



# **Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project**

**Grade 5 Science**

**Unit 2 Instructional Framework**

**Matter and Energy in Organisms and Ecosystems**

**October 2022**

*The SIPS Grade 5 Science Unit 2 Instructional Framework: Matter and Energy in Organisms and Ecosystems was developed with funding from the U.S. Department of Education under the Competitive Grants for State Assessments Program, CFDA 84.368A. The contents of this paper do not represent the policy of the U.S. Department of Education, and no assumption of endorsement by the Federal government should be made.*

*All rights reserved. Any or all portions of this document may be reproduced and distributed without prior permission, provided the source is cited as: Stackable Instructionally-embedded Portable Science (SIPS) Assessments Project. (2022). SIPS Grade 5 Science Unit 2 Instructional Framework: Matter and Energy in Organisms and Ecosystems. Lincoln, NE: Nebraska Department of Education.*

## Table of Contents

Unit 2 Overview .....	1
Stage 1 – Desired Results .....	2
Overview of Student Learning Outcomes .....	2
Next Generation Science Standards (NGSS) Performance Expectations & Foundation Boxes.....	2
Acquisition Goals.....	4
Cross-curricular Integration.....	5
Common Core State Standards for Literacy .....	5
Common Core State Standards for Mathematics.....	5
Enduring Understandings.....	6
Essential Questions .....	6
Vocabulary .....	6
Stage 2 – Assessment Evidence .....	7
Assessment Overview .....	7
Instructionally-Embedded Assessments .....	7
Instructionally-embedded Assessments for Use during Instructional Segment 1 .....	8
Instructionally-embedded Assessments for Use during Instructional Segment 2 .....	11
Instructionally-embedded Assessments for Use during Instructional Segment 3 .....	13
Guidance for Equitable Assessments for Diverse Learners .....	17
Stage 3 – Learning Plan .....	18
Learning Plan Rationale .....	18
Unit Entrance .....	18
Instructional Segment 1 Learning Investigations and Sample Lessons .....	19
Instructional Segment 2 Learning Investigations and Sample Lessons .....	22
Instructional Segment 3 Learning Investigations and Sample Lessons .....	24
Accessibility and Differentiation for Diverse Learners.....	28
Core Text Connections .....	28
Instructional Resources.....	29

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

## Unit 2 Overview

### Storyline Synopsis:

This unit consists of three instructional segments, each engaging students in multiple science and engineering practices and crosscutting concepts as students make sense of the key disciplinary ideas of energy in chemical processes and everyday life, matter and energy flow in organisms, interdependent relationships in ecosystems, and cycles of matter and energy transfer in ecosystems.

- **Instructional Segment 1:** By engaging in the practices of developing and using models, obtaining, evaluating, and communicating information, and analyzing data, students learn that animals need food to grow, repair, and provide energy for warmth and motion, but animals cannot make their own food and instead eat plants and animals. Students begin the unit by exploring an anchor phenomenon that is based on a shared class experience of viewing an owl in flight and dissecting owl pellets to explore the questions, “What do owls eat?” and “Is it possible to tell what an owl eats by dissecting owl pellets?” This investigation is revisited throughout the unit as students add to their explanatory models that show the transfer of matter and flow of energy within the owl’s ecosystem. The segment culminates with students expanding their model food chain into a food web to show the interrelationships among animals and plants and the flow of matter and energy within an ecosystem.
- **Instructional Segment 2:** By engaging in the practices of questioning, carrying out investigations, analyzing and interpreting data, and developing models, students engage in arguments from evidence about the role of air, water, and sunlight for plants to grow and make food. Students begin the segment by generating questions and obtaining information about the conditions and social reasons for a local community member’s garden. Students then conduct several investigations to explore how well plants grow in variable conditions (i.e., with more or less sunlight, air, water, and soil). At the end of the segment, students revisit their models from segment 1 to model the importance of the sun in providing energy to plants that form the foundation of the food web.
- **Instructional Segment 3:** By engaging in the practices of engaging in argument from evidence and developing models, students use reasoning and evidence to support arguments related to the different types of interactions in an ecosystem and how matter cycles among living and non-living components of an ecosystem. Students analyze and interpret data about interdependent relationships within an ecosystem by studying the movement of matter between plants, animals, and decomposers, and create models of food chains and food webs to show how decomposers play a role in moving matter within the ecosystem. Students then share their explanatory models and receive and provide feedback. Students extend the learning as they also investigate multiple ecosystems before and after the introduction of an invasive species to support a claim about how organisms’ needs are met in an ecosystem and how the introduction of an invasive species can disrupt those needs.

**Unit Storyline Framing:** *Barn owls are large predatory birds. Where does the energy and matter (stuff) of an owl come from to start? And where does it go?*

*(Districts/Teachers/States can customize the Unit Storyline Framing. Rather than using an owl as the central animal/population that is the focus of the model, they could still use the owl pellet as an anchor phenomenon to start the unit on investigating food (and other needs) that animals must meet to grow and survive, and then pivot to the specific animal of interest for their community.)*

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Stage 1 – Desired Results**

**Overview of Student Learning Outcomes**

The Grade 5 Unit 2 Topic Bundle, “**Matter and Energy in Organisms and Ecosystems**” organizes performance expectations with a focus on the interconnectedness of organisms and environments within ecosystems, and how matter cycles and energy flows within these ecosystems that enable living things to grow and survive. By building on familiarity with previous Unit 1 ideas related to matter in physical systems and developing scientific models, Unit 2 allows students to use and extend this knowledge to explain and model phenomena and solve design problems when investigating life and life systems on Earth. Students apply Science and Engineering Practices with an emphasis on developing and using models and engaging in evidenced-based arguments related to the transfer of matter in ecosystems and the transfer of energy that is required by living things for growth and survival.

**Unit 2 Big Ideas:**

<b>LS1.C Organization for Matter and Energy Flow in Organisms &amp; PS3.D Energy in Chemical Processes and Everyday Life</b>	1. Plants need food to grow, which they make themselves by using energy from the sun and materials (chiefly air and water) from the environment. (5-PS3-1; 5-LS1-1)
<b>LS1.C Organization for Matter and Energy Flow in Organisms</b>	2. Animals need food to grow, repair, and provide energy for warmth and motion, but animals cannot make their own food and instead eat plants, animals, or plants and animals. (5-PS3-1, 5-LS2-1)
<b>LS2.A Interdependent Relationships in Ecosystems</b> <b>LS2.B Cycles of Matter and Energy Transfer in Ecosystems</b>	3. Matter moves (cycles) between organisms and non-organisms (i.e., abiotic elements) creating interdependent relationships among organisms and components within an ecosystem. (5-LS2-1)



The [SIPS Unit 2 Student Profile](#) describes what students should know and be able to demonstrate prior to and at the culmination of three-dimensional science instruction in Unit 2 to prepare for new and increasingly sophisticated learning opportunities in Unit 3.

