

Science Unit

<b>Unit Designer(s):</b>	= Skyla and Stephanie	
<b>Science Unit Topic:</b>		<b>Grade Level:</b>
Energy and Matters in Ecosystems		5
<b>Resources</b> Identify resources that will enhance teachers' professional knowledge and understanding of the content addressed in this unit and resources that are developmentally appropriate for students.		
<b>Educational Resources</b> Cite reputable sources with which students will engage in this unit of study.		<b>Professional Resources</b> Cite professional sources that will be used to increase the content knowledge and pedagogical content knowledge of the teacher.
<a href="https://www.youtube.com/watch?v=TitrRpMU0I">https://www.youtube.com/watch?v=TitrRpMU0I</a>  <a href="https://www.youtube.com/watch?v=LnPRHcp5_vo">https://www.youtube.com/watch?v=LnPRHcp5_vo</a>  <a href="https://www.youtube.com/watch?v=6fSMOOwt_mo">https://www.youtube.com/watch?v=6fSMOOwt_mo</a>		<a href="https://manoa.hawaii.edu/exploringourfluidearth/standards-alignment/next-generation-science-standards-ngss/crosscutting-concepts/energy-and-matter">https://manoa.hawaii.edu/exploringourfluidearth/standards-alignment/next-generation-science-standards-ngss/crosscutting-concepts/energy-and-matter</a>  <a href="https://www.coreknowledge.org/wp-content/uploads/2019/09/CKSci_G5U2_Ecosystems_TG.pdf">https://www.coreknowledge.org/wp-content/uploads/2019/09/CKSci_G5U2_Ecosystems_TG.pdf</a>  <a href="https://www.nps.gov/teachers/classrooms/matter-in-motion.htm">https://www.nps.gov/teachers/classrooms/matter-in-motion.htm</a>

**Stage 1 – Identify Desired Results**

**Unit Summary:**

Our unit on energy and matter in ecosystems consists of teaching about how energy transfers between different organisms among the ecosystem. We will be teaching our students how different nutrients are passed from producers, to consumers, then broken down by decomposers with the use of pictures and videos. Our instructional strategies will be showing videos about ecosystems and food chains/food webs. We will also be using educational books to read to the class to keep them engaged. We will also allow for some partner-work time to give students time to work together one on one. Our instructional materials will be the education videos, the books, worksheets, homework, and their assessment. Their assessment will be a test made up of open-ended questions, true/false questions, and matching questions.

*Next Generation Science Standards:*

*5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.*

*5-LS2-1. Develop a model to describe the movement of matter along plants, animals, decomposers and the environment.*

**Learning Progression**

Identify where this unit and the knowledge and skills acquired and practiced within it lie within students' learning progression. Use the NGSS to identify when students will engage in related science concepts prior to this unit/grade level and in the future.

<b>Prior Learning</b>	<b>Future Learning</b>
<p>5-LS1-1. From Molecules to Organisms: Structures and Processes. Support an argument that plants get the materials they need for growth chiefly from air and water.</p> <p>4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p>	<p>Grade 6: MS-PS1-1 Matter and its Interactions. Develop models to describe the atomic composition of simple molecules and extended structures.</p> <p>MS-PS1-4 Matter and its Interactions. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.</p>

	<p>MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p>
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**Critical Perspectives, Knowledge, and Skills**  
 In a paragraph, describe how you will engage students in thinking about, discussing, and conducting work related to identity, power, equity, and social justice throughout the unit. Include how you will engage community members in authentic ways to center the voices, experiences, and knowledge of students, families, and communities.

- We will engage our students in critical perspectives, knowledge, and skills by helping them understand that a food web/food chain is a collective process and that Food webs show the connection of various species.. When one organism fails to do their part, it affects the entire food chain. Students will learn that A social connection of this idea is showing that when this cycle is disrupted, then it results in a significant impact for all organisms involved.

