

Domain-Based Unit Overview

Title of Domain: Energy and Matter in Ecosystems

Big Idea

This unit focuses on the scientific concept that energy and matter flow through and ecosystem to an individual organism and back to the ecosystem in a continuous cycle.

What Students Need to Learn

You can find the Focus on the Main Idea at the start of every lesson.

1. Organisms need and use energy
2. Plants and animals need and use energy
3. Matter cycles through ecosystems

MN Academic Standards (2019)

5L.1.2.1.4
5P.3.1.1.1
5P.3.1.1.2
5L.3.2.1.1
5L.4.1.2.1

Pre-Assessment

- 1) What can you tell me about ecosystems?
- 2) How does energy flow through an ecosystem?
- 3) Where does matter exist in an ecosystem?

Domain Chapter 1	Living Things Grow and Change (3 Days)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4
Objectives	<p>✓ Explore living things, how they grow and change, and how they meet their energy needs</p> <p>✓ Explore living things, how they grow and change, and how they meet their energy needs.</p> <p>✓ Identify the basic function in an ecosystem of producers and consumers.</p> <p>✓ Identify food as the source of chemical energy needed for survival.</p>

Vocabulary	organism, producer, consumer, decomposer, and scavenger
Procedure	<p>Day 1</p> <ol style="list-style-type: none"> 1) Students will be planting a mystery seed in soil. Students will have a choice between 4 seeds to plant with their partner. Each student will receive a plastic cup in which they will write their names and seed letter on the cup with masking tape. Students will fill the $\frac{3}{4}$ of the cup with soil, place the seed about an inch down and place a small amount of water into the cup. Cups with seeds will be placed in the greenhouse (borrowed from middle school science teacher). Students are to complete the hypothesis section of the lab packet “Mystery Plant Data Sheet”. <p>Day 2</p> <ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse when you arrive to school. 2) Teacher asks students pre-assessment questions. 3) Big Question: Where do organisms get the energy they need for living? 4) Review lesson vocabulary 5) Ask Class: How do you know which things are alive and which things are not alive in the classroom? 6) Discuss which process are for plants and for animals. Make sure you discuss the following process: movement, respiration, sensitivity, growth, reproduction, excretion, and nutrition. 7) Teacher reads Chapter 1: Living Things Grow and Change 8) Complete Unit 2- Lesson 1 Worksheet 9) Exit Ticket: Where do organisms get the energy they need for living? <p>Day 3</p> <ol style="list-style-type: none"> 1) Students will observe decomposers throughout the unit. As a large class create a compost bin in which you will place red compost worms into and observe daily. Compost worms can be order through https://unclejimswormfarm.com/ and are usually delivered within two business days. Make sure you read the directions at arrival of the worms to guarantee best results. See the “Composting Worms Information Sheet” for information on setting up your habitat. 2) Show the following video on what you should and should not place into your composting bin. https://www.youtube.com/watch?v=eLZNLexp--o
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 2	Producers, Consumers, and Decomposers (1 Day)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4
Objectives	<p>✓ Create a model that shows the relationship between sunlight, producers, and consumers.</p> <p>✓ Explain how the energy in animals' food originated as energy from the sun.</p>
Vocabulary	sugar, glucose, photosynthesis, and metabolism
Procedure	<ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse when you arrive to school. 2) Have students observe the decomposers at work. Note: They will be very active, so do not be surprised if they are all over the place when you open the bin lid. As a group share observations. You may also need to add leaves and water at this time. You want moist soil. 3) Review: What are three things that plants need? 4) Big Question: How do organisms use energy that originally comes from the sun? 10) Review lesson vocabulary 11) Popcorn read Chapter 2: Producers, Consumers, and Decomposers 12) Complete as a class "Unit 2- Lesson 2" Worksheet 13) Exit Ticket: On a white board have students answer the following question "How do organisms use energy that originally comes from the sun?"
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 3	What Plants Need (2 Days)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4
Objectives	<p>✓ Explain that experiments have shown that the increase in matter during plant growth does not come from the soil.</p>
Vocabulary	transpiration and hydroponics
Procedure	<p>Day One</p> <ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse. 2) Students will be growing sunflowers without soil throughout the unit. Students will follow "Growing Plants Without Soil Lab".

