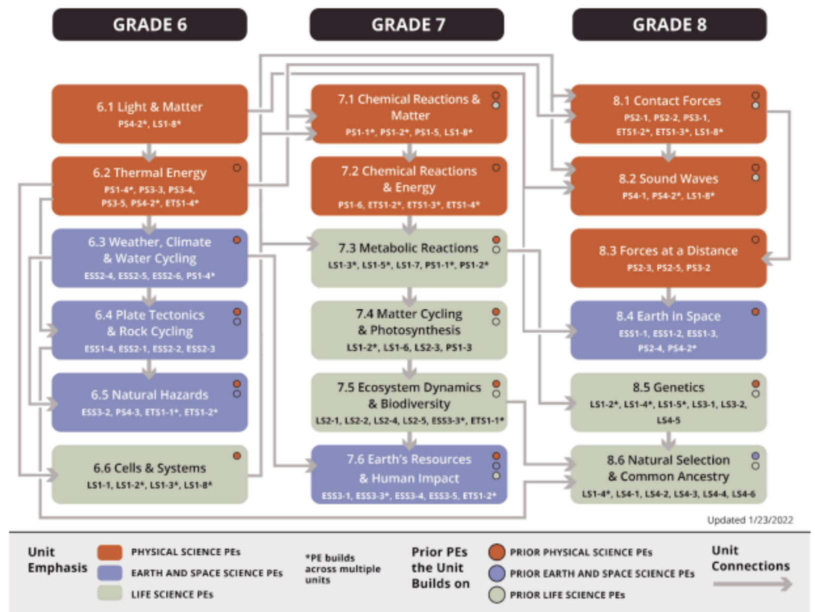
Overview

Curriculum Level

Curriculum Selected: *OpenSciEd is a freely accessible curriculum program administered by a dedicated team of directors, editors, managers, and partners located across the United States. James Ryan serves as the Executive Director of this organization. I selected this curriculum due to its complimentary access and comprehensive unit materials.*

Unit Level

Unit Selected: *What is the title of the unit you selected? Provide an overview of the scope and how this instructional segment fits into what was learned before this unit. Why did you select this unit?*
Thermal Energy: Cup Design



OpenSciEd's curriculum initiates at the 6th-grade level, as they are in the process of developing their elementary curriculum. The provided image outlines the scope and sequence of their middle school curriculum. The first unit delves into the fascinating realm of "Light & Matter," equipping students with essential knowledge for the unit I have chosen, which is centered on "Thermal Energy." My selection of the thermal energy unit is rooted in my fond memories of teaching it during my middle school science student-teaching experience.

		In the first segment, labeled 6.1, students explore the concept that when light interacts with an object, it can either be reflected or transmitted, contingent on the material of the object. Additionally, students discover that light follows a straight-line path, except when it encounters the interface between different transparent materials, causing it to bend, a phenomenon known as light refraction. *Moving on to segment 6.2, students further build upon the foundational principles of light introduced in 6.1. Here, in the context of particle models and energy transfer, students gain insights into how the absorption of light occurs at the microscopic level. This absorption of light results in an increase in the kinetic energy of the particles within the substance, deepening their understanding of this crucial scientific concept.*
Curriculum Goals: *OpenSciEd places a high value on providing quality education and is dedicated to ensuring access to such education. The organization recognizes the existence of systemic inequities within our educational systems, which have created a substantial gap that must be bridged. OpenSciEd is resolute in its mission to facilitate student success in the field of science through the delivery of a top-notch curriculum.* *OpenSciEd firmly asserts that its curriculum not only empowers teachers by tapping into their expertise and creativity but also remains firmly rooted in the students' interests. The organization's commitment extends beyond academic content; it is deeply committed to fostering classroom norms that cultivate a safe learning environment where every individual is valued, heard, and respected. Furthermore, OpenSciEd is actively engaged in identifying and dismantling inequitable systems, routines, and*	**For what age students was this curriculum made?** *OpenSciEd currently offers curriculum materials for 6th through 8th-grade levels, in addition to comprehensive units covering biology, chemistry, and physics designed for high school students.*	**Unit Assessment Outcomes:** *What are the specific assessment outcomes (not individual lesson objectives) of the unit? What will students achieve by the end of this unit? How will they demonstrate this knowledge?* 1. Understanding of Particle-Scale Mechanisms: By the end of this unit, students should demonstrate a solid understanding of how absorption of light occurs at the particle level, resulting in an increase in the kinetic energy of particles within a substance. They should be able to describe this phenomenon accurately, indicating comprehension of particle-scale mechanisms. 2. Application of Particle Models: Students will use and develop a particle model of matter to predict and describe various phenomena, such as how objects within a room are visible and how objects, like cups of liquid, cool off or warm up to reach room temperature. Their ability to apply these models to explain real-world situations will be a key assessment outcome. 3. Modeling Skills: Students will demonstrate proficiency in developing and using models to predict and describe phenomena, in line with Science and Engineering Practice

