

Strand: States of Matter and Density 6.2.1 and 6.2.2

6.2.1 Develop models to show that molecules are made of different kinds, proportions and quantities of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).

Standard 6.2.2 Develop a model to predict the effect of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).

Emphasis: States of Matter and Density

Anticipated Time Required (assuming 50 minute class periods): 10

Dominant CCC:

Proportion and quantity-time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Models can be used to represent systems and their interactions.

Dominant SEP:

Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.

Solids, liquids, and gases are made of molecules or inert atoms that are moving about relative to each other. Widely spaced (gas), closely spaced (liquid), or vibrating in place (solid)

The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.

The term “heat” as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that energy.

Management Strategies to support equitable access to content:

Small groups or partner work, multi-level ability groups, and reteaching when necessary.

Shopping list:

Root beer (enough for your class to have floats)

Vanilla ice cream (enough for your class to have floats)

30 clear plastic cups

30 spoons

Hot pot

Gum drop candies (5-6 bags)

Toothpicks

Food coloring

Clear plastic containers (15 - larger enough to hold a half gallon or more of water)

Empty water bottles (30)

Balloons (60)

Pie pans (15-18 depending upon class size)

Fun size snickers

Fun size kit kats

Fun size milky ways

Fun size 3 musketeers

Fun size m-ms

30 pint jars

Variety of objects for density jars: bolts, nails, screws, rocks, cereals, styrofoam, sweedish fish, nuts (metal), bouncy balls, etc.

Sharpies (just black ones, about 10)

Fabric measuring tapes (enough for 15)

Olive oil

Ice cube tray

Storyline- States of Matter - VanCouwenberghe

<p>Anchor Phenomenon: What is happening to the molecules in the ice cream as it melts? (What I want kids to answer.)</p> <p>When I add ice cream to my root beer, the ice cream starts to melt. If the ice cream is melted, is it still ice cream?</p>		
<p>Standards:</p> <p>6.2.1 Develop models to show that molecules are made of different kinds, proportions and quantities of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>		
<p>Dominant DCI</p> <p>Develop and use a model to describe phenomena.</p> <p>Construct an explanation using models or representations.</p>	<p>Dominant CCC</p> <p>Proportion and quantity-time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.</p> <p>Cause and effect relationships may be used to predict phenomena in natural or designed systems.</p> <p>Models can be used to represent systems and their interactions.</p>	<p>Dominant SEP</p> <p>Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.</p> <p>Solids, liquids, and gases are made of molecules or inert atoms that are moving about relative to each other. Widely spaced (gas), closely spaced (liquid), or vibrating in place (solid)</p> <p>The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.</p> <p>The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or</p>

			molecules within a substance) and the transfer of that energy.
Resources:	<p><u>What is the world made of? : all about solids, liquids, and gases</u> by Zoehfeld, Kathleen Weidner.</p> <p><u>Joe-Joe the wizard brews up solids, liquids, and gases</u> by Braun, Eric</p> <p>https://www.youtube.com/watch?v=ZqjR2PFvA28 SubZero Ice Cream Science</p> <p>http://www.ptable.com/ Interactive Period Table</p> <p>https://www.brainpop.com/science/matterandchemistry/stat esofmatter/ States of Matter Brainpop</p>		

Science Experiences

CCC/SEP	What are students doing? (This should match your SEP)	What specific understandings should students get from this experience? (What pieces of the performance expectation does the experience provide?)	New questions students have to propel us to the next science experience	Assessment
Using models to understand and ask questions.	<p>Root Beer Float observations: Students will be making observations of the root beer floats they were given. They will be drawing a model and labeling the parts of the float with the different observations that they make about each part. They also will be making a list of questions they have about their root beer float.</p> <p>Gas Demonstration: http://www.giftofcuriosity.com/states-matter-</p>	Matter has three states: solid, liquid, and gas.	<ul style="list-style-type: none"> • What makes the substances in the RBF different? • Why are some substances solid (or liquid or gas)? 	<p>Model of float in science notebook observations made questions listed</p> <p>Model of a float have each part and observations about each part the model, student should have a</p>

	<p>dancing-raisins-experiment/</p>			<p>questions that have about the beer floats that their learning.</p>
<p>Construct an explanation based on a teacher demonstration.</p>	<p>Boiling ice cubes: Students will watch a demonstration of me placing ice cubes into a hot pot. They will watch the ice cubes heat up and melt. When the water starts to boil, they will watch the water turn into steam and evaporate. We will run this demonstration until there is no water left in the hot pot. Students will be prompted after each state change to explain what is happening to the molecules in the different states.</p>	<p>Adding energy changed the substance (water). During a phase change, the arrangement of atoms don't change; each molecule still has the same atoms.</p>	<p>If adding heat doesn't change the composition of the molecules, how does it affect the molecules?</p>	<p>Students will create a table in their notebook and fill out the properties of matter. Illustration to represent the molecular movement in each state of matter. Students will also draw and label why the ice cubes melt from a solid to a liquid, why the ice cubes freeze from a liquid to a solid. They will show that the molecules found in water change when the phase change.</p>
<p>Develop a model to represent molecules.</p>	<p>GumDrop Molecules: Students will be using gumdrops and toothpicks to build models of molecules found in their root beer floats. They will also be drawing these models in their notebooks using zoom-in boxes so that they will have up close pictures of the different parts of their root beer floats.</p>	<p>Matter is made of molecules. Molecules have individual components called atoms.</p> <p>Water molecules are made of two hydrogen atoms and one oxygen atom, oxygen is made of two oxygen atoms, and carbon dioxide is made of one carbon atom and two oxygen atoms.</p>	<p>How are the molecules in the ice cream changing as it melts into the root beer?</p>	<p>Students will build a model of oxygen, carbon and water using drops.</p>
<p>Develop and use a model to show particles in motion in water.</p>	<p>Food Coloring in Water: Students will be creating a model that demonstrates that when food coloring is dropped into water, it</p>	<p>Water is made of particles that are constantly in motion. Particles in warm water move faster than particles in cold</p>	<p>What happens to a substance if the molecules are moving faster? How does the movement of molecules</p>	<p>Models drawn in experiment in notebook. A small</p>