<p><b>Overarching Concepts/Enduring Understanding</b>        Use a critical lens to integrate the content in the standards to create clear, concise statements that identify <b>what students will understand</b> in this unit. These numbered statements should go beyond vocabulary terms, dates, historical figures, etc. and instead, articulate important, sustainable ideas:</p>	<p><b>Essential Questions</b>        Create open-ended, engaging, developmentally appropriate questions, aligned with the overarching concepts that could be used to communicate the purpose of the lessons in the unit to the students. List the questions below and connect them to the overarching concept (by number).</p>
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<ol style="list-style-type: none"> <li>1. <u>“Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)”</u></li> <li>2. <u>“The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).”</u></li> <li>3. <u>“The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)”</u></li> </ol>	<ol style="list-style-type: none"> <li>1. What is the importance of a food chain?</li> <li>2. How does energy flow throughout an ecosystem?</li> </ol>
<p style="text-align: center;"><b>Cross-Cutting Concepts</b></p> <p>What connections to other science units of study can be made in this unit? Explain the CCC connections.</p>	<p style="text-align: center;"><b>Science &amp; Engineering Practices</b></p> <p>What SEP will be <u>emphasized</u> in this unit? Explain how.</p>
<p>-Some connections to other science units of study that can be made in this unit are when the students learned the basics about plants and animals. They should have had some units focusing on primarily plants/animals in fourth grade. Some other cross cutting concept to this unit is learning about the basic definition of matter and energy which should have been talked about in grade 3 and 4.</p> <p>-”A system can be described in terms of its components and their interactions. (5-LS2-1)”</p> <p>-”Energy can be transferred in various ways and between objects”</p>	<ul style="list-style-type: none"> <li>- We will use many diagrams and drawings to represent how energy and matter is transferred from producers to consumers and then decomposers, as well as to show what the food chain and food web looks like.</li> <li>- “Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). <ul style="list-style-type: none"> <li>• “Support an argument with evidence, data, or a model.”</li> </ul> </li> <li>- “Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.”</li> </ul>

- “Develop a model to describe phenomena. (5-LS2-1)”

***Integration of Students’ Assets***

Describe how the content of the unit is relevant to the students’ lives. Explain how the unit connects with the students’ lives, families, and the school and local community

Students can do so many activities and make so many observations based on this lesson and what they learn just by looking out the window or standing outside their home. Students are humans, which are part of the ecosystem, therefore they can understand where they fit in within the ecosystem we are learning about.

***What It Looks Like in the Classroom***

Provide a thorough explanation of what students will learn about science in this unit and explain some of the processes within which they will engage to learn it. Use research from the field of science education to support your description of what the teacher and students will be doing to engage in science throughout this unit.

Students will learn about different types of ecosystems and organisms and what those two things truly are. They will learn about how plants and animals are interdependent in their own ecosystems and how important it is for environments to not have drastic changes because it affects the survival of certain organisms. They will learn lots of details about food webs and chains in all different kinds of ecosystems and biomes and how they are all similar yet different. Students can use a “nature journal” to log all the things they see outside by using their senses such as see, feel, touch, smell etc., and they can go back later on and write down what kind of ecosystem these things need and live in. We will use a do now, worksheets, educational videos, in person experiments, worksheets, tests, and homework in order to keep our students engaged and on task with the lesson. We will also offer time where students can work with a partner to complete some of the experiments we have planned to complete this unit.

**Stage 2 – Determine Acceptable Evidence**

***Assessment & Assessment Rationale***

Describe your final/summative assessment(s). Explain how the summative assessment(s) is linked to the overarching concepts of the unit.

**Our final assessment is going to be a written, open ended, true or false and matching test. The test will ask them to match different organisms with the function they serve in an ecosystem ex: producer, consumer, decomposer. The open ended will ask them to explain the difference between an aquatic and terrestrial ecosystem. The true and false section will ask the students to show what they learn about food systems and food chains and what happens when the ecosystem is disrupted. Students will show what they know about the overarching concepts about our unit based off of this written assessment. We chose not to use multiple choice questions because we don't think that is a good representation of student knowledge and that it is mainly based on memorization or recognition, and we want to ensure students are actually absorbing the information we are teaching during the unit.**

***Formative Assessments & Rationale***

Explain how the formative assessments you plan to use throughout the unit are linked to the overarching concepts of the unit. (A list of the types of assessments used most often is sufficient.)

<b><i>Formative Assessments</i></b>	<b><i>Rationale</i></b>
<p><b><i>Do Nows</i></b>  <b><i>Exit Slips</i></b>  <b><i>Jamboards</i></b>  <b><i>Quizzes/tests</i></b>  <b><i>Homework worksheets</i></b></p>	<p><b><i>5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.</i></b></p> <p><b><i>5-LS2-1. Develop a model to describe the movement of matter along plants, animals, decomposers and the environment.</i></b></p>