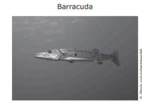
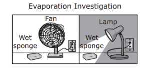
assumptions that persist in many science learning environments and educational institutions, thus striving to create a fairer and more inclusive educational landscape.		(SEP) 2.5. They should be able to develop models that effectively describe the heating and cooling mechanisms observed in the unit. 4. Understanding Unobservable Mechanisms: The unit emphasizes the development of models to describe unobservable mechanisms, especially at the particle scale (SEP 2.6). Students should be able to articulate how these unobservable mechanisms result in observable heating and cooling phenomena. 5. Use of Simulations: Given the particle-scale context, students will utilize simulations effectively to model relationships among variables (SEP 2.4). Their proficiency in using simulations to support their modeling efforts will be an important assessment aspect. 6. Cup Design Challenge: Students will develop models to plan for the cup design challenge, and they should be able to explain how their cup designs work to minimize energy transfer. Their success in designing and explaining the functionality of their cup designs will serve as a practical assessment of their understanding of thermal energy principles. Overall, students' achievement in this unit will be demonstrated through their ability to explain, model, and apply particle-scale mechanisms related to thermal energy, both in theoretical scenarios and in practical challenges like the cup design project.

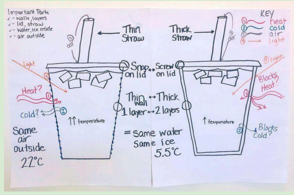
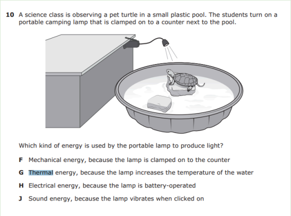
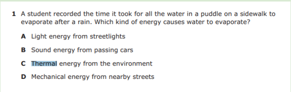
Stakeholders: *OpenSciEd is governed by a board consisting of eight directors and managers. The development teams responsible for the elementary units include The BSCS Science Learning Team, The Northwestern University Team, The Michigan State University Team, The Carolina Biological Supply Team, The Horizon Research, Inc. Team, The Oakland University Team, and The University of Texas at Austin Team.* *OpenSciEd collaborates with over 900 field test teachers across ten partner states. Some of the program's key funders include Bill and Melinda Gates, Carnegie Corporation of New York, Charles and Lynn Schusterman, William and Flora Hewlett, and the Walton Family Foundation.*	**21st Century Classroom:** *OpenSciEd's curriculum aligns with several ideals of Twenty-First Century Classrooms, as outlined in the Kaufman article. Here are a few ways in which the curriculum upholds these ideals:* *1. Emphasis on Creativity and Relevance: OpenSciEd places a strong emphasis on creativity within its curriculum. It strives to make content relevant to students, ensuring that lessons are engaging and meaningful. This approach aligns with the ideal of fostering creativity and relevance in education.* *2. Hands-On Learning: The program incorporates hands-on learning experiences, allowing students to actively engage with the material. This aligns with the ideal of promoting experiential learning, which is a key component of Twenty-First Century Classrooms.* *3. Critical Thinking and Problem Solving: OpenSciEd includes lessons that encourage critical thinking and problem-solving skills among students. These lessons are designed to challenge students to think critically and apply their knowledge to real-world scenarios, which is in line with the emphasis on critical thinking in modern classrooms.* *4. Flexibility and Adaptability: OpenSciEd's curriculum is intentionally designed to provide teachers with the flexibility to adapt and modify lessons to cater to the specific interests and needs of their students. This adaptability aligns with the ideal of personalized learning, where instruction is tailored to individual learners.* *5. Digital Accessibility: OpenSciEd offers easy access to its curriculum through Google Drive, allowing teachers to download materials and edit them as needed. Additionally, the curriculum can be converted into online lessons, supporting the integration of technology in teaching, which is another aspect of Twenty-First Century Classrooms.* *To further align with Twenty-First Century Classrooms ideals, OpenSciEd could consider:*

