it! How is it? Be careful to wipe the small bag clean, otherwise it will be very salty!* *T: Can you tell me how the ice cream tastes? Is it (delicious/not delicious, hard/soft/sweet /salty/just right?)* Do closing routine as students eat their ice cream.
Evaluation ● Students assess their knowledge, skills and abilities. Activities permit evaluation of student development and lesson effectiveness.	**Students reflect upon their experiences with making ice cream.** **Opening Routine.** T: *Hello everyone! Did you like the ice cream we made yesterday?* Students respond. T: *What were the ingredients?* Students respond. T: *Let's talk about the state of each of these ingredients. What was the state of milk/sugar/vanilla?* Students respond. T: (**Ppt 4-8)** *So we changed a liquid to a solid. But as we said, ice cream is not really solid. Did you know that there are many types of milk? Fat and other things are in milk, so not everything freezes. Some of them may still be in liquid form.* T: *Can you guess which type of milk will make the creamiest ice cream?* Students respond. T: *Right, the non-fat or low-fat milk will taste most like ice instead of ice cream. Milk with high fat or cream may taste the best. That's why we say we can't have too much ice cream because it is fattening.* T: *Why do you think we need to shake the bag to make ice cream? Think about how we changed different states of matter.* Examples: ice (solid) to water (liquid) to steam (gas) Students respond. T: *It's because when we shake it, gas is folded into the ice cream. That's why the milk mixture did not freeze into one big ice crystal. Instead, the gas keeps ice crystals separate. That is why ice cream is smooth. We say that ice cream is semi-solid because it actually has some liquid and gas in it.* T: *Can we answer the question if ice cream is solid, liquid, or gas?* Students respond. T: *Let's answer together. Ice cream is semi-solid. It is mostly solid, but it has some liquid and gas, too.*

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	T: Oh, w*e also used a secret ingredient, what was that?* Students respond. T: *What did salt do when we made ice cream?* Students respond: *It helped to lower the temperature, so we didn't need to use a freezer.* **Literacy Activity:** T: Distribute **Worksheet 4c.** *Wow, are we ready to teach other people how to make ice cream?* Students may work individually or with partners to complete the activity. Do closing routine.

Teacher Reflection: Lesson 4 – *A Matter of Taste: Make Ice Cream*	
What worked well?	
What did not work well?	
What would I do differently?	
Other comments or notes	

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Lesson 5 – Assessment
This is the Matter With Ice Cream

Lesson 5 of 5	Duration: 30 Minutes
Objectives	**I Can:** Oral language: • Explain what matter is. • Give one or two examples about the properties of matter in solid, liquid, and gas form. • Give examples from daily life that show how temperature can change the state of matter. • Show and teach others the basic ingredients of ice cream. • Show and teach others how to make ice cream without an ice cream maker. **Literacy:** • Write and use the terms solid, liquid, and gas. • Recognize and write the ingredients in ice cream. **STEM and Other Subject Areas:** • Give examples of freezing or melting points of water (or some other form of matter.) • Give examples of how temperature can change the states of matter.

Materials/Resources	• PowerPoint presentation - Lesson 5
	• video camera
	• samples of:
	  ○ sugar
	  ○ milk or half & half
	  ○ vanilla extract
	  ○ rock salt
	  ○ quart-size freezer bags
	  ○ gallon-size freezer bags
	• ice cubes
	• measuring spoons and cups
	• clear bowl
	• **Worksheet 5a** – *The Three States of Matter* (2 per page)
	• **Worksheet 5b** – *My Ice Cream Experiments*
	• **Teacher Resource 5c** – Suggested Rubric

Review	Preparation: Use **Ppt.5-1** to help students review.

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Assessment Tasks

Interpretive Task: **The State of Matter**
Cut **Worksheet** 5a in half. Distribute one half-sheet to each student. T: *Today you will show what you have learned about matter and its states. First, I will read a story about various things, and I would like you to check if these things are solids, liquids, or gases. Ready?* Read each item below two times each. 1. *I am cold and hard.* 2. *I am in the air and have no definite shape.* 3. *I change my shape to fit my container.* 4. *I become this when water is boiled to 212 °F.(100°C)* 5. *I am sometimes large or sometimes small, but I have a definite shape.* 6. *First I am a solid, but when my temperature reaches 32°F(0°C), this is what I become.* **NOTE:** Use a document camera to model one example. If needed, consider using a limited amount of gestures to assist students with the meaning of the statements as you repeat them.

Presentational Task ***I Can Make Ice Cream* Video**

T: Now you will have a chance to show what you learned about one of our favorite things – ice cream! You are going to be the star of a cooking show!
Distribute **Worksheet 5b**. *But first, the director has some questions for you.*
Instruct students will complete the worksheet independently.
 	
T: Now, let's get ready for your video.
• Divide students into groups of four.
• In their small groups, instruct students to compare their notes on **Worksheet 5b**.
• You may wish to display the following directions and read aloud:
  ○ Each student must play a part in the show.
  ○ There will not be enough time to measure the ingredients and perform the steps exactly like you did in Lesson 4, but you can use the props and/or pictures of the ingredients to demonstrate the steps.
  ○ Be sure to show what you know about the states of matter and their properties. (For example: *The ice and the salt are solid. They are hard and have shape. They will change the milk from liquid to solid.)*
  ○ Be creative by using expressions and gestures.
 	
Record the presentations. Use a rubric to score each student individually. Refer to **Teacher Resource 5c** for a suggested rubric.
 	
After the presentations:
• Replay the presentations as time allows.
• Distribute completed rubrics to each student. Discuss the CanDo statements and ask students which ones were accomplished.

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Teacher Reflection: Lesson 5 – *This is the Matter With ice Cream*	
What worked well?	
What did not work well?	
What would I do differently?	
Other comments or notes	