**Next Generation Science Standards (NGSS) Performance Expectations & Foundation Boxes**

**5-PS3-1** 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. **[Clarification Statement: Examples of models could include diagrams and flow charts.]**

**5-LS1-1** Support an argument that plants get the materials they need for growth chiefly from air and water. **[Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]**

**5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. **[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. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]**

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

Targeted Scientific Practices	Targeted Disciplinary Core Ideas	Targeted Cross-Cutting Concepts
<p><b>[SEP-2] Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Use models to describe phenomena. <b>(5-PS3-1) (5-LS2-1)</b></li> </ul> <p><b>[SEP-7] Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>Support an argument with evidence, data, or a model. <b>(5-LS1-1)</b></li> <li>Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. <b>(5-PS1-4)</b></li> </ul> <p><b>Connections to the Nature of Science</b>            Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none"> <li>Science explanations describe the mechanisms for natural events. <b>(5-LS2-1)</b></li> </ul>	<p><b>PS3.D: Energy in Chemical Processes and Everyday Life</b></p> <ul style="list-style-type: none"> <li>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). <b>(5-PS3-1)</b></li> </ul> <p><b>LS1.C: Organization for Matter and Energy Flow in Organisms</b></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. <b>(5-PS3-1; secondary)</b></li> <li>Plants acquire their material for growth chiefly from air and water. <b>(5-LS1-1)</b></li> </ul> <p><b>LS2.A Interdependent Relationships in Ecosystems</b></p> <ul style="list-style-type: none"> <li>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 plant 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. <b>(5-LS2-1)</b></li> </ul> <p><b>LS2.B Cycles of Matter and Energy Transfer in Ecosystems</b></p>	<p><b>[CCC-5] Energy and Matter</b></p> <ul style="list-style-type: none"> <li>Energy can be transferred in various ways and between objects. <b>(5-PS3-1)</b></li> <li>Matter is transported into, out of, and within systems. <b>(5-LS1-1)</b></li> </ul> <p><b>[CCC-4] Systems and System Models</b></p> <ul style="list-style-type: none"> <li>A system can be described in terms of its components and their interactions. <b>(5-LS2-1)</b></li> </ul>

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

	<ul style="list-style-type: none"> <li>• Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)</li> </ul>	
--	--	--

**Acquisition Goals**

Acquisition Goals are multi-dimensional knowledge-in-use statements that integrate aspects of the NGSS dimensions (SEP & DCI or SEP & DCI & CCC) but are smaller in breadth than a performance expectation. Acquisition Goals describe the essential concepts and key skills a student must acquire to obtain mastery of the unit’s objectives and emphasize student understanding as rooted in engagement with the science and engineering practices and not in memorization of science facts. The acquisition goals intentionally include SEP and CCC from outside of the unit’s PE bundle.

***Students will know and be able to . . .***

- A1.** Plan or carry out an investigation on an animal's main food supply.
- A2.** Analyze and interpret data to determine the role of food in an animal's growth and repair.
- A3.** Construct an explanation about how animals rely on food for body repair and growth.
- A4.** Obtain and communicate information about how the energy for motion and/or body warmth in animals comes from food.
- A5.** Use a model to describe how the energy for motion and/or body warmth in animals comes from food.
- A6.** Use a model to describe that plants form the foundation of the food web.
- A7.** Ask questions based on observations about the relationship between food and growth in plants.
- A8.** Plan or carry out an investigation on the role of air and water in plant’s growth.
- A9.** Analyze and interpret data to determine the role of sunlight in the process of making food by plants.
- A10.** Engage in argument from evidence about the role of sunlight in the process of making food by plants.
- A11.** Plan and carry out an investigation to obtain data about the role of decomposers within an ecosystem.
- A12.** Develop a model to describe that matter cycles among living and non-living components within an ecosystem.
- A13.** Support an argument that makes a claim that multiple organisms' needs must be met within their ecosystem and the effects of introducing non-native species.
- A14.** 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. [5-PS3-1]
- A15.** Support an argument that plants get the materials they need for growth chiefly from air and water. [5-LS1-1]
- A16.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [5-LS2-1]

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

- A17.** Engage in argument from evidence about the role of air and water in the process of making food by plants.
- A18.** Develop a model to describe that plants get the materials and energy they need for growth chiefly from air, water, and sunlight.
- A19.** Engage in argument from evidence about the role of plants as the foundation of the food web.
- A20.** Analyze and interpret data to make sense of the process of decomposition of matter, using logical reasoning.
- A21.** Use data to evaluate claims about the role of decomposers in breaking down matter.

***Cross-curricular Integration***

Students deepen their knowledge of the interconnectedness of organisms and environments within ecosystems and how matter cycles and energy flows within these ecosystems that enable living things to grow and survive. Students develop these understandings by developing and using models of ecosystems and food webs and by constructing and supporting evidence-based arguments that center around ecosystems, food webs, and the materials and energy that organisms use to grow and survive. Students use reading and research skills to **acquire new information** and **draw on** and **integrate information** from **multiple sources** and use writing and speaking and listening skills to **construct and present arguments** with **strong reasoning and evidence**. Students also use mathematical practices such as **reasoning and modeling** and mathematical concepts related to **measurement and data** to explain phenomena or create solutions to design problems.

**Common Core State Standards for Literacy**

***Reading Informational Text***

- RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. **(5-LS1-1)**
- RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **(5-PS3-1) (5-LS2-1)**
- RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. **(5-LS1-1)**

***Speaking and Listening***

- SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. **(5-PS3-1) (5-LS2-1)**

***Writing***

- W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. **(5-LS1-1)**

**Common Core State Standards for Mathematics**

***Mathematical Practice***

- MP.2** Reason abstractly and quantitatively. **(5-LS1-1) (5-LS2-1)**
- MP.4** Model with mathematics. **(5-LS1-1) (5-LS2-1)**
- MP.5** Use appropriate tools strategically. **(5-LS1-1)**

***Measurement and Data***

- 5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. **(5-LS1-1)**

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

<i>Enduring Understandings</i>	<i>Essential Questions</i>	
<p><b>Students will understand that . . .</b></p> <p><b>EU1.</b> The energy needed by many living things comes from the sun and flows through an ecosystem from one level of the food web to the next. Matter continuously cycles among plants, animals, decomposers, and the environment within an ecosystem.</p> <p><b>EU2.</b> We can use different types of models to clarify and deepen our ideas and explanations about the dependent relationships and interactions among animals and plants in an ecosystem.</p> <p><b>EU3.</b> Organisms can survive only in environments where their needs can be met. The changes that one organism makes to adapt or survive impacts other organisms and the environment.</p> <p><b>EU4.</b> Many factors (e.g., non-native species introduction) can alter the living and non-living parts of an ecosystem, thereby creating changes to the overall system.</p> <p><b>EU5.</b> Scientific arguments are based on evidence and reasoning. Data collected from an investigation or represented in models can be analyzed and compared to provide the most relevant evidence to strengthen an argument.</p>	<p><b>EQ1.</b> How do energy and matter move through an ecosystem?</p> <p><b>EQ2.</b> How can I explain the interdependent relationships and interactions among animals and plants in an ecosystem?</p> <p><b>EQ3.</b> How can change in one part of an ecosystem affect change in other parts of the ecosystem?</p> <p><b>EQ4.</b> What factors can influence the health and stability of an ecosystem?</p> <p><b>EQ5.</b> How do I use evidence, data, and models effectively to develop a strong scientific argument? How much evidence do I need to support my argument?</p>	
<i>Vocabulary</i>		
<ul style="list-style-type: none"> <li>• Ecosystem</li> <li>• Environment</li> <li>• System</li> <li>• Energy</li> <li>• Energy transfer</li> <li>• Stored energy</li> <li>• Cycles</li> <li>• Matter</li> <li>• Organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Microbes</li> <li>• Conditions</li> <li>• Habitat</li> <li>• Population</li> <li>• Producers</li> <li>• Consumers</li> <li>• Decomposers</li> <li>• Decomposition</li> <li>• Predator</li> </ul>	<ul style="list-style-type: none"> <li>• Prey</li> <li>• Artificial light</li> <li>• Natural light</li> <li>• Materials</li> <li>• Food web</li> <li>• Food chain</li> <li>• Scientific argument</li> <li>• Explanation</li> <li>• Invasive species</li> <li>• Native species</li> </ul>



**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

## Stage 2 – Assessment Evidence

### *Assessment Overview*

For each of the acquisition goals listed in the Stage 1 – Desired Results, evidence statements were developed. These statements provide information about what we would expect students to do in order to determine the degree to which students have met the acquisition goals. These acquisition goals and evidence statements were then sequenced into instructional segments. Evidence statements and acquisition goals that were deemed critical were identified and assessment opportunities were developed. For this unit, three instructional segments were identified. An overview of each segment is provided below.