	1. Enhancing Digital Collaboration: Expanding opportunities for collaborative digital projects among students, which encourages teamwork and communication skills. *2. Incorporating Multimedia: Integrating multimedia resources such as videos, simulations, and interactive online tools to enhance the learning experience.* *3. Global Perspective: Incorporating global perspectives and diverse cultural content to promote global awareness and cultural competency among students.* *4. Assessment for Learning: Implementing formative assessment strategies and digital tools to provide ongoing feedback to students and inform instruction.* *5. Data Analytics: Utilizing data analytics and learning analytics tools to track student progress and tailor instruction to individual needs.* *By considering these other ideas, OpenSciEd can further its alignment with the ideals of Twenty-First Century Classrooms and provide an even more comprehensive and modern educational experience for students and teachers alike.*

Unit Analysis and Alignment(6th Grade Science:Thermal Energy)

Within this table, please identify all unit objectives posted, where available or derived. Across each unit objective, complete all columns to align the unit to assessments, state standards, published standardized test items, and then evaluate the alignment and suggest modifications (if necessary). Add as many additional rows (or delete) as needed to accommodate your unit.

1	2	3	4	5	6
Unit Objective(s)	**Assessment Tied to Objective** *(ways this objective is measured by student outcomes: project, test, etc ~ include examples.)*	**State Standard Connected to this Specific Objective** *(Write out the TEKS, Common Core, etc..)*	**Published Assessment Examples of Questions** *(2 per objective- use STAAR or other state released assessments)*	**Evaluation of Alignment** *(Reflect: Do the unit assessments and objectives align with the state assessment? How/ how not?)*	**Modify Unit** *(How would you modify or add to the unit to increase alignment? Provide examples to show what you mean)*
Why does the temperature of the liquid in some cup systems change more than in others?	We observe an iced drink in a regular cup warming up more quickly compared with an iced drink in a fancy cup. We develop systems models to explain what is happening in the two cups that one can better maintain the temperature of the drink. We brainstorm related phenomena and ask questions about design features that influence how well an object can keep something hot or cold. We figure out: The cup system includes the different parts of the cup and the water and air inside the cup. All of these parts work together (interact) to form the system. Some systems have structural features that help maintain the	6.2(A)plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology; 6.2(C)collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers; 6.9(A)investigate methods of thermal energy transfer, including conduction, convection, and radiation;[without vocabulary(for this unit)]	***There isn't a 6th grade STAAR, so I will be using questions from previous 5th grade science stars because 5th grade has very similar science TEKS to 6th.*** **12** Students study barracudas. They gather some observations of barracudas. A barracuda is shown. Barracuda  Which observation describes barracudas interacting with the living elements of their ecosystem? **F** Barracudas can travel quickly using surface ocean currents. **G** Barracudas live around hard structures such as oil rigs and jetties. **H** Barracudas are predators of other fish. **J** Barracudas tend to live in warm waters. **7** A student uses the setup shown to investigate ways to speed up evaporation. Evaporation Investigation  Which forms of energy are being compared in the student's investigation? **A** Light energy and electrical energy **B** Mechanical energy and electrical energy **C** Light energy and thermal energy **D** Mechanical energy and thermal energy	In general, the unit assessments have a strong alignment with the curriculum. However, there is a distinction between the unit assessments and the state assessments. The first question relates to 6.2(A), where students are required to make observations and subsequently respond to questions derived from those observations. The second question is closely associated with 6.9(A). It necessitates a comprehensive understanding of thermal energy and its impact on the surrounding environment for students to form accurate responses.	I would modify this unit by integrating a broader range of vocabulary words aligned with the TEKS. Additionally, I would encourage students to make connections between the activities in this unit and the various forms of energy they studied in their 5th-grade curriculum.