<p>Develop and use a model, construct an explanation (with teacher help), cause and effect of thermal energy on particles</p>	<p>mixes into the water without human help. They will be dropping food coloring into hot water, warm water, and cold water. They will be drawing a model of each experiment in their notebook and using a timer to time the distribution of the food coloring throughout the water.</p> <p>Note to teacher: Do not have ice in your cold water. It will alter the experiment and not give you the results that you desire.</p> <p>Background: Having ice in the water causes the food coloring to mix faster. The ice floats, but as it melts, the more dense cold water sinks to the bottom taking the food coloring with it.</p> <p>Water Bottle Experiment: With assistance, students will be setting up an experiment using a water bottle, balloon, and two pans of different temperature water. Students will be making observations on what happens to the balloon when the bottle is placed in the pan of cold water. Students will then be making observations on what happens when the bottle is placed in hot water. http://www.daviddarling.info/childrens_encyclopedias/heat_Chapter1.html</p>	<p>water but the particles do not change.</p>	<p>affect the substance?</p>	<p>drawn and labeled in their notebook containing the food coloring. Takes for the food coloring to mix water at different temperatures. Temperatures of water will also be recorded. They will also, quickly assess motion of the molecules in ice cream as it melts. This will be recorded in the notebook.</p>
		<p>Thermal energy increases particle movement and causes expansion. When thermal energy decreases, particle movement will decrease and will contract.</p>		<p>Experiment and observations in notebook. Student will design new models of beer float in the science notebook. In this model, they need to include structure of the molecules in the beer float, how molecules change heat energy is (being specific that the molecules made of the same atoms but the same and show how molecules have different out and are more</p>

				<p>Students will then compare this model to the original model they drew on the day of class. They note what changes have made to the model as the experience has progressed.</p> <p>They could be added to their model of the phenomenon (RBI weather); by now their models have been revised to include</p> <ul style="list-style-type: none"> • Composition • Specific heat (6.2.1) • Effects of thermal energy on molecular density (6.2.2)
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Storyline - Density - VanCouverberghe

<p>Anchor Phenomenon: Why do some objects sink in water while other objects float? (What I want them to answer.)</p> <p>Joseph likes to play in the water. Last night he dropped a rubber ducky into the bathtub and his bottle of shampoo. The duck floated on the surface of the water, but the bottle of the shampoo sunk to the bottom of the bathtub. Why did this happen?</p> <p>Standards:</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>		
<p>Dominant DCI</p>	<p>Dominant CCC</p>	<p>Dominant SEP</p>

<p>Develop and use a model to describe phenomena.</p> <p>Construct an explanation using models or representations.</p>	<p>Proportion and quantity-time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.</p> <p>Cause and effect relationships may be used to predict phenomena in natural or designed systems.</p> <p>Models can be used to represent systems and their interactions.</p>	<p>Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.</p> <p>Solids, liquids, and gases are made of molecules or inert atoms that are moving about relative to each other. Widely spaced (gas), closely spaced (liquid), or vibrating in place (solid)</p> <p>The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.</p> <p>The term “heat” as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that energy.</p>
<p>Resources:</p>	<p>https://www.youtube.com/watch?v=JsoE4F2Pb20 Drum Crush</p> <p>https://www.youtube.com/watch?v=xg5NiOwf_Zw Can Crush</p> <p>https://www.youtube.com/watch?v=Zz95_VvTxZM Railroad Car Vacuum</p>	

Science Experiences

CCC/SEP	What are students doing? (This should match your SEP)	What specific understandings should students get from this experience? (What pieces of the performance expectation does the experience provide?)	New questions students have to propel us to the next science experience	Assessment
<p>Construct an explanation as to why some objects float in water while others sink.</p>	<p>Review molecule movement in different states of matter.</p> <p>Candy Bar Experiment: Students will get mini candy bars of the following varieties: Kit Kat, Milky Way, 3 Musketeers, Snickers, and M-Ms. They will conduct an experiment where they determine which of the candy bars will sink, and which ones will float. They will make a prediction, run the experiment and record the results, and then develop an explanation as to why certain candy bars float and why others sink.</p>	<p>Some things float in water and some things sink in water.</p>	<p>What makes some things float and other things think in water?</p>	<p>Students will have a table to take home where they will have to test 5 home objects to see whether they sink or float with predictions made about each one. They will also have to explain each object.</p> <p>Notebook table with their candy bar experiment results and explanations.</p>
<p>CCC: Cause and effect SEP: Developing and using models</p>	<p>Reading: Students read short article to learn how arrangement of molecules affects a substance's density. They create an explanatory model showing the arrangements of molecules in the candy bars they tested during the previous learning episode (or for the objects they tested at home?)</p> <p>http://www.shonscience.com/unit-1-earth-as-a-system2/does-the-shape-size-or-temperature-of-matter-affect-its-density</p>	<p>When molecules are packed more closely, a substance is more dense. If a substance is more dense than water, it will sink in water (and if it is less dense than water, it will float).</p>	<p>What happens when two liquids with different densities put together?</p>	<p>Explanatory models; models could include zoom-in boxes to show the arrangement of molecules; molecules in substances that sank should be closer together than the molecules in the water (molecules in water should be packed more closely than substances that floated).</p>
<p>Develop a model that shows the different densities of liquids.</p>	<p>Layered Liquids In A Jar: Students will create their own layered experiment showing the different densities of liquids and objects in</p>	<p>Each object in our jars have different densities. By creating a layered liquid jar, students will have to think about the way the</p>		<p>A finished layered jar with written explanations of why their objects are sinking</p>