	<p>Day Two</p> <ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse. 2) Have students pick up a variety of small dead leaves from the ground. Thinner leaves work best. 3) Have students complete Day One observation for their Mystery Plants. 4) Review: Give an example of a producer, consumer, scavenger, and decomposer. 5) Big Question: Where do plants get the materials they need for growth? 6) Review lesson vocabulary 7) Read pages 15-18 as a large group read Chapter 3: What Plants Need 8) Stop at the bottom of page 18 in the student reader and place a clear plastic bag over a plant. Make sure the plastic bag covers the plant completely and the plant is placed in a sunny area. 9) Continue reading 18-22 in the student reader. 10) Place a leave under a microscope so students are able to see small holes. These holes is where air is let in and released. 11) Have students completed “Unit 2- Chapter 3 Worksheet” 12) Exit Ticket: Students should share with table groups “Where do plants get the materials they need for growth?”
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 4	Energy Relationships Among Organisms (7 Days)
MN Academic Standards	<p>5P.3.1.1.2 5L.1.2.1.4 5P.3.1.1.1</p>
Objectives	<p>✓ Explain the energy relationship between the sun, plants, herbivores, omnivores, and carnivores</p> <p>✓ Make a presentation that explains the energy relationship between the sun, plants, herbivores, omnivores, and carnivores</p>
Vocabulary	herbivore, carnivore, and omnivore
Procedure	<p>Day One</p> <ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse. 2) Have students observe their “No Soil Plants” and complete next blank observation day. 3) Review: Have students describe what hydroponics and transpiration is.

	<p>4) Review learning targets for the lesson.</p> <p>5) Big Question: Where do different organisms get their energy?</p> <p>6) Review lesson vocabulary.</p> <p>7) Large group read Chapter 4 “Energy Relationships Among Organisms”</p> <p>8) Students will discuss the following questions with their elbow partner.</p> <p style="padding-left: 40px;">a) Where do organisms get their energy? (Big Question)</p> <p style="padding-left: 40px;">b) What’s the difference between herbivores, carnivores, and omnivores? Give an example of each.</p> <p>Day Two-Six</p> <p>1) Teacher: Turn on light to the greenhouse.</p> <p>2) Students will be divided to complete the “Matter and Energy Project”</p> <p>3) Students will complete the project for one of the following ecosystems: desert, river, or coral reef.</p> <p>4) Students will work through the “Matter and Energy Project” and will present their project to their classmates.</p> <p>5) If time allows have groups type the information they will be sharing with other groups.</p> <p>6) Posters can be completed with paint, markers, or colored pencils. They can be two-dimensional or three-dimensional. Let each group be creative.</p> <p>7) On Day Six review the rubric with the class.</p> <p>Day Seven</p> <p>1) Teacher: Turn on light to the greenhouse.</p> <p>2) Students will share their presentations with classmates today.</p> <p>3) Teacher will complete the presentation component of the rubric during the presentations.</p> <p>4) When all the groups have finished presenting their project. Students should complete a peer observation for each group member and a self-evaluation on themselves.</p>
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 5	Ecosystems (1 Day)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4 5L.4.1.2.1
Objectives	✓ Define the term ecosystem and describe at least four examples

Vocabulary	ecosystem
Procedure	<ol style="list-style-type: none"> 1) Teacher: Turn on the light to the greenhouse 2) Review: How does matter and energy travel throughout an ecosystem? 3) Share learning targets with class. 4) Big Question: What is an ecosystem, and what are some different types of ecosystems? 5) Review lesson vocabulary 6) Popcorn read Chapter 5 “Ecosystem” 7) Discuss the following questions as a large group <ol style="list-style-type: none"> a) What is the difference between an ecosystem and a non-ecosystem? b) What would happen to the organisms if their water were taken away? How do you think this would affect an ecosystem? c) What would happen to the organisms if their ecosystem suddenly stopped getting as much sunlight? How would this affect the ecosystem as a whole? 8) Complete Unit 2- Chapter 5 worksheet. 9) Exit Ticket: What is an ecosystem, and what are some different types of ecosystems?
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 6	Food Chains and Food Webs (1 Day)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4
Objectives	✓ Compare a food chain to a food web
Vocabulary	food chain, and food web
Procedure	<ol style="list-style-type: none"> 1) Teacher: Turn on the to the greenhouse 2) Have students make an observation on their “Mystery Plants” 3) Review: Why are ecosystems important? 4) Big Question: What are food chains and food webs? 5) Introduce vocabulary for the chapter 6) Large group read Chapter 6 “Food Chains and Food Webs” 7) As a class completes a food web and food chain for the following organisms: fox, cat, grass, slug, birds, and rabbits. 8) Have students complete activity 12.1 (page 142 of Teacher Resources)

	9) Have students answer the big question “What are food chains and food webs”
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 7	Rain Forest Ecosystem Field Diary (1 Day)
MN Academic Standards	5P.3.1.1.2 5L.1.2.1.4
Objectives	✓ Create and use a model to show the cycling of matter and food energy from producers to consumers to decomposers, and show how the interactions of producers, consumers, and decomposers meet the needs of the living things in an ecosystem.
Vocabulary	producers, consumers, scavengers, and decomposers
Procedure	<ol style="list-style-type: none"> 1) Teacher: Turn on the light for the greenhouse. 2) Review: Review: What is an example of a food chain? What is an example of a food web? Why are food chains important to an ecosystem? 3) Introduce learning targets with class 4) Big Question: What goes on in a rainforest ecosystem? 5) Review what a producer, consumer, scavenger, and decomposer are and give an example of each. 6) Have the students listen to the teacher read page 41 from the student reader. 7) Have students draw what they heard on a piece of white paper. Students should use colored pencils to add color and value to their image. Give students five minutes to complete this activity 8) Have students listen as the teacher reads page 42. 9) Have students add additional details to their picture from what they heard in the reading. Give students another five minutes to add information from page 42. 10) Have students listen to the teacher as they read pages 43 and 44 11) Students should add additional details from pages 43-44 to their pictures. Provide students five minutes of work time. 12) Teacher will continue to read pages 45-46 outloud to the class as they listen for new information. 13) Have students add additional details to their drawing. Students will have an additional five minutes to complete their artwork. 14) Students will discuss the following with their diagonal partner <ol style="list-style-type: none"> a) What details did you add to your image?