**Instructional Segment 1** focuses on Big Idea 2, which has students obtaining and communicating information and using models and data to identify and explain what animals eat, how they use this food, and that the foundation of food webs are plants. Students are informally assessed on their ability to obtain and communicate information, some of which includes analyzing data, and to use models to show how energy for motion and/or body warmth in animals comes from food and how tracing most animals' food source(s) eventually leads back to plants. Students are formally assessed at the end of the segment on their ability to identify and use evidence from various sources (texts, prior investigations, models) to construct an explanation about these same disciplinary core ideas.

**Instructional Segment 2** focuses on Big Idea 1, which has students carrying out investigations, analyzing and interpreting data, and modeling to engage in argumentation about the role of air, water, and sunlight in plant growth. The importance of the sun in providing energy to plants that form the foundation of the food web is emphasized and modeled. Students are formally assessed about these concepts and informally assessed using data and observations to describe what makes plants grow.

**Instructional Segment 3** focuses on Big Idea 3 and how matter cycles through the ecosystem. Students are formally and informally assessed on how to develop and use models, carry out investigations, and support arguments about how matter cycles through the ecosystem. Students use these same practices to explore the role of decomposers and the interactions among elements in an ecosystem, including how the ecosystem might be altered by the introduction of a non-native species or by the removal or change to a living or nonliving element.

**End-of-Unit Stackable, Instructionally-embedded, Portable Science (SIPS) Assessment:**

For the end-of-unit SIPS assessment, students engage in three scenario-based assessment tasks. The tasks focus on the PEs: 5-PS3-1, 5-LS1-1, 5-LS2-1.

### *Instructionally-Embedded Assessments*

For each instructional segment, descriptions of *informal* and *formal* instructionally-embedded assessments are included based on the acquisition goals and evidence statements deemed critical to assess along an instructional plan. Informal assessments defined as “in the moment” assessment opportunities identify student challenges and lack of knowledge or misconceptions and could include class check-ins such as discussion prompts, exit tickets, or graphic organizers. Formal assessments measure how well students perform when engaging with more complex tasks that require integration of the dimensions (SEPs, DCIs, CCCs) in the service of sense-making. They are administered at specific, intentional points in time along an instructional plan before or after a lesson or a series of lessons. Examples include performance tasks, concept maps, research projects, or hands-on tasks.

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Instructionally-embedded Assessments for Use during Instructional Segment 1**

**Informal Assessment: Owl Pellets [Anchor Phenomenon]**

Segment 1 begins with an investigation wherein students gather data to use for further analysis of what animals eat.

**Assessment Purpose and Use**

- Gather evidence of students’ observational skills.
- Provide students with the opportunity to generate investigable questions which they will answer as they explore the unit.

**This assessment will assess students’ ability to:**

- Develop a model to describe a phenomenon that includes the movement of matter within an ecosystem, including matter, plants, animals, decomposers, and the environment.
- Use models to describe a phenomenon that includes the idea that energy in many animals’ food was once energy from the sun.
- Generate investigable questions which require more information to answer than what is in the activity.
- Make observations and/or measurements to produce data in determining the role of food in an animal's growth and repair.
- Gather observations and/or data to generate a conclusion about the role of food in an animal's growth and repair.
- Describe how a model shows how energy for motion and/or body warmth in animals come from food.

**Administration Time:** 45-60 minutes

**Scoring Time:** 10 minutes

**Assessment Type**

Informal - Classroom Check-In

**Assessment Sub-Type(s)**

Lab/Experiment

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Owl Pellets (Anchor Phenomenon)

**NGSS PEs:**

5-PS3-1

**CCSS:**

RI.5.7

RI.5.9

**EUs/EQs:**

EU1/EQ1

EU5/EQ5

**AGs:**

A1

A5

**Informal Assessment: The Role of Food in an Animal’s Growth, Repair, and Energy**

Throughout Segment 1 of instruction, educators can use informal classroom check-ins (e.g., exit tickets, discussion prompts, or in-the-moment questions) to get a feel for which students understand the concepts outlined by the evidence statements below under the heading, “This assessment will assess students’ ability to:”. Informally assessing students’ ability to describe patterns and identify evidence could be done using quick “in-the-moment” questions. Answering these questions or describing these concepts could be done by writing, drawing, or communicating orally.

**Assessment Purpose and Use**

- Engage students in discussion among peers.
- Determine misconceptions and misunderstandings.
- Perform assessment at class level, in groups, or in pairs to steer discussion and guide instruction.

**Administration Time:** 5-10 minutes

**Scoring Time:** ~5 minutes

**Assessment Type**

Informal - Classroom Check-In

**Assessment Sub-Type(s)**

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**This assessment will assess students’ ability to:**

- Describe patterns in data related to the role of food in an animal's growth and/or repair.
- Use data to answer questions about the role of food in an animal's growth and repair.
- Identify evidence that supports an explanation of the role of food in an animal's growth and repair.
- Identify information that relates to how energy for motion and/or body warmth in animals comes from food.
- Describe how the energy for motion and/or body warmth in animals comes from food.

Discussion prompts  
 Exit Tickets  
 In-the-moment Questions

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Matter Matters
- Food Chain
- Eating for Energy and Matter

**NGSS PEs:**

5-PS3-1

**CCSS:**

RI.5.1  
 RI.5.7  
 MP.5

**EUs/EQs:**

EU1/EQ1  
 EU5/EQ5

**AGs:**

A2  
 A3  
 A4

**Formal Assessment: Modeling Energy and Food Webs**

Throughout Segment 1, students progressively add to an explanatory model of the owl/predator’s food web using the knowledge they gain from looking at what animals eat and do with that food. Students determine that all food sources ultimately lead back to plants. This can be demonstrated using a concept map of a food web, or even building a 3D/tactile representation of a food web for a hands-on task.

**Assessment Purpose and Use**

- Determine students’ understanding.
- Provide an opportunity to observe and support students’ ability to engage with peers.

**Administration Time:** 30 minutes

**Scoring Time:** 30 minutes

**Assessment Type**

Formal - Extended Performance Task

**Assessment Sub-Type(s)**

Concept Map  
 Scenario/Phenomena-based Assessment Task

**This assessment will assess students’ ability to:**

- Identify information that relates to how energy for motion and/or body warmth in animals comes from food.
- Describe how the energy for motion and/or body warmth in animals comes from food.
- Describe how a model shows how energy for motion and/or body warmth in animals comes from food.
- Use models to show how tracing most animals' food source(s) eventually leads back to plants.
- Describe patterns in data related to the role of food in an animal's growth and/or repair.
- Use data to answer questions about the role of food in an animal's growth and repair.