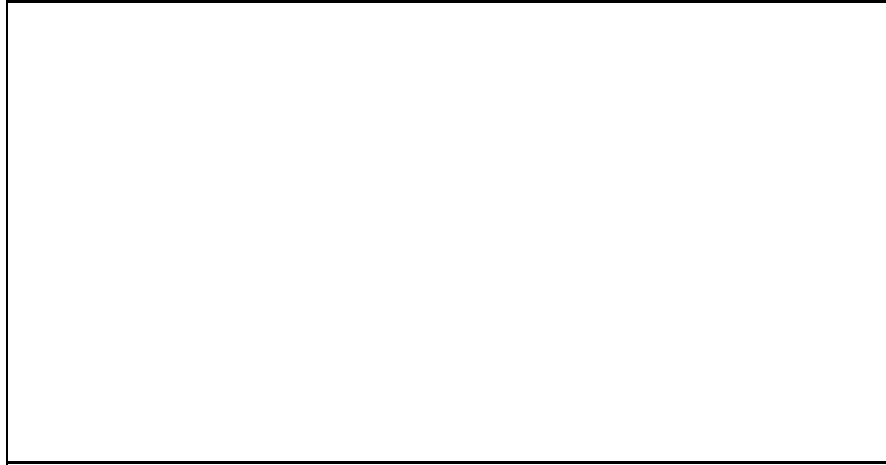
Construct an explanation as to why a balloon would shrink when you freeze it.

those liquids. A bolt is more dense than all of the liquids in the jar, while the piece of styrofoam is less dense than every other object in the jar. (I would expect students to explain how the molecules may look in the objects they put in their jars.)



molecules are arranged in their objects and have an understanding of why that arrangement would make them sink or float. Also, they need to consider the relative densities of substances. A candybar that sank in water during the first lesson might float in a different liquid.

or floating is the assessment. (This will be used as a summative assessment for density.)

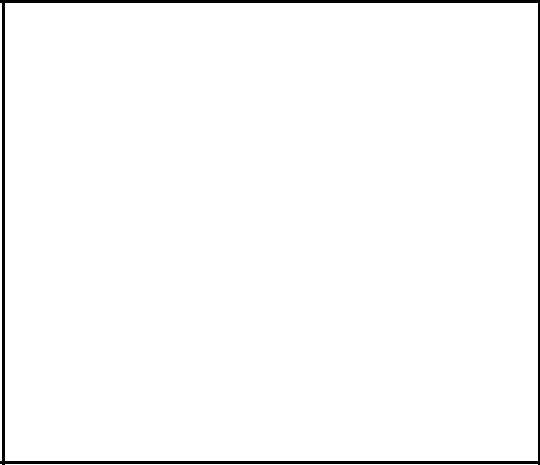


Freezing a Balloon: Students will be placed in small groups. Each group will blow up a balloon and take measurements on that balloon. The balloon will be placed inside the freezer for 10 minutes. They will then measure the balloon straight out of the freezer.

We are removing thermal energy from the gas inside the balloon when the balloon is frozen. The gas molecules slow down and move closer together, causing the balloon to shrink.

<https://gdsites.graniteschools.org/departments/instructionalservices/curriculum/science/Pages/default.aspx?RootFolder=%2fdepartments%2finstructionalservices%2fcurriculum%2fscience%2fDocuments%2f6th%20->

Measurement data and model of experiment in notebook.



<p>Construct an explanation as to why ice floats. Obtain and communicate information on why ice floating is important.</p>	<p>Ice Water Observation:</p> <p>First, students will observe a teacher led experiment. Teacher will demonstrate what happens to colored water when it is added to different temperatures of water in clear containers. Students will then use that observation to create an explanation on what happened when the colored water was added to each different temperature of water.</p> <p>Students will have a glass of ice water set in front of them. From their previous knowledge, they are going to construct a written explanation as to why ice floats on top of the water.</p> <p>Students will then have a discussion, led in the classroom, as to why ice floating is important on lakes and ponds in the winter.</p>	<p>https://gsdsites.graniteschools.org/departments/instructionalservices/curriculum/science/Pages/default.aspx?RootFolder=%2fdepartments%2finstructionalservices%2fcurriculum%2fscience%2fDocuments%2f6th%20%208th%20Grade%20New%20Science%20Standards%20Resources%2f6th%20Grade%20Lessons%2fStrand%206%2e2%20-erCTID=%7b78026A67-6C5555A8F11C%7d</p>	<p>What makes water unique? (This is more of making a list type of activity to help with the next lesson.)</p>	<p>Students will record in their notebook their ice observations and an explanation as to why ice floats on water.</p>
<p>Construct and explain by making a brochure to describe water at the molecular level and explain why water is unique.</p>	<p>Students will create a brochure, using the information they have gained on water, to communicate why water is unique.</p>	<p>Water is made of one oxygen atom and two hydrogen atoms. It can be found in all three states (solid, liquid, gas) on Earth. Thermal energy causes water to change states. It also expands when frozen.</p>		<p>Completed brochure showing models of water molecules, it's three states of matter on Earth, and why it is unique.</p>

This makes ice less dense than water and allows ice to float on top of water in the winter.