	temperature of a substance inside the system, keeping the substance hot or cold longer compared with other systems. Heat can enter the cup system and/or cold can leave the cup system, and maybe gases can escape the system too 				
What cup features seem most important for keeping a drink cold?	We plan and carry out an investigation to figure out 2 things. First, what cup features are important for keeping a drink cold? Second, how would changing the cup features cause the drink to warm up faster? We collect, organize, and publicly analyze data from our investigation to identify patterns to determine which cup features help maintain a drink's temperature. We figure out: Some systems have structural features that are designed to help maintain the temperature of a substance inside the system. *The cup features that seem to play a significant role in keeping a drink cold are a*	6.2(A)plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology; 6.2(C)collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers; 6.9(A)investigate methods of thermal energy transfer, including conduction, convection, and radiation;[without vocabulary(for this unit)]	 **10** A science class is observing a pet turtle in a small plastic pool. The students turn on a portable camping lamp that is clamped on to a counter next to the pool. Which kind of energy is used by the portable lamp to produce light? **F** Mechanical energy, because the lamp is clamped on to the counter **G** Thermal energy, because the lamp increases the temperature of the water **H** Electrical energy, because the lamp is battery-operated **J** Sound energy, because the lamp vibrates when clicked on  **1** A student recorded the time it took for all the water in a puddle on a sidewalk to evaporate after a rain. Which kind of energy causes water to evaporate? **A** Light energy from streetlights **B** Sound energy from passing cars **C** Thermal energy from the environment **D** Mechanical energy from nearby streets	The first question necessitates that students have a solid grasp of thermal energy and its interactions with the surrounding environment. This question aligns with the standard 6.9(A), which relates to the transfer of energy. The second question similarly ties into 6.9(A) as it hinges on students' comprehension of thermal energy and heat, reinforcing the importance of their understanding of these concepts.	If I were to modify this lesson, I would place a strong emphasis on incorporating vocabulary from the TEKS standards into the student discussions. This approach ensures that students engage with essential terminology while participating in classroom conversations.

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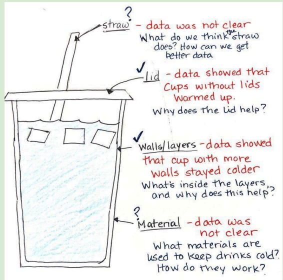
<td>lid, double walls, and maybe the type of cup material.

</td>
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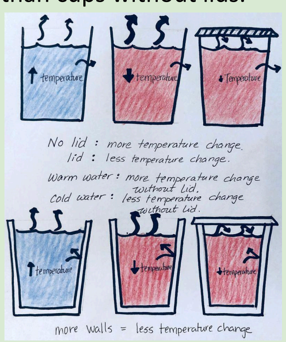
<tr>
<td>How are the cup features that keep things cold the same or different for keeping things hot?</td>
<td>We look at the order of cups based on their ability to keep liquids cold. We investigate whether these same features are able to keep liquids hot. Based on our findings, we revise our explanation from Lesson 1 to explain how particular cup features help to keep liquids hot and/or cold. We ask additional questions about the cup features now that we know more. We then design an experiment to investigate our questions and ideas about how the lid works. We figure out:
Cups that can keep liquids cold are also able to keep liquids hot.
Cups with lids are able to keep liquids hot and cold better than cups without lids.
Cups with more walls or layers will be able to keep liquids hot and cold better than cups without lids.