**Sample Formal Assessment Task:**

[“The Life of a Bear”](#)

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Stage 1 & Stage 3 Associations:**

Stage 3 Connection(s):	NGSS PEs:	CCSS:	EUs/EQs:	AGs:
• Eating for Energy and Matter	5-PS3-1	SL.5.5	EU2/EQ2	A4
• The Importance of Plants in Food Webs	5-LS2-1	RI.5.7	EU5/EQ5	A5
		W.5.1		A6
		MP.5		

**Formal Assessment: Explaining the Role of Food and Arguing the Source of that Food**

Later in the unit (in Segment 3) the teacher has opportunities to administer short performance tasks to assess students’ ability to construct explanations and engage in argumentation. Students present and self-evaluate their explanatory models. An important aspect of explanation and argumentation is linking evidence to reasoning and connecting both to the claim. A formal assessment like this at the culmination of Segment 1 can focus on assessing students’ ability to find evidence (from readings, investigations, or models) to support their claim about the role of food in animals’ growth and survival and the role of plants as the foundation of a food web.

**Assessment Purpose and Use**

- Assess students’ current level of knowledge at the culmination of Instructional Segment 1.
- Use the assessment results to inform planning for Instructional Segment 2 and to identify opportunities for reteaching or extension.

**Administration Time:** 20-25 minutes

**Scoring Time:** 15-20 minutes

**Assessment Type**

Formal - Extended Performance Task

**Assessment Sub-Type(s)**

- Written Response
- Presentation
- Other

**This assessment will assess students’ ability to:**

- Identify evidence that supports an explanation about the role of food in an animal’s growth and repair.
- Construct an explanation about the role of food in an animal's growth and repair.
- Identify information that relates to how energy for motion and/or body warmth in animals comes from food.
- Describe how a model shows how energy for motion and/or body warmth in animals comes from food.
- Use evidence and/or data to support an argument that tracing most animals' food source(s) eventually leads back to plants.
- Describe how the energy for motion and/or body warmth in animals comes from food.

**Stage 1 & Stage 3 Associations:**

Stage 3 Connection(s):	NGSS PEs:	CCSS:	EUs/EQs:	AGs:
• Matter Matters	5-PS3-1	W.5.1	EU2/EQ2	A3
• Food Chain			EU5/EQ5	A4
• Eating for Energy and Matter				A5
• The Importance of Plants in Food Webs				A19

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Instructionally-embedded Assessments for Use during Instructional Segment 2**

**Informal Assessment: Asking Questions about the Relationship between Food and Growth in Plants**

The teacher uses informal daily check-ins to gauge students’ ability to ask questions based on observations about the relationship between food and growth in plants and to use observations and measurements to answer such questions. These informal assessments can include exit tickets, discussion prompts, “in-the-moment” questions, and/or graphic organizers about the learning activities for food and growth in plants.

**Assessment Purpose and Use**

- Engage students in discussion among peers.
- Determine misconceptions and misunderstandings.
- Performed either at class level, in groups, or pairs.

**Administration Time:** 5 minutes

**Scoring Time:** 5 minutes

**Assessment Type**

Informal - Classroom Check-In

**Assessment Sub-Type(s)**

- In-the-moment Questions
- Discussion prompts
- Graphic Organizers
- Exit Tickets

**This assessment will assess students’ ability to:**

- Identify and develop testable questions about the relationship between food and plant growth.
- Identify information that describes the relationship between food and growth in plants.
- Describe patterns in data related to the role of sunlight in the process of making food by plants.
- Use data to answer questions related to the role of sunlight in the process of making food by plants.
- Make observations and/or measurements to produce data in determining the role of air and water in a plant's growth.
- Use observations and/or data to generate a conclusion about the role of air and water in plant growth.
- Develop a model that can be used to show that plants get the materials and energy they need for growth chiefly from air, water, and sunlight.
- Describe why air and water are important to plant growth.
- Describe how to conduct an investigation to determine the role of air and water in a plant's growth.
- Identify and use evidence, data, or a model to support the claim that plants make their own food using matter from air and water in the presence of sunlight.

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

	<b>NGSS PEs:</b>	<b>CCSS:</b>	<b>EUs/EQs:</b>	<b>AGs:</b>
• What’s in Your Garden? Interview with a Gardener	5-LS1-1	SL.5.5	EU1/EQ1	A7
• Conditions for Plant Growth		5.MD.A.1	EU5/EQ5	A8
• What do Plants Need to Survive?				A9

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

A15*
------

A18
-----

**Formal Assessment: What’s in Your Garden? Interview with a Gardener**

The teacher uses student questions for a community expert to gauge students’ progress and understanding of how to ask questions based on observations about the relationship between food and growth in plants, focusing on how plants make food. Students speak with a community expert or watch videos about the impacts of gardens, food access, and plants on the community. Students reflect on their own community and consider the food needs and the impact of food access for their community or other communities.

**Assessment Purpose and Use**

- Determine how well students have acquired an understanding of the concepts and practice.

**This assessment will assess students’ ability to:**

- Identify and develop testable questions about the relationship between food and plant growth.
- Describe why air and water are important to plant growth.
- Identify information that describes the relationship between food and growth in plants.

**Administration Time:** 15-25 minutes

**Scoring Time:** 5 minutes

**Assessment Type**

Formal - Short Performance Task

**Assessment Sub-Type(s)**

Scenario/Phenomena-based Assessment Task

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- What’s in Your Garden?  
Interview with a Gardener

**NGSS PEs:**

5-LS1-1
---------

**CCSS:**

RI.5.9
--------

**EUs/EQs:**

EU5/EQ5
---------

**AGs:**

A7
----

**Formal Assessment: Conditions for Plant Growth**

Students are presented with plants that they watch over time in various conditions, with individual groups selecting different variables. The data from the experiments will give students the opportunity to describe the pattern of the role that each of these variables has on plant growth.

**Assessment Purpose and Use**

- Assess clarity of instruction.
- Determine if reteaching is required prior to advancing to the next lesson.
- Provide information to support differentiated instruction.

**This assessment will assess students’ ability to:**

- Make observations and/or measurements to produce data in determining the role of different variables in a plant's growth.
- Use observations and/or data to generate a conclusion about the role of air and water in a plant's growth.
- Describe patterns in data related to the role of different variables in the process of making food by plants.
- Use data to answer questions related to the role of different variables in the process of making food by plants.

**Administration Time:** 30 minutes for 2-3 days

**Scoring Time:** 5 minutes

**Assessment Type**

Formal - Extended Performance Task

**Assessment Sub-Type(s)**

Lab/Experiment  
Extended Project

**Sample Formal Assessment Task:**

[“Lights for Plants, On or Off?”](#)

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

- Use evidence, data, or a model to support an argument that plants acquire [water] the materials they need for growth chiefly from air and water.
- Use evidence, data, or a model to support an argument about the role of sunlight in the process plants use to make food.
- Develop a model that can be used to show that plants get materials and energy they need for growth chiefly from air, water, and sunlight.
- Identify and use evidence, data, or a model to support an argument that plants acquire the materials they need for growth chiefly from air and water.
- Describe how to conduct an investigation to determine the role of air and water in a plant's growth.