<https://gsdsites.graniteschools.org/departments/instructionalservices/curriculum/science/Pages/default.aspx?RootFolder=%2fdepartments%2finstructionalservices%2fcurriculum%2fscience%2fDocuments%2f6th%20-%208th%20Grade%20New%20Science%20Standards%20Resources%2f6th%20Grade%20Lessons%2fStrand%206%2e2%20-%20Models%20of%20Matter&FolderCTID=%2f7b78026A67-6E6D-4EBF-BA26-6C5555A8F11C%7d>

6.2.2 States of Matter Storyline

Student Science Performance	
Topic: Matter Has Three States	Title: Root Beer Float Observations
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p> <p>Crosscutting Concepts: Systems and System Models, Energy and Matter</p> <p>Science and Engineering Practices: Using models to understand and ask questions.</p>	
<p>Lesson Performance Expectations: Students will understand that matter has three states: solid, liquid, and gas.</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: When I add ice cream to my root beer, the ice cream starts to melt. If the ice cream is melted, is it still ice cream?</i></p> <p><i>Gather: Students will each receive a root beer float. Before anyone in the class can enjoy their root beer float, students must make a model of the root beer float in their science journals. Each part of their root beer float needs to be labeled (for right now something as simple as ice cream, soda, cup, melted ice cream, etc.) and they must describe each part of the float with different scientific observations.</i></p> <p><i>As the students make observations, I want them to ask scientific questions about their root beer floats, having them really try to think like a scientist and ask questions that will help guide their understanding of the different parts of a root beer float.</i></p> <p><i>After the observations are done and before a class discussion on the states of matter take place, I would like to have the students watch a gas demonstration. In this demonstration the teacher will use ¼ cup of raisins in a clear glass and add sprite (or any other clear carbonated beverage) to the glass. The raisins, within second, should begin to dance for the class.</i></p> <p><i>The gas demonstration would lead to a class discussion on the states of matter using a representation of their model that is drawn on the board.</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>While students are making observations about their float, teachers should be walking around the room helping students at different tables make scientific observations. A good reminder for students is that since we have not used the sense of taste, their observations should not include anything that would suggest students have tasted their float. It is perfectly okay to have small groups of kids making observations together as long as every group member has a voice and is actively participating in the discussion.</p> <p>Students will be using the observations to model and labels the different parts of a root beer float. With my students, I always state that good scientists have good models so that others can see and understand their thinking.</p> <p>Teachers can also help guide their observations for each part.. “Did you notice if the ice cream is hot or cold? What is different about the soda and the ice cream? What are the bubbles at the top of the float? What is happening to the ice cream and why are we seeing it change in the float?”</p> <p>Teachers may also need to help students come up with questions about their float that will help lead them to further understanding of the states of matter.</p> <p>Questions specifically I want the students to come up</p>

Reason: Having the kids observe something that most of them are very familiar with and write down specific observations that they have about their float will hopefully guide them to a firm understanding of states of matter. Using a root beer float gives each child a picture of a clear solid, liquid, and gas working together. It also shows a change in state as the ice cream begins to melt. When all of their observations are made, I would also like them to ask questions about their root beer float in a scientific way and make a list of those questions somewhere on their notebook page.

Communicate: Once their observations are made and the gas demonstration is watched, students will start to have a discussion with the rest of the class on what they observed about their root beer float. This will be added to the model on the board. The teacher should lead the discussion and help students arrive to the conclusion that there are three states of matter. The three states of matter should be added to their drawing in a colored pencil or pen (ice cream - solid, soda - liquid, gas bubbles on top - gas).

with or think about: What makes the substances in the root beer float similar? What makes them different? Why are some substances solid? Liquid? Gas?

Using a representation of the models drawn in their notebooks, teachers will guide a discussion which will lead students to the understanding that matter appears in three states: solid, liquid, and gas. Do not allow them to erase or change any of their observations at this point. As a teacher, I would probably save a copy of this model under my smart board apps to use in further discussions.

Also, it is important to take a few notes about what they saw in the gas demonstration video. This would also be a good quick model for the kids to add to their notebooks. They wouldn't have to label it more than "Gas Demonstration - Dancing Raisins." This could easily be drawn together as a class with notes taken off to the side.

Once the students have finalized their labeling, make sure to really emphasize that all three components of their root beer float are states of matter. All of those things are matter.

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Model of root beer float drawn and labeled with their observations in their notebook. I would like this model to include the different layers of the root beer float (ice cream, soda, foam on top) and I would also like them to include gas bubbles they see in their cup as the carbonation rises and maybe even an increase in the amount of foam that rests at the top as the ice cream melts.

Questions about root beer float clearly written in their notebook.

Quick drawing of Dancing Raisins experiment.

With a colored pencil or pen, each part of the float labeled with their state of matter.