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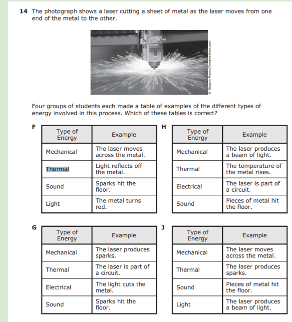
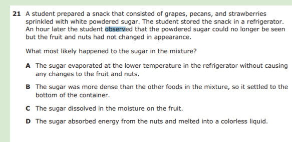
<td>
14 The photograph shows a laser cutting a sheet of metal as the laser moves from one end of the metal to the other.

Four groups of students each made a table of examples of the different types of energy involved in this process. Which of these tables is correct?
F
<table><tr><th>Type of Energy</th><th>Example</th></tr><tr><td>Mechanical</td><td>The laser moves across the metal.</td></tr><tr><td>Thermal</td><td>Light reflects off the metal.</td></tr><tr><td>Sound</td><td>Sparks hit the floor.</td></tr><tr><td>Light</td><td>The metal turns red.</td></tr></table>
H
<table><tr><th>Type of Energy</th><th>Example</th></tr><tr><td>Mechanical</td><td>The laser produces a beam of light.</td></tr><tr><td>Thermal</td><td>The temperature of the metal rises.</td></tr><tr><td>Electrical</td><td>The laser is part of a circuit.</td></tr><tr><td>Sound</td><td>Pieces of metal hit the floor.</td></tr></table>
G
<table><tr><th>Type of Energy</th><th>Example</th></tr><tr><td>Mechanical</td><td>The laser produces sparks.</td></tr><tr><td>Thermal</td><td>The laser is part of a circuit.</td></tr><tr><td>Electrical</td><td>The light cuts the metal.</td></tr><tr><td>Sound</td><td>Sparks hit the floor.</td></tr></table>
J
<table><tr><th>Type of Energy</th><th>Example</th></tr><tr><td>Mechanical</td><td>The laser moves across the metal.</td></tr><tr><td>Thermal</td><td>The laser produces sparks.</td></tr><tr><td>Sound</td><td>Pieces of metal hit the floor.</td></tr><tr><td>Light</td><td>The laser produces a beam of light.</td></tr></table>

21 A student prepared a snack that consisted of grapes, pecans, and strawberries sprinkled with white powdered sugar. The student stored the snack in a refrigerator. An hour later the student observed that the powdered sugar could no longer be seen but the fruit and nuts had not changed in appearance.
What most likely happened to the sugar in the mixture?
A The sugar evaporated at the lower temperature in the refrigerator without causing any changes to the fruit and nuts.
B The sugar was more dense than the other foods in the mixture, so it settled to the bottom of the container.
C The sugar dissolved in the moisture on the fruit.
D The sugar absorbed energy from the nuts and melted into a colorless liquid.</td>
<td>In the first question, students are tasked with demonstrating their comprehension of thermal energy, including its definition and how it interacts with its surroundings. This directly aligns with 6.9(A), which relates to the understanding of thermal energy and its properties.