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Conditions for Plant Growth

**NGSS PEs:**

5-PS3-1
5-LS1-1

**CCSS:**

RI.5.9
MP.2
MP.4
5.MD.A.1

**EUs/EQs:**

EU1/EQ1
EU5/EQ5

**AGs:**

A8
A9
A10
A17
A18

**Instructionally-embedded Assessments for Use during Instructional Segment 3**

**Informal Assessment: Asking Questions about How Matter Moves through an Ecosystem**

The teacher uses informal check-ins to gauge students’ progress and understanding of being able to use models and arguments to support claims about how matter moves through an ecosystem. These informal assessments can include exit tickets, discussion prompts, “in-the-moment” questions, and/or graphic organizers.

**Assessment Purpose and Use**

- Engage students in discussion among peers.
- Determine misconceptions and misunderstandings.
- Perform either at class level, in groups, or in pairs to steer discussion and guide instruction.

**This assessment will assess students’ ability to:**

- Use a model to describe that matter can cycle within ecosystems through organisms taking in and releasing matter.
- Describe that matter cycles among biotic and abiotic components within an ecosystem.
- Explain how non-native species introduced into an ecosystem can alter the living and non-living parts of an ecosystem creating changes to the overall system.

**Administration Time:** 5 minutes

**Scoring Time:** 5 minutes

**Assessment Type**

Informal - Classroom Check-In

**Assessment Sub-Type(s)**

In-the-moment Questions  
 Discussion prompts  
 Graphic Organizers  
 Exit Tickets

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

- Describe how a model supports the idea that matter cycles among biotic and abiotic components within an ecosystem.
- Use models to show how matter cycles among biotic and abiotic components within an ecosystem.
- Describe the relationships in a system between organisms that consume other organisms as shown in a model.
- Develop a model that describes how matter cycles among biotic and abiotic components within an ecosystem.
- Identify what evidence supports an argument that makes a claim that multiple organisms' needs must be met within their ecosystem and the effects of introducing non-native species.
- Use evidence, data, or a model to support a claim that multiple organisms' needs must be met within their ecosystem and the effects of introducing non-native species.

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Movement of Matter Through an Ecosystem: Can You Show It?
- Where Does the Energy and Matter an Owl Needs Come From?
- Constructing an Ecosystem
- Uninvited Guest: What Happens When Someone New Moves In?

**NGSS PEs:**

5-LS2-1

**CCSS:**

SL.5.5

**EUs/EQs:**

EU1/EQ1

EU3/EQ3

EU4/EQ4

**AGs:**

A12

A13

**Formal Assessment: Movement of Matter Through an Ecosystem: Can You Show It?**

Students are given a variety of biotic and abiotic (living and nonliving) picture cards and create a model of how matter moves through an ecosystem.

**Assessment Purpose and Use**

- Assess clarity of instruction.
- Determine if reteaching is required prior to advancing to the next lesson.

**This assessment will assess students' ability to:**

- Describe that matter cycles among biotic and abiotic components within an ecosystem.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Use models to show how matter cycles among biotic and abiotic components within an ecosystem.

**Administration Time:** 45 minutes

**Scoring Time:** 5 minutes

**Assessment Type**

Formal - Short Performance Task

**Assessment Sub-Type(s)**

Concept Map



**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

- Describe the relationships in a system between organisms that consume other organisms as shown in a model.
- Develop a model that describes how matter cycles among biotic and abiotic components within an ecosystem.
- Use models to show the cycling of matter in the system between plants, animals, decomposers, and the environment.

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Movement of Matter Through an Ecosystem: Can You Show It?

**NGSS PEs:**

5-LS2-1

**CCSS:**

SL.5.5

**EUs/EQs:**

EU1/EQ1

EU2/EQ2

**AGs:**

A12

A16

**Formal Assessment: Where Does the Energy and Matter an Owl Needs Come From?**

Students review the “gotta haves” for the explanatory model, self-evaluate their explanatory model, and then present their model to their peers for feedback.

**Assessment Purpose and Use**

- Assess student explanations of the anchoring phenomenon.
- Determine if reteaching is required to support student understanding.

**Administration Time:** 100 minutes

**Scoring Time:** 30 minutes

**This assessment will assess students’ ability to:**

- Describe how a model shows how energy for motion and/or body warmth in animals come from food.
- Use models to show that plants form the foundation of the food web.
- Describe the relevant relationships between energy from the sun and how it is transferred to animals through a chain of events that begins with plants producing food then being eaten by animals as shown in a model (e.g., food web).
- Describe that matter cycles among biotic and abiotic components within an ecosystem.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Use models to show the cycling of matter in the system between plants, animals, decomposers, and the environment.
- Describe the relationships in a system between organisms that consume other organisms as shown in a model.
- Identify what evidence supports an argument that makes a claim that multiple organisms’ needs must be met within their ecosystem and the effects of introducing non-native species.
- Use evidence, data, or a model to support a claim that multiple organisms’ needs must be met within their ecosystem and the effects of introducing non-native species.

**Assessment Type**

Formal - Extended Performance Task

**Assessment Sub-Type(s)**

Scenario/Phenomena-based Assessment Task

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Stage 1 & Stage 3 Associations:**

**Stage 3 Connection(s):**

- Where Does the Energy and Matter an Owl Needs Come From?

**NGSS PEs:**

5-LS2-1
5-PS3-1

**CCSS:**

RI.5.1
RI.5.7
RI.5.9
W.5.1

**EUs/EQs:**

EU1/EQ1
EU2/EQ2
EU5/EQ5

**AGs:**

A5
A6
A12
A16
A19

**Formal Assessment: Movement and Decomposition of Matter in an Ecosystem**

Matter cycles through ecosystems in different ways and is recycled. Decomposers break down dead organisms, and therefore, nutrients and gases are released and used by other organisms. When living things die, the cycle repeats. In this assessment, students analyze and interpret data to obtain evidence about the role of decomposers and the interactions among elements in an ecosystem. This assessment is intended to be administered following the lesson, "Constructing an Ecosystem."

**Assessment Purpose and Use**

- Assess clarity of instruction.
- Determine if reteaching is required.
- Provide information to support differentiated instruction.

**This assessment will assess students' ability to:**

- Make observations and/or measurements to produce data about the role of decomposers within an ecosystem.
- Identify information that shows the interactions in the system of plants, animals, and decomposers, in an environment that allows multiple species to meet their needs.
- Use observations and/or data to generate a conclusion about how interactions in a system of plants, animals, decomposers, and the environment allow multiple species to meet their needs.
- Use evidence, data, or a model to support the claim that there are interdependent relationships among organisms/elements within an ecosystem.
- Use models to show how matter cycles among biotic and abiotic components within an ecosystem.
- Describe the relationships in a system between organisms that consume other organisms as shown in a model.
- Develop a model that describes how matter cycles among biotic and abiotic components within an ecosystem.

**Administration Time:** 40 minutes

**Scoring Time:** 5-10 minutes

**Assessment Type**

Formal - Extended Performance Task

**Assessment Sub-Type(s)**

Lab/Experiment

**Sample Formal Assessment Task:**

["Movement and Decomposition of Matter in an Ecosystem"](#)

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Stage 1 & Stage 3 Associations:**

Stage 3 Connection(s):	NGSS PEs:	CCSS:	EUs/EQs:	AGs:
<ul style="list-style-type: none"> <li>Movement of Matter Through an Ecosystem: Can You Show It?</li> <li>Matter Cycles through Decomposition: What's the Breakdown?</li> <li>Constructing an Ecosystem</li> </ul>	5-LS2-1	MP.2	EU1/EQ1	A11*
		MP.4	EU2/EQ2	A12
			EU5/EQ5	A20
				A21

**Formal Assessment: Uninvited Guest: What Happens When Someone New Moves In?**

Nonnative species can be introduced to an ecosystem intentionally or unintentionally, which can result in the extinction or damage of native species. Organisms can survive only in environments where their needs can be met. In this assessment, students research a non-native species and present how it affected an ecosystem.