6.2.1 States of Matter Storyline

Student Science Performance	
Topic: Matter is Made of Molecules	Title: Gumdrop Molecules
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>6.2.1 Develop models to show that molecules are made of different kinds, <u>proportions and quantities</u> of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).</p> <p>Crosscutting Concept: System Models, Energy and Matter, Structure and Function Science and Engineering Practices: Developing and Using Models, Asking Questions and Defining Problems</p>	
<p>Lesson Performance Expectations: Students will understand that matter is made of molecules. Molecules have individual components called atoms.</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: What is matter made of?</i></p> <p><i>Gather: Students will be building models of molecules that make up water, carbon dioxide, and oxygen. They will use gum drops to represent each atom inside of a molecule.</i></p> <p><i>Reason: This will give students a visualization of how matter is made of molecules and each of those molecules is made of atoms.</i></p> <p><i>Communicate: Students will be creating models of molecules, and drawing examples of those molecules in their science notebooks to communicate an understanding that matter is made of molecules, and molecules are made of atoms.</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>To start, I would do a quick review of the lesson from yesterday. This would be as simple as drawing a quick ice cream float on the board and labeling the parts as solid, liquid, and gas. I would also reemphasize that all of these things are matter.</p> <p>Show the students a glass of water. Ask the students what is inside the glass? The students will say water. Ask them what state it is in? The students will say liquid. Final question, what is water?</p> <p>Here I would start with a quick discussion about how all matter is made of molecules. Each of these molecules have individual components called atoms. I would then actually tell the class that water is made of two hydrogen atoms and one oxygen atom.</p> <p>Green Gumdrop - Hydrogen White Gumdrop - Oxygen Red Gumdrop - Carbon</p> <p>With the materials on their desk, I would have them make, with me, a representation of what one molecule of water would look like. I would attach one green gumdrop to two white gumdrops using toothpicks. I would also probably show them a visual representation of the water molecule as found on google search. I would also tell them that water is an important ingredient found in their soda.</p> <p>I would have the kids leave their water molecule on</p>

their desk, and with their chromebook, I would have them google, "what is carbon dioxide made of?" I would also tell them that carbon dioxide is the "fizz" they had in their root beer floats yesterday. The search should show that carbon dioxide is made of one carbon atom and two oxygen atoms. We would review what color oxygen atoms are and then choose a color for the carbon atom (color does not matter so as long as it isn't the same as the hydrogen atom). Students would then build a model representation of the carbon dioxide atom.

Oxygen is a gas and is found all around us. I would then have them google oxygen molecule and build that model on their own. This would be a time to walk around and help those students who are struggling with this concept or even struggling with the computer. When they are done building, they should have three different models of molecules on their desk.

On a page in their science journals, I would have the students record the pictures of the models they build with labels for each molecules. Zoom in boxed would show the relationship between these models and the molecules that make them up. For example, students would draw a glass of water, and then draw a hand lense. Inside the hand lense, they would draw the different atoms that make up a molecule of water. This would show understanding that matter is made of molecules and molecules are made of atoms. I would probably drawn an example of this on the board, and then have students show a little creativity in coming up with their next two examples. (I would, of course, want to check in with all students to make sure their examples fit.

After the students have recorded the information in their journals, I would pose the question on ice cream, referring back to their root beer floats.

"When we started observations yesterday, we had ice cream that started out as a solid but slowly melted and turned into a liquid. Does the change from solid to liquid change the molecules in the ice cream?"

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

The assessment that I will use for this particular lesson will be their zoom in models in their science notebooks and their gumdrop molecules that they build for each example.

6.2.1 States of Matter Storyline

Student Science Performance	
Topic: States of Matter and Changing Molecules	Title: Boiling Ice
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>6.2.1 Develop models to show that molecules are made of different kinds, <u>proportions and quantities</u> of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>	
<p>Lesson Performance Expectations: Students will understand that adding heat doesn't change the composition of the molecules even though it may change the state of that molecule.</p> <p>Crosscutting Concept: System and System Models, Energy and Matter, Cause and Effect</p> <p>Science and Engineering Practices: Developing and Using Models, Asking Questions and Defining Problems, Constructing Explanations and Designing Solutions</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: When we started observations yesterday, we had ice cream that started out as a solid but slowly melted and turned into a liquid. Does the change from solid to liquid change the molecules in the ice cream?</i></p> <p><i>Gather: Students will watch a demonstration of ice being put into a hot pot, brought to a boil, and boiled until nothing is remaining in the hot pot.</i></p> <p><i>Reason: Students will see, from the demonstration, that the ice cube will go through the three states of matter. After each state change, we will discuss what the molecules in the ice cube look like. They will see, at the end of the demonstration, that nothing about the molecular makeup of the water changes. Then, we will watch a short video which shows what DOES change as substances change states. We will walk through the observation again talking about what happens during each state change.</i></p> <p><i>Communicate: During the observation and the explanation afterward, there will be lots of discussions about the changes that go on during a state change. The students will then take this information and try to make</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>Remind students of the question that we ended science with yesterday and begin with this phenomenon.</p> <p>Place ice into a hot pot, have the students tell you what state of matter the ice is. Ice is made of frozen water, so they should also be able to identify for you the atoms that make up a molecule of water.</p> <p>As the ice cubes begin to melt, have the students identify what state of matter the ice is changing into. As the ice melted, ask them what it is turning into. Ask them to identify, again, the molecules in the melted ice cube.</p> <p>As the water now begins to boil, you will have to point out to the class that steam is rising from the water. Hold a tin pie plate over the boiling water for a minute or so, and show the class what was collected on the tin. Ask the students what the steam was called? (They may or may not remember this from 4th grade science.) Condensation rises from the water as the water begins to evaporate. The evaporation is what is collected on the plate. The evaporation collected is water. Ask them</p>

a prediction about what does change if it's not the structure of the molecules. With their table, they will create this prediction and record it on the board. The class will create the table together, and then use the table to help them on a quick check assessment.

again what molecules make up water?

After the experiment is over, have the class discuss if the molecules found in ice, which we talked about when we first put them in the hot pot, changed after they melted, boiled, condensed, and evaporated? The answer from the class should be no, heat didn't change the molecules. If there are questions, go over the molecules that were discussed at each state of matter.

At this point, when it was decided that there was no molecular change, I would ask the kids to brainstorm with their table groups what might have changed about the molecules/atoms, since the heat didn't change their makeup but did change their state. Each group would make a prediction about what possible could have changed and write it on the whiteboard or smartboard.