The second question pertains to the students' ability to formulate hypotheses grounded in their observations. This skill is directly relevant to the cup experiment and is in line with the learning objectives 6.2(A) and 6.2(C), which emphasize the importance of students' ability to make hypotheses based on their scientific observations.</td>
<td>If I were to adapt this lesson, I would give greater emphasis to vocabulary. Additionally, I would integrate more student-led discussions to create opportunities for students to connect the lesson with their prior knowledge and real-world experiences.</td>
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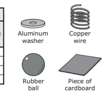
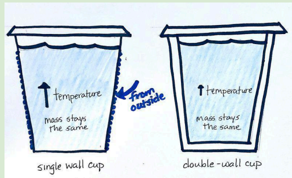
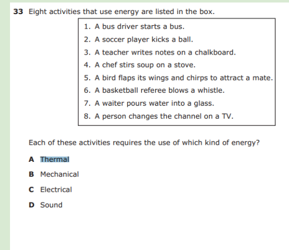
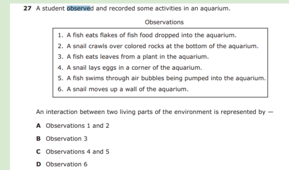
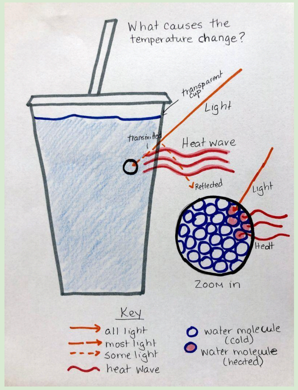
<tr>
<td>Where does the water on the outside of the cold cup system come from?</td>
<td>We construct an investigation to support or refute the claim that the formation of water droplets (condensation) on the outside of a cup of cold water comes from water leaking through the cup walls. We measure the mass of a cup of cold water before and after condensation forms on the outside. We also observe condensation on the outside of a cup of cold water that has been dyed using food coloring. We use our observations and data to construct an argument to refute the claim that water droplets on the outside of the cup come from inside the cup system. The water droplets that form on the outside of a cup of cold water come from the air outside the cup, not from the inside of the cup.
Water droplets often condense on a cold surface when humid air comes in contact with the surface. Liquids do not move through solids.
Matter does not enter or leave a closed system; therefore, the mass of a closed system does not change.</td>
<td>6.2(A)plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology;
6.2(C)collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers;
6.9(A)investigate methods of thermal energy transfer, including conduction, convection, and radiation;[without vocabulary(for this unit)]</td>
<td>
11 Students observe a glass of ice and water. The glass is dry on the outside. After ten minutes students see drops of water on the outside of the glass.
Which statement best explains the students' observations?
A The water vapor in the air changes to a liquid when it touches the cold glass.
B The cold water inside the glass rises and then slides down the outside of the glass.
C The ice in the glass melted and caused the water to overflow the glass.
D The water moved to the outside surface through tiny holes in the glass.
30 A student wants to classify four different objects based on physical properties. The student uses the questions shown in the table to test each object.
<table>
<tr><th rowspan="2">Materials</th><th colspan="3">Physical Properties</th></tr>
<tr><th>Insulate Thermal Energy?</th><th>Float in Water?</th><th>Conduct Electrical Energy?</th></tr>
<tr><td>1</td><td>Yes</td><td>No</td><td>No</td></tr>
<tr><td>2</td><td>No</td><td>No</td><td>Yes</td></tr>
<tr><td>3</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>4</td><td>No</td><td>No</td><td>Yes</td></tr>
</table>
Materials


Which statement correctly identifies two of the materials based on the classification of properties in the table?
F Material 1 is a rubber ball.
Material 2 is a piece of cardboard.
G Material 2 is an aluminum washer.
Material 3 is a copper wire.
H Material 3 is a piece of cardboard.
Material 4 is an aluminum washer.
J Material 1 is a copper wire.
Material 4 is a rubber ball.
</td>
<td>The first question is closely tied to the primary objective of this lesson. It requires students to directly apply the knowledge they have learned in this lesson to explain why water condenses on the exterior of a cold cup.