	<p>b) Why did you choose to add those details compared to other details.</p> <p>c) Compare and Contrast their images</p> <p>15) Exit Ticket: What goes on in a rainforest ecosystem?</p>
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>

Domain Chapter 8	Changes in Ecosystems (5 Days)
MN Academic Standards	<p>5P.3.1.1.2</p> <p>5L.1.2.1.4</p> <p>5P.3.1.1.1</p>
Objectives	✓ Describe specific ways that an ecosystem and its food webs can be disrupted and protected.
Vocabulary	disrupted
Procedure	<p>Day 1</p> <p>Teacher: Turn on the lights to the greenhouse at the start of the day</p> <p>Have students make observations on their “Mystery Plants” and their “No Soil Plants”</p> <p>Review: What goes on in a rainforest ecosystem?</p> <p>Go over Learning Targets with class</p> <p>Big Idea: What happens when ecosystems are disrupted?</p> <p>Review Vocabulary for the chapter</p> <p>Large group read Chapter 8 “Changes in Ecosystems”</p> <p>Ask the class the following discussion questions</p> <ol style="list-style-type: none"> 1. Are there interdependent relationships in ecosystems? 2. What kinds of changes can disrupt an ecosystem? 3. What did you read about in the reading selection that is like these activities? <p>Have students complete worksheet 14.1 with a partner.</p> <p>Day 2</p> <p>Teacher: Why is a balanced ecosystem essential to food webs and chains?</p> <p>Teacher: Today we will be playing a predator and prey game outside.</p> <p>Teacher: Introduces the game see “Predator and Prey Activity” sheet for game instructions and needed materials. Make sure to review safety elements of the game.</p> <p>End of Activity Group Discussion:</p> <ol style="list-style-type: none"> 1. What were some challenges of the game?

	<ol style="list-style-type: none"> 2. What went well in the game? 3. How does this game relate to what we have been learning about this unit? <p>Day 3</p> <ol style="list-style-type: none"> 1. Class Discussion: What do we notice about our plant versus other plants? How can these changes help us identify our plant? 2. Students will complete “Mystery Plant Identification” lab 3. Students will need to have access to the internet to help them uncover their mystery plant. <p>Day 4</p> <p>Non-Soil Plants Discussion</p> <ol style="list-style-type: none"> 1. Have the class walk around and write down things they notice about the plants without soil on a large post-it. 2. Have partners grab their plants and sit next to one another. 3. Partners should share with one another what they observed and discuss what they notice about their plant. 4. Class Discussion: <ol style="list-style-type: none"> a. What similarities do we notice between the plants we grew in soil versus plants we did not use soil for? b. What differences do we notice about plants we grew in soil versus plants we grew without soil? c. Why did some plants grow and others did not? d. What changes would your group make if they were to do the experiment again? <p>Compost Discussion</p> <ol style="list-style-type: none"> 1. Review: Why is composting good for the planet but also good for decomposers? What is a decomposer? 2. Teacher: Today we will take a look at our composting worms and discuss what changes we have seen take place in the bin throughout the unit. 3. Teacher: Open the lid to the composting worms and let students discuss amongst themselves. 4. Class Discussion: Who would like to share their observations with the class? (Teacher will call on students to share their observations) 5. Teacher: Review what is happening, why it is happening, and the important role that decomposers play in breaking down organic material into nutrient rich soil. <p>Exit Ticket</p> <ol style="list-style-type: none"> 1. Have students share how plants that do not grow in soil and composting worms play an important role in an ecosystem. <p>Day 5</p>
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	<p>Final Reflections</p> <p>Teacher: Write the following reflection questions on the board.</p> <ol style="list-style-type: none"> 1. What makes living things alive? 2. Where do organisms get the energy they need for living? 3. What happens when human activity disrupts an ecosystem? 4. What is an ecosystem, and what are some different types of ecosystems. 5. What have I learned about ecosystems? <p>Students: Students will reflect on each question and write their responses on a piece of lined paper in complete sentences.</p>
Poetry	<i>If Applicable</i>
Fiction	<i>If Applicable</i>
Saying and Phrases	<i>If Applicable</i>
Writing	<i>If Applicable</i>