Then I would have the students watch this video:
<https://www.brainpop.com/science/matterandchemistry/statesofmatter/>

(My school has a subscription to this website, but there are also great videos online. There is also a Bill Nye on states of matter.)

With my help, students would fill out a table that identifies the properties for each of the states of matter in their science notebook. Verbally walk through how the molecules in ice change as they walk through their boiling ice observations.

At this point, have them label a piece of paper with these three things: ice cube (solid), water (liquid), and condensation (gas). Have them describe in words and pictures what is happening to the molecules in each of those examples.

From here, go back to the phenomena. As an end to science class, have them tell two people what changes when ice cream melts? Then record the answer in their science journals.

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Table with properties of matter in their notebooks.
Ice Cube, Water, Condensation quick check.
Answer to phenomena question written in their notebook.

6.2.1 States of Matter Storyline

Student Science Performance	
Topic: Particles in Motion	Title: Food Coloring in Water
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>6.2.1 Develop models to show that molecules are made of different kinds, <u>proportions and quantities</u> of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p> <p>Crosscutting Concept: Energy and Matter, Energy and Matter</p> <p>Science and Engineering Practices: Developing and Carrying Out Investigations, Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information</p>	
<p>Lesson Performance Expectations: Students will understand that particles are constantly in motion. Particles in warm substances move faster than particles in cold substances.</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: How does the movement of molecules affect the substance?</i></p> <p><i>Gather: Students will be conducting their own experiments using food coloring and three cups of different temperature water (cold, warm, and hot). In each temperature of water, the students will be dropping a dropper of food coloring into each glass one at a time. They will observe what happens to the food coloring as it disperses and jot down small notes as they watch the experiment happen. They will time how long it takes for the food coloring to disperse throughout their glass of water and record that information in a data table in their science notebooks.</i></p> <p><i>Reason: The food coloring being dropped into different temperature water allows students to visibly see particles in the water moving at different rates. Doing this experiment will show that particles in warmer substances move faster than particles in colder water.</i></p> <p><i>Communicate: This will be a small group experiment with small group discussions. Students will need to communicate with each other what they see happening in each of the cups of water as the experiment is running, record the time it took for the food coloring to</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>Make sure each small group has the materials that they need to do the experiment. Remind students the importance of making sure that every cup hold the same amount of water and get the same amount of food coloring. The only difference in the cups should be the temperature.</p> <p>Help students set up a data table to show the different temperatures of water and the time it takes for the food coloring to disperse. (I would do this in a smart board app, and revisit with other timed experiments.)</p> <p>During the experiment, remind students to make observations in their notebook by noting things they see happening in the water. This is on top of timing the experiment.</p> <p>At the end of the experiment, check tables and help with table discussions to lead each table to the conclusion that particles move faster in warmer substances. (This is a pretty easy conclusion to make when the experiment is done correctly.)</p> <p>Follow up experiment with assessment referring back to the root beer float.</p>

disperse, and draw conclusions as to what is happening or being modeled in the experiment. Teacher communication will happen in these small groups, as well, as the teacher walks around to monitor and help guide discussions in the small group.

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Time table and model of experiment in notebook with written observations.

Assessment to hand in - students will be given a drawing of melting ice cream from their root beer float. They will need to show, with zoom in boxes, what is happening to the molecules in ice cream as they are melting. (This doesn't have to be the exact molecules in ice cream, molecules can be represented by a variable.) Once graded and returned, this should be glued or drawn into their science notebook to help them with later lessons on states of matter and/or density.

6.2.2 Density Storyline

Student Science Performance	
Topic: Density	Title: Freezing Balloons
Overarching Performance Expectations (Standard) from State Standards or NGSS: Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).	
Lesson Performance Expectations: Students will understand that density measures how closely particles are packed in matter. Crosscutting Concept: Energy and Matter Science and Engineering Practices: Developing and Carrying Out Investigations, Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information	
Students Will. . . To Construct Meaning <i>Engage with a Phenomenon: By removing thermal energy from the gas inside the balloon when the balloon is frozen, the gas molecules slow down and move closer together, causing the balloon to shrink.</i> <i>Gather: Students will first blow up their balloons and take measurements. Once they have this done and recorded, have them place the balloons in the freezer for 45 minutes to an hour. Once the time is up, have them retrieve their balloons and take another set of measurements.</i> <i>Reason: Students will be able to see a great example of how removing thermal energy from an object slows down the molecules and causes them to move closer together and shrinks the object.</i> <i>Communicate: Measurements will be collected in pairs or small groups twice. They will have to communicate with each other the best possible place to draw their lines for measurement. They also, after the experiment is over, will have to decide why their balloon shrunk when exposed to the cold.</i> <i>Once they have worked together to have a prediction, the class will have a discussion as to why the shrinkage occurred.</i>	Teacher Will. . . To Support Students Put students into small groups (partners would even work if you have the freezer space available). Have each group blow up a regular size balloon Have the students draw two lines on the balloon, they can pick the distance the two lines are from each other, but make sure they are at least a couple of inches. Have them take measurements, using a fabric tape measure, of the balloon around the middle, top, bottom, and the distance between the two lines. Record these measurements in their notebook. Once every group is ready to go, have each group place their balloons into the freezers at school. At my school, we don't have enough space, so I would do this in sets and have the students in the classroom working on something else while we complete this experiment. You could also do this experiment several times throughout the day so that all groups get the same experience. Each balloon group should be in the freezer for 45 minutes to an hour. When the time is up, have the students take their balloons out of the freezer and re-do all of their measurements. They should see a decrease in their measurements they took to begin the experiment. Have them record these measurements in their notebooks. Ask the students to write down why they think the balloons shrunk when put in the freezer.