On the other hand, the second question pertains to a broader understanding of thermal energy, which is a concept that builds upon the foundation laid in this unit but is not explicitly covered within this particular lesson.</td>
<td>To enhance this lesson, I would also integrate a time-lapse video illustrating the formation of condensation on a cold glass surface. This addition would cater to the visual learners in the class, providing them with a vivid demonstration of the concept being discussed.</td>
</tr>
</table>

	temperature from outside mass stays the same single wall cup temperature mass stays the same double-wall cup				

If matter cannot enter or exit a closed system, how does a liquid in the system change temperature?	We consider what we know about the components (or structures) of the closed cup system, how they function, and how they interact with one another and with other objects and substances outside of the cup system to determine what else might a temperature change in the liquid inside. We develop models to represent our ideas about interactions between energy (light, heat, or cold) and the closed cup system. We use these models to explain the temperature change, and we determine ways to test our ideas to figure out how energy interacts with the closed cup system. We figure out: Since most of the matter does not enter or leave the cup system with a lid, light and heat or cold may interact with the system to cause a temperature change in the liquid inside. *note: students will likely use “heat waves” as an initial representation for heat, and this is OK at this point in the unit. From lessons 8-14, students develop their understanding of heat, and the way they represent it in their models.	6.2(A)plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology; 6.2(C)collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers; 6.9(A)investigate methods of thermal energy transfer, including conduction, convection, and radiation;[without vocabulary(for this unit)]	 33 Eight activities that use energy are listed in the box. 1. A bus driver starts a bus. 2. A soccer player kicks a ball. 3. A teacher writes notes on a chalkboard. 4. A chef stirs soup on a stove. 5. A bird flaps its wings and chirps to attract a mate. 6. A basketball referee blows a whistle. 7. A waiter pours water into a glass. 8. A person changes the channel on a TV. Each of these activities requires the use of which kind of energy? A Thermal B Mechanical C Electrical D Sound  27 A student observed and recorded some activities in an aquarium. Observations 1. A fish eats flakes of fish food dropped into the aquarium. 2. A snail crawls over colored rocks at the bottom of the aquarium. 3. A fish eats leaves from a plant in the aquarium. 4. A snail lays eggs in a corner of the aquarium. 5. A fish swims through air bubbles being pumped into the aquarium. 6. A snail moves up a wall of the aquarium. An interaction between two living parts of the environment is represented by — A Observations 1 and 2 B Observation 3 C Observations 4 and 5 D Observation 6	The first question relates to the understanding of thermal energy, aligning with 6.9(A). It also relates to the 5th-grade TEK (Texas Essential Knowledge and Skills) regarding energy types. The second question focuses on the observation of interactions between an object and its environment, directly tying into 6.2(C).	To modify this final lesson in the unit, I would incorporate additional video examples. The video materials can serve as a comprehensive review. These video resources would not only function as a review but also as a topic for classroom discussions. By revisiting key concepts and connecting them to the current lesson, students will be encouraged to bridge the gap between their prior knowledge and the new content.This approach promotes peer collaboration and support, as students engage in meaningful discussions and share their insights.

	 What causes the temperature change? transparent cup Light transmitted Heat wave Reflected Light Heat Zoom in Key all light most light some light heat wave water molecule (cold) water molecule (heated)				

Alignment Reflection

Vertical Alignment Reflection: *Does the level of sophistication the TEKS or Common Core state standards require align with the amount of rigor evidenced in the unit? Provide two pieces of evidence (screenshots, quoted documentation, etc.) to support your claim. One "paragraph" should suffice, along with your evidence.*

This unit appears to align closely with the TEKS objectives, specifically TEKS 6.2(A) and 6.2(C). The images from the OpenSciEd unit overview below, show standards "2.A, 2.B, and 7.A," which correspond to these TEKS standards.

TEKS 6.2(A), which pertains to planning and implementing comparative and descriptive investigations, aligns with the 2.A and 2.B standards in the OpenSciEd materials. These aligning elements emphasize making observations, and posing well-defined questions. Furthermore, TEKS 6.2(C), which involves the collection and recording of data and qualitative methods such as labeled drawings and writing, is also directly related to standard 7.A in which students develop models for the cup experiment.