**Assessment Purpose and Use**

- Assess clarity of instruction.
- Determine if reteaching is required prior to advancing to the next lesson.
- Provide information to support differentiated instruction.

**Administration Time:** 40 minutes

**Scoring Time:** 10 minutes

**Assessment Type**

Formal - Research Project

**Assessment Sub-Type(s)**

Oral or Written

Other

**This assessment will assess students' ability to:**

- Explain how non-native species introduced into an ecosystem can alter the living and non-living parts of an ecosystem, creating changes to the overall system.

**Stage 1 & Stage 3 Associations:**

Stage 3 Connection(s):	NGSS PEs:	CCSS:	EUs/EQs:	AGs:
<ul style="list-style-type: none"> <li>Uninvited Guest: What Happens When Someone New Moves In?</li> </ul>	5-LS2-1	W.5.1	EU3/EQ3	A13
		SL.5.5	EU4/EQ4	

**Guidance for Equitable Assessments for Diverse Learners**

How do we optimize accessibility for diverse learners and why is this important? [Designing Equitable Assessments for Diverse Learners](#) provides steps to planning and developing equitable assessments that incorporate the principles of [Universal Design for Learning](#) (UDL) and the elements of [Universally Designed Assessments](#) (UDA). Both UDL and UDA are designed to promote access to instruction and/or assessment to the widest range of students. This includes, but is not limited to, students with varying abilities, cultures, primary languages, background knowledge, and interests. For more information about equitable assessment design and use, and why it is important, view *Chapter 4: Fairness and Accessibility* of the Strengthening Claims-based Interpretations and Uses of Local and Large-scale Science Assessment Scores (SCILLSS) [Digital Workbook on Educational Assessment Design and Evaluation: Creating and Evaluating Effective Educational Assessments](#).

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**Stage 3 – Learning Plan**

***Learning Plan Rationale***

The learning plan is based upon an articulation of learning goals (i.e., NGSS PEs, CCSS, EUs/EQs, and acquisition goals (defined in Stage 1) distributed over three instructional segments. These learning goals are used in Stage 2 to identify and describe the assessments that will be used to assess (to collect evidence of) students’ learning throughout the course of the unit and instruction. The lessons in Instructional Segments 1 through 3 are designed to ensure students have opportunities to acquire and apply the learning goals in Stage 1. The instructional segments in both Stage 2 and Stage 3 are similar in terms of the learning goals they represent. Assessments listed in Stage 2 for a segment might use (assess) fewer learning goals than are present in the respective Stage 3 but will not use additional learning goals (unless they were taught in a prior segment).

***Unit Entrance***

The unit opening focuses on students experiencing and discussing a phenomenon that sparks their interest and curiosity. To do so, the class engages with an “anchor phenomenon” and generates questions based on that phenomenon, posting their questions to the “driving question board.” Some of the questions added to the driving question board can be used by the teacher to transition into Instructional Segment 1, by framing the lessons (and segment) as a means by which to investigate and answer some of the questions that students generate based on the anchor phenomenon.

Throughout the unit (e.g., at the conclusion of each instructional segment) the teacher returns to the driving question board and has students reflect on their recent learning, and which questions they can now answer based on their learning in the prior segment. Following this reflection, the teacher uses the driving question board again, this time identifying remaining unanswered (or partially answered) questions that can motivate the activities and investigations that will be the focus of the next instructional segment.

**Anchor Phenomenon**

In this unit, the anchor phenomenon is based on the shared experience of having the students watch a video featuring a barn owl flying and then dissecting owl pellets. The teacher can problematize this for students by setting up the general question of “Barn owls are large predatory birds. Where does the energy and matter (stuff) of an owl come from to start? And where does it go?”

- Details for this Anchor Phenomenon activity appear in the first lesson (*Owl Pellets Anchor Phenomenon*) in Segment 1.

**Unit Framing**

***General Framing***

What does this owl/predator need to survive and where does that come from? Where does the food it eats get its energy and the “stuff” (matter) it’s made of? And, what happens to that stuff as the owl lives and dies?

- Districts/Teachers/States can customize, rather than using an owl as the central animal/population that is the model’s focus. They could still use the owl pellet as an anchor phenomenon to start the unit on investigating food (and other needs) that animals must meet to grow and survive, and then pivot to the specific animal of interest for their community.

***Framing for SIPS Instructional Framework (using owl from the anchor phenomenon)***

Today many animals are declining in numbers. One example is barn owls. Barn owls are large birds. Where

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

do they get their energy and the stuff they are made of? Can we trace that back to the start? How can understanding where their food comes from and where it goes help us support owls and their role in the ecosystem?

*Example Driving Questions*

Potential/example driving questions that students might generate include:

- Is it possible owls didn't have enough food, so they now live somewhere else?
- What do owls eat?
- Do owls eat plants?
- How often do owls eat?
- Where do owls live?
- Are other animals eating the owls' food?
- Where do the animals that owls eat live?
- What is food for the animals that owls eat?
- Could what owls eat tell us about the type of habitat the owl lives in?

*Problematization / Investigative Strategy for the Unit*

To understand whether the owl population has enough to eat, we'll need to investigate what they eat and why they need to eat. We'll need to understand how the owls' food supply also depends on the food supply and the interconnected plants and animals that live in the ecosystem. Was a new species introduced to the ecosystem that changed the balance and decreased the owls' food supply?

**Instructional Segment 1**

*Learning Investigations and Sample Lessons*

<p><b>Stage 1 Associations</b>  <b>NGSS PEs:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">5-PS3-1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">5-LS2-1</div> <p><b>CCSS:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.7</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.9</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">SL.5.5</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">W.5.1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">MP.5</div> <p><b>EUs/EQs:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">EU1/EQ1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">EU2/EQ2</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">EU5/EQ5</div>	<p><b>Estimated Classroom Time: 175-200 minutes</b></p> <p><b>Owl Pellets (Anchor Phenomenon)</b></p> <ul style="list-style-type: none"> <li>• 5Es: Engage &amp; Explain</li> <li>• Estimated Time: 50 to 75 minutes</li> <li>• AGs: A1, A5</li> </ul> <p>Students make observations as they watch a video of a barn owl or other predator move (example: <a href="https://youtu.be/lfqefdO5loQ">https://youtu.be/lfqefdO5loQ</a>). As students watch the video, they observe the animal and its movements and then make predictions about its needs. The whole class shares their observations and starts to think about what questions they have about barn owls. Students also engage in a conversation about which questions are investigable and which are closed-ended.</p> <p>Next, students make observations as they dissect an owl pellet either in person or virtually. Students classify the bones that they find in the pellet and record data on what they find within their owl pellet. The class comes together and creates a class table of organisms.</p> <p>The teacher facilitates a discussion about what kinds of things barn owls eat based on students' observations. Students also talk about what they think might be missing.</p>
--	--