After they have their prediction down, have a class discussion on their reasonings behind the shrinking of the balloon. If needed, prompt them with talk of molecule differences in solids, liquids, and gases. Use past experiences from their density lessons as well.

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Drawing of initial balloon measurements either in a data table or using a picture of the balloon. Give students the choice of which way they want to record the data, but make sure they do record it.

Drawing of final balloon measurements either using a data table or a picture of the balloon. (Think before and after pictures.)

Prediction as to why the balloon shrunk, followed by the key idea with the scientific reasons as to why the balloon shrunk in kid friendly form.

6.2.2 Density Storyline

Student Science Performance	
Topic: Layers of Different Densities	Title: Layered Liquids in a Jar
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>	
<p>Lesson Performance Expectations: Students will understand that Each object in our jars have different densities. By creating a layered liquid jar, students will have to think about the way the molecules are arranged in their objects and have an understanding of why that arrangement would make them sink or float.</p> <p>Also, they need to consider the relative densities of substances. A candybar that sank in water during the first lesson might float in a different liquid.</p> <p>Crosscutting Concept: Energy and Matter</p> <p>Science and Engineering Practices: Developing and Carrying Out Investigations, Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information</p>	
<p>Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: What happens when you put two objects (or more) of different densities together?</i></p> <p><i>Gather: Students will be using a variety of different objects to create a layered jar showing what happens when you mix objects of different densities together. They will build their jar with the different layers of objects/fluids, and then they will draw their completed jar in their science notebooks with written explanations as to why objects floated in water and others did not, or why they sunk in water, but floated in water....etc. I would suggest doing this experiment and reasoning with a partner.</i></p> <p><i>Reason: Students will use their knowledge of density to create a layered jar and explain why things are sinking/floating in their jar. This shows a true understanding of density.</i></p> <p><i>Communicate: Communication will be between partners as they put together their jars and develop explanations as to what is happening in their jars.</i></p>	<p>Teacher Will. . . To Support Students</p> <p>The most important aspect of today’s lesson is to be monitoring the class as they complete their jars to help them understand why things are sinking/floating and to help them construct an explanation for these things. It’s also important to monitor the pouring of liquids into their jars to prevent overfilling.</p> <p>Have a variety of objects available for the students to use in their jars: styrofoam, bolts, nails, candy bar pieces, cereal pieces, water, oil, balsamic vinegar, pennies, bouncy balls, corn syrup, etc.</p>
<p>Assessment of Student Learning</p> <p><i>Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.</i></p>	

Their finished jar with the different layers of floating/sinking objects is their assessment for today's experience. You could do a couple of different things for their notebooks: 1. You could have the students take a picture of their finished jars with their device and print them a colored copy of it. Then they could label and identify why objects sunk or floated in their jar, or 2. You could have them draw the whole jar with colored pencils and have them do the same labeling.

6.2.2 Density Storyline

Student Science Performance	
Topic: Density	Title: Building Background - Density
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>	
<p>Lesson Performance Expectations: Students will understand that density measures how closely particles are packed in matter.</p> <p>Crosscutting Concept: Energy and Matter</p> <p>Science and Engineering Practices: Developing and Carrying Out Investigations, Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: Why do some objects sink, while other objects float?</i></p> <p><i>Gather: Students will read the article on this site: http://www.shonscience.com/unit-1-earth-as-a-system2/does-the-shape-size-or-temperature-of-matter-affect-its-density</i></p> <p><i>This should give them a little more background information on how different things (size, shape) affect an object's density. Once the article is read and discussed in class, students will pick three of the objects they tested at home and create an explanatory model showing the arrangement of molecules in their object. This will be completed in their science notebook.</i></p> <p><i>Reason: Reviewing information on density and building a stronger background with density will help them understand tomorrow's experience better and will help them understand the special properties of water.</i></p> <p><i>Communicate: Students will be showing their understanding of density by using parts of a homework assignment and applying the molecular arrangement to show why their object sank or floated. They will also be having a personal conversation with me so I can do a quick check on their understanding of density.</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>Review density with the class before starting today's lesson.</p> <p>Have the students read the article in their small groups highlighting information that they feel is important.</p> <p>Once the article is read, discuss with the students the main points of the article and record them on the board. Basic points that they need to understand: When molecules are packed more closely, a substance is more dense. If a substance is more dense than water, it will sink in water (and if it is less dense than water, it will float).</p> <p>Once they are at the independent part of their lesson, walk around the room helping students decide which objects they should choose for their molecular arrangement and check for understanding.</p>
<p>Assessment of Student Learning</p> <p><i>Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.</i></p>	

The assessments for this particular experience are the personal conversations with the teacher and their models they make from their homework assignment showing the arrangement of molecules. This can be done by using zoom in boxes.