It is evident that the unit closely mirrors the TEKS objectives, with clear alignment to TEKS 6.2(A) and 6.2(C).

2.A Plan and carry out an investigation to gather evidence to answer scientific questions about how parts of the cup system relate to the temperature change of the liquid inside. 2.B Analyze and interpret data to find patterns indicating which parts of the cup system (features) influence the temperature change of the substance inside the system.	2.A Planning and Carrying Out Investigations; Systems and System Models **When to check for understanding:** During the *Plan Cup Investigations in Small Groups* and *Carry Out Cup Investigations* activities on day 1, circulate among the groups to check on their plans written in their science notebooks. **What to look/listen for:** • the agreed-upon parameters for the fair test and • only 1 changed variable from either of the 2 cup systems tested in Lesson 1. Analyzing and Interpreting Data; Patterns **When to check for understanding:** During the *Analyze Class Data* activity on day 2. **What to look/listen for:** • No-lid conditions seem to warm up faster than those with lids. • Single-wall cups seem to warm up faster than double-wall cups. • Rationale for how students ordered cups from best to worst performers.	
7.A Develop two models to show relationships among the parts of the mostly closed cup system and how light and heat or cold (i.e., mechanisms) cause the liquid inside to warm up or cool down (effect).	7.A Developing and Using Models; Cause and Effect **When to check for understanding:** Students **construct models** that represent their ideas of how different types of energy (light and heat or cold) interact with the closed cup system to cause a temperature change in the liquid inside. They are asked to **make claims** that describe how they think each type of energy causes the temperature of that liquid to change, supported with evidence and reasoning. **What to look/listen for:** When analyzing students' models of light's interactions with the cup system, look for evidence of student understanding of the following concepts: • Light travels in straight lines. • Light reflects, transmits, or is absorbed in varying amounts when it shines on the cups. • If all or part of the light is absorbed, that light energy may be related to the temperature change or may turn into heat. Because students have not learned about heat energy yet, when you analyze their models of heat and the corresponding claims, look for evidence that students are using their prior day-to-day experiences. Examples include these: • Hot or warm objects cool down; cool or cold objects warm up. • When hot or warm objects come into contact with cool or cold objects, the cooler objects warm up and the warmer objects cool down. • Temperature tells us how warm or cool something is.	

Overall Summary: *Provide an overall summary of your findings, including strengths, weaknesses and implementation challenges of the instructional unit; provide possible recommendations for modifications, if appropriate, elaborating on the notes you provided in the rightmost column above. In what ways does the instructional unit best exemplify 21st Century learning skills, particularly with the use of technology, as best you can tell from the information provided.*

The instructional unit by OpenSciEd exhibits several strengths and aligns partially with the TEKS objectives. Strengths of the unit include its emphasis on creativity, relevance, and hands-on learning, promoting student engagement and critical thinking. Furthermore, the unit's adaptability and flexibility, allowing teachers to tailor lessons to their students' interests, is commendable. The incorporation of technology is another notable strength, with the curriculum being easily accessible through Google Drive and adaptable for online lessons. This aligns with 21st-century learning ideals, fostering digital literacy and enhancing accessibility for both students and educators.

However, there are potential weaknesses in the unit's coverage. While it mirrors TEKS objectives, there may be opportunities to further enrich the content with additional inclusion of 21st-century learning, such as increased emphasis on digital collaboration, multimedia integration, global perspectives, and data analytics. To address these weaknesses, OpenSciEd could consider incorporating more collaborative digital projects, multimedia resources, and global perspectives into the curriculum.

OpenSciEd's instructional unit demonstrates strengths in fostering creativity, relevance, and adaptability while effectively incorporating technology. However, there is room for improvement in aligning with a broader range of 21st-century learning indicators. By embracing these recommendations, OpenSciEd can enhance its curriculum's alignment with 21st-century learning skills, providing a more comprehensive and modern educational experience.