Stage 3 – Planning Learning Experiences

***Titles and Sequence of Lessons***

<b>Day</b>	<b>Lesson Objectives:</b> Include the DCI, SEP, and CCC as they are addressed throughout the unit.	<b>Methodology:</b> Brief Description of the Lesson (including critical thinking questions and phenomena)	<b>Assessments:</b> Include one informal and one formal assessment for each lesson (identify the specific <u>criteria</u> that will be used to assess student learning)
1	<p><i>What is an Ecosystem?</i></p> <p>5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics</p> <p>Develop a model to describe the movement of matter among plants, animals, decomposers, and the Environment.</p> <p>DCI: LS2.A: Interdependent Relationships in Ecosystems</p> <p>The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and</p>	<p><i>CTQ: What makes up an ecosystem? What standards need to be met in order for something to be counted as a full ecosystem? Are people a part of an ecosystem?</i></p> <p><i>Students will learn all about the general overview of an ecosystem and what are the moving parts into that makes up an ecosystem.</i></p>	<p>Informal: Think-Pair-Share.</p> <p>The teachers will be walking around listening to students' discussion during "think-pair-share" talking about what they already know about ecosystems prior to the lesson, what they know during the lesson, and what they learned after the lesson.</p> <p>Formal: quiz at the end of the lesson consisting of multiple choice questions and fill in the blanks. Also, homework worksheets are a good way we can understand what the students are learning and absorbing from the lesson.</p>

	<p>animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)</p> <p>SEP:Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.</p> <p>Develop a model to describe phenomena. (5-LS2-1)</p>		
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	CCC: Systems and System Models. A system can be described in terms of its components and their interactions. (5-LS2-1)		
2	<i>What are the different types of ecosystems?</i>	<i>CTQ: What are the 5 different types of ecosystems in a general understanding? (For example, what are the temperatures like and their environment?)</i>	Informal: In class discussion, we will walk around and look at each other's ecosystems that the students created and talk about what we observe in each. Formal: Students will create their own type of ecosystem out of shoe boxes that we will grade.
3	<i>Animals and plants in ecosystems</i>  5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	<i>CTQ: What type of animals and plants can we find in each of the ecosystems?</i>	Informal: Students will work together to complete a worksheet where they draw a line from an animal or plant to the ecosystem they belong in. The teacher will walk around and listen to the discussion between the partners. Formal: Written-test, students will take a test consisting of multiple choice and open-ended about the animals and plants found in different ecosystems.
4	<i>What is Energy in terms of life science and ecosystems?</i>	<i>CTQ: How do we as living things use energy in our day to day life? What is an</i>	Informal: KWL chart. Students will fill out what they already knew before starting

	<p><b>5-PS3-1 Energy</b></p> <p>Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <p>SEP: Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> <li>• Use models to describe phenomena.</li> </ul> <p>DCI: PS3.D: Energy in Chemical Processes and Everyday Life</p> <ul style="list-style-type: none"> <li>• The energy released [from] food was once energy</li> </ul>	<p>example of energy use done by something in an ecosystem other than humans.</p> <p>Students will be introduced to the concept of Energy and energy transfer. We will talk about all different types of energy such as thermal, solar, kinetic etc,. They will also understand how energy can be created but never destroyed. They will learn how people and animals get their energy from their food due to certain materials they need for body repair, growth and to maintain body warmth. Videos will be shown and students will have the opportunity to work with classmates on answering the CTQ.</p> <p><a href="https://www.youtube.com/watch?v=YSFR7ByqTps">https://www.youtube.com/watch?v=YSFR7ByqTps</a></p>	<p>this topic, what they want to know, and what they learned. They can answer the CTQ for what they already knew and put a classmate's response to the question for what they learned. This will tell me that they were engaged and listening to their classmates when sharing.</p>
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	<p>from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).</p> <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"><li>• Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (<i>secondary</i>)</li></ul> <p>CCC: Energy and Matter</p> <ul style="list-style-type: none"><li>• Energy can be transferred</li></ul>		
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	<p>d in various ways and between objects.</p>		
5	<p><i>How is energy transferred through living things?</i></p> <p>5-PS3-1 Energy</p> <p>Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <p>SEP: Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> <li>Use models to describe phenomena.</li> </ul>	<p><i>CTQ: How does energy get passed from one living thing to the next? How do animals transfer energy to one another?</i></p> <p><i>In this lesson, we will talk about and show graphics/videos on how animals and humans eat food/plants to get energy. They then use this energy to carry out tasks. We will go into more detail about different kinds of energy transfers such as mechanically, electrically, by radiation and by heating.</i></p> <p><a href="https://www.youtube.com/watch?v=F9IC3w8IAQ">https://www.youtube.com/watch?v=F9IC3w8IAQ</a></p> <p><a href="https://www.youtube.com/watch?v=YSFR7ByqTps">https://www.youtube.com/watch?v=YSFR7ByqTps</a></p> <p><a href="https://www.youtube.com/watch?v=VhIBReUVSk8">https://www.youtube.com/watch?v=VhIBReUVSk8</a></p>	<p>Informal: Exit slip</p> <p>Hand students a small piece of paper at the end of the lesson and have them write down one or two ways they use/transfer energy every day.</p> <p>Formal: Students will draw a graphic/picture of an example of energy being transferred through living things. This could be humans, plants or animals. Must include labels and a description of how the energy is being transferred.</p>