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

<b>AGs:</b>	<p>Students then return to the earlier questions. The whole class works together to generate a driving question board about the owl from the video. The focus of the unit is on how energy and matter move through the ecosystem and make it to and from the barn owl.</p> <p>Finally, the whole class begins the collective development of a shared “explanatory model” to help answer the question, “Where does the energy and matter the owl needs come from and where does it go?” A good place to start is generating a food web using input from students. To start, the teacher focuses on the organisms that the owl eats and waits to go farther. This explanatory model will be expanded and refined throughout the unit. Students add their own details to their individual models and then share details on the class model.</p> <p>Resources:</p> <ul style="list-style-type: none"><li>• <a href="https://www.newpathonline.com">Virtual Owl Pellets (newpathonline.com)</a> (NOTE: requires a PAID ACCOUNT to do the full activity) [<a href="https://www.newpathonline.com/free-curriculum-resources/virtual_lab/Owl_Pellet_Dissection/8/8,9,10,11,12,13,14/1814">https://www.newpathonline.com/free-curriculum-resources/virtual_lab/Owl_Pellet_Dissection/8/8,9,10,11,12,13,14/1814</a>]</li><li>• <a href="https://www.birds.cornell.edu/k12/pellet-teaching-tips/">Owl Pellet Dissections: Ways to Boost Learning and Engagement [cornell.edu]</a> [<a href="https://www.birds.cornell.edu/k12/pellet-teaching-tips/">https://www.birds.cornell.edu/k12/pellet-teaching-tips/</a>]</li><li>• <a href="https://ngss.nsta.org/Resource.aspx?ResourceID=264">Dissecting an Owl Pellet</a> [NSTA.org; vetted by NSTA and free access. Lesson plan, not a virtual pellet.] [<a href="https://ngss.nsta.org/Resource.aspx?ResourceID=264">https://ngss.nsta.org/Resource.aspx?ResourceID=264</a>]</li></ul> <p><b>Matter Matters</b></p> <ul style="list-style-type: none"><li>• 5Es: Explore &amp; Explain</li><li>• Estimated Time: 50 to 100 minutes</li><li>• AGs: A2, A16</li></ul> <p>Students conduct research through other media (reading passages, text chapters, videos, websites, podcasts, images, diagrams, and others) that will help tie in what they learned about matter in Unit 1 (e.g., matter is made of particles too small to be seen) and apply it while considering how animals take what they eat and add that matter to their bodies. The sources used could come through student research, selected readings from the teacher, or a combination of both. Selected reading passages should support students in understanding that all food is composed of matter and that humans and animals are similarly composed of matter. Through reading and discourse in the class or in groups, students explore the idea that animals need to consume matter to grow and heal and that animals’ food sources provide this matter. Students then compare the data in their reading and from the earlier owl pellet dissection investigation to find patterns related to the food that owls need to grow and survive. Students use their data and information from the readings (possibly including more data on food and its importance) to respond to short answer questions, general reading guides, or specific reading guides targeted at reading passages. Students discuss their findings with peers in small and/or large group settings.</p>
A1	
A2	
A3	
A4	
A5	
A6	
A14*	
A16	
A19*	

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

Students then revise their explanatory models by adding information from the activity, such as additional information about where the owl's matter comes from and how it is used. In addition, a key/legend will be added to the class model. Its first entry will illustrate and label the color/style of the arrow that represents matter transfer.

[See Sample Lesson: [Matter Matters](#)]

### **Food Chain**

- 5Es: Elaborate & Evaluate
- Estimated Time: 40 to 50 minutes
- AGs: A3, A5, A6\*

*Part 1.* Students are assigned a prey of the barn owl (such as a vole) and tasked with making a simple model of a *food chain*. They are provided with information about the prey they have been assigned, such as pictures, videos, and basic information including the average mass of each organism. From this, they predict what the prey eats and consider what else (besides the owl) may eat the prey. Students create a simple food chain that includes the owl, the prey, and a food source for the prey such as grain seeds. Then, they demonstrate how when the prey organism eats its food, some of the matter from one organism becomes part of the other organism (possibly using playdough or building blocks to build on each time something gets eaten) and calculate how many seeds/food items would need to be consumed to equate to the average mass of the consumer. Students determine how to represent these approximations as part of their food web. Students describe how their model of the food chain shows that matter moves between organisms to support the latter animal's growth and repair. At the conclusion, the teacher asks students to consider whether "all the matter that an animal eats ends up as part of the animal" (No), and whether "all of the matter of an organism ends up as part of the animal" (like in the owl pellets, no). The teacher encourages students to consider how they might represent that as part of their food chain.

*Part 2.* Students then synthesize information they gathered in their owl pellet investigation, their readings on food sources and the role of food in growth and survival, and their food chain models shared in class to add information to their explanatory model.

### **Eating for Energy and Matter**

- 5Es: Explore & Explain
- Estimated Time: 20 to 25 minutes
- AGs: A4; A5

Students watch videos of animals doing activities that require energy and/or matter (e.g., swimming, playing, eating, growing over their lifetime, "warm-blooded" animals living in cold climates, etc.). Students discuss where animals acquired the energy and matter to do these things. Students draw from the examples and discussion to conclude that food provides energy (in addition to the matter).

Students revise their explanatory model by adding an arrow/line from the prey to the owl indicating the flow of energy. This energy arrow/line will use a different style/color than

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

the arrow/line representing matter which was added to the model in the *Matter Matters* lesson.

**The Importance of Plants in Food Webs**

- 5Es: Elaborate & Evaluate
- Estimated Time: 50 minutes
- AGs: A6; A14\*; A19\*

Students return to their model of a food chain, but this time expand it into a *food web* (as a class, the teacher discusses and emphasizes differences and similarities between a chain and web). Students can start by looking at other students' food chains from the *Food Chain* lesson. The teacher can also provide several additional animals and plants that are part of the barn owl/local predator's ecosystem. Students are given at least one carnivore, herbivore, and omnivore. Through discussion, readings, and other media, students can learn more about these categories and their food sources. Combining multiple pieces of information, students create their food webs and add evidence to their explanatory models. Using guiding questions, the teacher helps students identify the evidence they have gathered to argue that irrespective of which animals are in play, the foundation of the food web begins with the sun providing energy to plants. This provides an important and natural segue into Instructional Segment 2, where students explore the idea that plants need food to grow, which they make themselves by using energy from the sun and materials (chiefly air and water) from the environment.

Enrichment Idea: Food webs invite discussion about replacement and redundancy in food webs: "If we take the raccoon out of the web because they are being killed by humans, then the alligator can still eat the heron, etc.". Also, this allows for discussing interrelatedness and dependencies in the food webs.