6.2.2 Density Storyline

Student Science Performance	
Topic: Water is Special	Title: Ice Water Observation
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p>	
<p>Lesson Performance Expectations: There are more spaces between molecules in ice than in the molecules of water, therefore ice is less dense than water and will float.</p> <p>Because ice floats on water, organisms are able to survive in the water under the ice.</p>	
<p>Crosscutting Concept: Energy and Matter</p>	
<p>Science and Engineering Practices: Developing and Carrying Out Investigations, Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information</p>	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: Why does ice float?</i></p> <p><i>Gather: Students will first watch a teacher led demonstration with colored water when it is added to containers of different temperatures of water.</i></p> <p><i>Before starting the experiment with ice, start with a quick observation as to what happens with frozen olive oil as it drops into the water. Have them communicate with their table what they saw. Create a quick summary on the board of what they saw.</i></p> <p><i>Then, students will have a glass of water set in front of them. Then they will add ice to the glass of water and make observations about what they are seeing. They will need to write a written explanation as to why ice floats on water.</i></p> <p><i>Once they have an explanation written in their notebook, pose the question why ice floating is important on lakes and ponds and have them record their answers in their notebooks.</i></p> <p><i>Reason: Understanding that density is how closely particles are packed together in matter will help them answer the question as to why ice floats on water. Understanding this means that they understand how density works.</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>First, demonstrate what happens to colored water when it is added to different temperatures of water in clear containers. Students will then use that observation to create an explanation on what happened when the colored water was added to each different temperature of water. Record this in their science notebooks. Discuss what they saw and how they explained this in their notebooks. (This can be done as a group explanation, as well.)</p> <p>You could also show this video as a demonstration: https://www.stevespanglerscience.com/lab/experiments/colorful-convection-currents/</p> <p>Before they start their experiment, they are going to see an example of what normally happens with frozen things. Take a frozen olive oil ice cube and drop it in water. Initially, the ice cube will sink to the bottom of the glass. Then as the water melts the cube, the oil will float on the surface. This shows that as the molecules speed up due to thermal energy, they will start to expand and become less dense than water.</p> <p>From there, have the students conduct their own experiment using a glass of water. Ice floats, even though it doesn't follow the lesson on thermal energy. They will need to use what they know about density, however, to create an explanation as to ice would float on water. You may have to help a few groups with</p>

Communicate: Communication will be with their small group helping them develop an explanation and through their written journal.

examples from their layered jar or bathtub.

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Their assessment is their written explanation as to why ice floats (this should be pretty simple and include that ice expands and becomes less dense than water, therefore floats) and why ice floating is important on lakes and ponds (because life still goes on under the ice sheet and by not freezing the whole pond, allows creatures to continue living).

6.2.1 Lesson Plan

Student Science Performance	
Topic: Thermal Energy and Particle Movement	Title: Thermal Energy With Water Bottles
<p>Overarching Performance Expectations (Standard) from State Standards or NGSS:</p> <p>6.2.1 Develop models to show that molecules are made of different kinds, <u>proportions and quantities</u> of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H₂O), atmospheric oxygen (O₂), and carbon dioxide (CO₂).</p> <p>Standard 6.2.2 Develop a model to predict the <u>effect</u> of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).</p> <p>Crosscutting Concept: System Models, Energy and Matter</p> <p>Science and Engineering Practices: Planning and Carrying Out an Investigation, Analyzing and Interpreting Data (through observation and maybe measurement), Constructing an Explanation, and Obtaining, Evaluating, and Communicating Information</p>	
Lesson Performance Expectations:	
<p style="text-align: center;">Students Will. . . To Construct Meaning</p> <p><i>Engage with a Phenomenon: Why do particles in warmer liquids move around faster compared to particles in colder liquids?</i></p> <p><i>Gather: Students will be conducting an experiment using an empty water bottle, balloon, and two bins full of water at different temperatures. Students will put the balloon on top of the empty water bottle. They will then place the water bottle in the bin filled with cold water. They will make observations (can include measurements of the balloon even though it might be difficult) as to what happens to the water bottle and balloon and record them in their notebook. Then they will place the water bottle in the bin with hot water and record observations on what happens to the water bottle and balloon in the hot water.</i></p> <p><i>Reason: Using the data collected on what happens to the</i></p>	<p style="text-align: center;">Teacher Will. . . To Support Students</p> <p>Clearly explain how to set up their experiment step by step.</p> <p>Students should also be drawing a model of their experiment in their science notebook in order to easily recall information learned via this experiment.</p> <p>Walk through how students should be making observations and how they should be recording them in their science notebooks in an organized way. Remind them of how to create tables, charts, or take notes on observations.. Show them how they could possibly measure the balloon with yarn to be more scientific and to add actual calculations into their experiment.</p>

balloon when placed in waters in different temperatures, students will try to figure out why there was no change in the balloon when placed in cold water and why the balloon started to inflate when placed in the hot water.

Communicate: Once an explanation is reached, written in notebook, and a thumbs up received from a teacher, students will be sharing their conclusions/explanations with other table groups to see if everyone agrees with your group's explanation.

As a class, write a kid friendly, yet scientific, explanation of what happened with the balloon in hot water.

Remind students that matter is made of particles that are constantly in motion, and particles in warm water move faster than particles in cold water.

Using the information from the previous lesson, why do we think that the ballooned water bottle, when placed in warm water, would start to inflate? Have students write down their explanations in their science notebook. For those struggling, make sure to give the students the keywords of particles in motion when warmed, and ask them questions about the material the balloon is made from. (Can even show them the stretch of a balloon when blown up.)

I, as a teacher, will give them the thumbs up or down on their explanation and their model of the experiment that was completed.

Explanation that I want students to reach: *Thermal energy increases particle movement and cause expansion. When thermal energy decreases, particle movement will decrease and will contract.*

Assessment of Student Learning

Short description of the evidence the teacher is willing to accept that a student is proficient with the performance expectations. This may be a rubric, narrative or other set of descriptors that are useful for distinguishing proficient from nonproficient performances.

Model of the experiment drawn in their science notebook.

Observations from their experiment organized in a readable manner, with or without balloon measurements. (Can be a table, chart, can be written observations, etc.)

Explanation of why the balloon expanded when placed in a hot water bath.

Thumbs up received from me on explanation and observations.

Kid friendly explanation written in their notebook as lesson summary.

[http://www.daviddarling.info/childrens encyclopedia/heat Chapter1.html](http://www.daviddarling.info/childrens%20encyclopedia/heat%20Chapter1.html)