DCI: PS3.D: Energy  
in Chemical  
Processes and  
Everyday Life

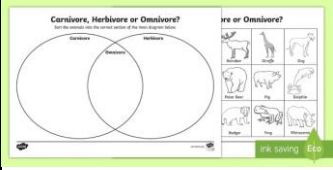
- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).

LS1.C:  
Organization for  
Matter and Energy  
Flow in Organisms

- Food provides animals with the materials they need for body repair and growth and the energy they need to

	<p>maintain body warmth and for motion. (secondary)</p> <p>CCC: Energy and Matter</p> <ul style="list-style-type: none"> <li>• Energy can be transferred in various ways and between objects.</li> </ul>		
<p>6</p>	<p><i>What is a food chain?</i></p> <p><i>5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</i></p> <p><i>[Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food.</i></p>	<p><i>CTQ: What is the definition of a food chain and what makes up a food chain?</i></p> <p><i>In this lesson, we will go over a PowerPoint explaining important definitions such as producer, consumer, carnivore, and decomposer, followed by a short video. There are two activities for this lesson: the cup stacking activity and the food chain link creation using paper links.</i></p>	<p>Formal: A quiz will be at the end of this lesson, specifically a matching quiz. On the left side of the paper will be a list of different organisms, they will have to match each organism to either producer, primary consumer, secondary consumer, or decomposer.</p> <p>Informal: The informal assessment of this lesson will be the completion of the cup stacking activity and the creation of the food chain link.</p>

	<p><i>Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]</i></p> <p>CCC: Energy and Matter</p> <ul style="list-style-type: none"> <li>• Energy can be transferred in various ways and between objects.</li> </ul>		
7	<p><i>What are Omnivores, Carnivores, and Herbivores</i></p> <p><i>5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</i></p>	<p><i>CTQ: What are the characteristics of omnivores, carnivores, herbivores that set them apart from each other?</i></p> <p><i>This lesson will consist of a PowerPoint going over the definitions of each of the categories listed above, as well as organisms that fit into each of them. We will also do a worksheet that characterizes the three</i></p>	<p>Formal: We will have a chapter test on lessons 6 and 7. This will include multiple choice, matching, T/F, and open-ended questions.</p> <p>Informal: The worksheet will be the informative assessment for this lesson so that students can demonstrate their understanding of the lesson in a fun way.</p>

		<p>groups and looks like this:</p> 	
8	<p>Disturbances in food chains- Cause and effect cross cutting concept</p> <p>5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p>	<p>CTQ: What does it mean if there is a disturbance in a food chain?</p> <p>In this lesson, we will go over what we already know about food chains and have students think about what happens when something happens to an organism in a food chain. Students will be introduced to the key term ‘extinction’ and understand how species become extinct.</p>	<p>Formal: Students will be given an index card and will make a KWL chart to show what they already know, what they want to know and what they learned.</p> <p>Informal: Students will draw a diagram of a food chain and will have to include a disturbance in it. They will write a short summary of what animals are affected and how the disturbance affects the rest of the food chain</p>
9	<p><i>What is a food web?</i></p> <p>5-LS2-1. <i>Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</i></p>	<p>CTQ: What is a food web?</p> <p>In this lesson, students will be taught the definition of a food web and will be shown graphics of food webs and what kinds of organisms are involved. They will be shown examples of food webs in different ecosystems.</p>	<p>Formal: Students will be given a short quiz on food webs in different ecosystems where they will have to identify food webs in the ecosystem.</p> <p>Informal: Students will create a diagram with a partner on a large piece of construction paper of a food web of an ecosystem of their choice.</p>
10	<p><i>Difference between food chain and food web?</i></p>	<p>CTQ: What is the difference between a food chain and a food web?</p>	<p>Formal: Students will be given a short quiz for extra credit where they have to</p>



	<p>5-LS2-1.  <i>Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</i></p>	<p>In this lesson, students will compare and contrast food webs and food chains.</p>	<p>identify if something is a food web or a food chain.          Informal: Students will play "around the world" where they are shown images/diagrams of either a food chain or food web and have to race each other to say which it is.</p>
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