**Instructional Segment 2**

***Learning Investigations and Sample Lessons***

<p><b>Stage 1 Associations</b></p> <p><b>NGSS PEs:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">5-LS1-1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">5-PS3-1</div> <p><b>CCSS:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.1</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.7</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RI.5.9</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">SL.5.5</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">MP.2</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">MP.4</div>	<p><b>Estimated Classroom Time: 225-295 minutes</b></p> <p><b>What's in Your Garden? Interview with a Gardener</b></p> <ul style="list-style-type: none"> <li>• 5Es: Engage &amp; Explore</li> <li>• Estimated Time: 25 to 45 minutes</li> <li>• AGs: A7</li> </ul> <p>Stories about gardens and those who tend to them can tell us about how plants grow. The beliefs we hold, scientific innovation, foodways, and cultural and community traditions are reflected in us in the <i>why</i> and <i>how</i> of our gardens. In this lesson, the teacher invites individuals from the community to participate in a class conversation about their gardens or presents students with videos, podcasts, and other conversations where individuals share about their gardens. For example, Ron Finley has a garden in Los Angeles and has spoken at length about his garden and how it has impacted his community (<a href="https://youtu.be/5dhdAgLPMUQ">https://youtu.be/5dhdAgLPMUQ</a>). Many people are doing this kind of work in a variety of spaces. The teacher can explore finding local individuals in the community to help make</p>
--	---



**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

5.MD.A.1											
<p>EUs/EQs:</p> <table border="1"> <tr> <td style="text-align: center;">EU1/EQ1</td> </tr> <tr> <td style="text-align: center;">EU2/EQ2</td> </tr> <tr> <td style="text-align: center;">EU5/EQ5</td> </tr> </table> <p>AGs:</p> <table border="1"> <tr> <td style="text-align: center;">A7</td> </tr> <tr> <td style="text-align: center;">A8</td> </tr> <tr> <td style="text-align: center;">A9</td> </tr> <tr> <td style="text-align: center;">A10</td> </tr> <tr> <td style="text-align: center;">A14</td> </tr> <tr> <td style="text-align: center;">A15</td> </tr> <tr> <td style="text-align: center;">A17</td> </tr> <tr> <td style="text-align: center;">A18</td> </tr> </table>	EU1/EQ1	EU2/EQ2	EU5/EQ5	A7	A8	A9	A10	A14	A15	A17	A18
EU1/EQ1											
EU2/EQ2											
EU5/EQ5											
A7											
A8											
A9											
A10											
A14											
A15											
A17											
A18											

relevant connections directly with the students. As a class, students begin by generating questions for the community experts, such as:

- When did you plant your current garden?
- How has the garden changed since you first started it?
- Where do you spend most of your time in your garden?
- What are your future plans for your garden?

Students can use a graphic organizer to document their initial thinking, questions they have for the expert, and what they learned in a chart. Students add to this chart throughout the conversation.

Enrichment Idea: Students could reflect on and write about the impacts of gardens and gardening for their community, research and learn about victory gardens during World War II, or learn about the challenges different communities face with food scarcity, food deserts, food waste, and other challenges people are facing related to food today.)

**Conditions for Plant Growth**

- 5Es: Explore & Explain
- Estimated Time: 50 minutes for *Part 1*, 5 minutes per day over 2 weeks (or use photos/video if real plants are not available) for *Part 2*, 50 minutes for *Part 3*.
- AGs: A9; A10; A14

*Part 1:* The teacher provides students with seed packets for a variety of garden plants. Students read over the packets and share what information is shared on the packets about the seeds (possible information could include: the amount of sunlight, water needs, soil needs, depth of planting, and spacing).

Next, the teacher will present students with seedlings (the teacher should select an annual plant that grows quickly and has already germinated) that they watch over time and track their growth. Students pick a variable to test for the plants to see what happens to the plant's growth. Examples: Test sunlight by growing some plants in the closet, some in full sun; growing some with water and some without; removing plants from soil and growing them in the water while keeping others in soil; growing plants in the room while other plants are grown in vacuum-sealed clear plastic bags (no air). The data from the experiment allows students to determine the need for plants to grow.

*Part 2:* Students engage in observations and gather data to address questions about the needs of plants and to argue for the cause-and-effect relationship between their variable and plant growth.

*Part 3:* After two weeks, students present their data and conclusions to the whole class. The whole class engages in a discussion about what plants need to grow and thrive, and this should include sunlight and water, not necessarily soil and spacing. Students record information that is shared with them and add information to their explanatory models about the energy and matter sources of plants. The teacher uses open-ended questioning to encourage students to think critically about their findings and facilitates discussion to reemphasize the importance of the sun in providing energy to plants that form the foundation of the food web.

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

**What Do Plants Need to Survive?**

- 5Es: Engage, Evaluate
- Estimated Time: 50 to 100 minutes
- AGs: A7; A8; A15; A17; A18

Students read informational text, watch videos, and engage with other media as part of verifying their understanding of the needs of plants. The teacher frames this as checking their results with others to see if others have the same findings. The teacher can either ask students to engage in research on their own or provide selected resources and appropriate reading passages. The teacher makes a variety of sources available to students. If asking students to engage in their own research, the teacher provides support and guidance to identify valid sources. Before students start conducting their research, the teacher facilitates a discussion to identify potential search terms and creates a list of search terms for students to use during their research.

After conducting their research, students report their findings to the class. Students present evidence that either supports or refutes their findings from the plant experiments. Students add information to their explanatory models based on the findings.

**Instructional Segment 3**

*Learning Investigations and Sample Lessons*

Stage 1  
 Associations

NGSS PEs:

5-LS2-1

CCSS:

RI.5.1

RI.5.7

RI.5.7

SL.5.5

W.5.1

MP.2

MP.4

EUs/EQs:

EU1/EQ1  
 (only matter  
 part)

EU2/EQ2

EU3/EQ3

EU4/EQ4

EU5/EQ5

**Estimated Classroom Time: 450 minutes**

**Movement of Matter Through an Ecosystem: Can You Show It?**

- 5Es: Engage & Explore
- Estimated Time: 90 minutes
- AGs: A12; A16

In this lesson, students learn about the types of matter that move among producers, consumers, and decomposers. The goal is for students to describe the movement of matter among plants, animals, and decomposers. At the end of the lesson, students develop a model (e.g., diagram) to describe how matter cycles among the living and nonliving components within an ecosystem, showing how organisms have biological needs which must be met within their ecosystems.

Students first develop an understanding of the biotic and abiotic factors within ecosystems, the characteristics and classification of living organisms, and how plants and animals obtain and use energy to fulfill their needs. Students delve deeper by examining the interdependent relationships within an ecosystem by studying the movement of matter between producers, consumers, and decomposers by creating models of food chains and food webs.

As a class, students learn that individual organisms live together in an ecosystem and depend on one another. They have many different types of interactions with each other, and many of these interactions are critical for their survival.

- An ecological community consists of all the populations of different species that live together in a particular area.

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

<b>AGs:</b>	<ul style="list-style-type: none"><li>• Many species share a habitat, and their interactions play a major role in regulating population growth and abundance.</li><li>• The populations of all the different species that live together in an area make up what's called an ecological <b>community</b>.</li><li>• Some organisms can make their own food, and others must get their food by eating other organisms.</li></ul> <p>After students have learned about the different types of interactions in an ecosystem, they will develop a model that describes how matter cycles among the living and non-living components of an ecosystem. The teacher asks students to think about and discuss why decomposers are an important part of the ecosystem. The teacher uses guiding questions, such as, "What would the world be like without decomposers?" (The world would be covered in waste. Plants would not have the nutrients to grow.) "How do decomposers contribute to a healthy ecosystem?" (They return nutrients to the soil to support plant growth.)</p> <p>Resources:</p> <ul style="list-style-type: none"><li>• Introductory video: <a href="https://www.khanacademy.org/science/biology/ecology/community-ecosystem-ecology/v/interactions-between-populations">Interactions Between Populations</a> [<a href="https://www.khanacademy.org/science/biology/ecology/community-ecosystem-ecology/v/interactions-between-populations">https://www.khanacademy.org/science/biology/ecology/community-ecosystem-ecology/v/interactions-between-populations</a>]</li></ul> <p><b>Matter Cycles through Decomposition: What's the Breakdown?</b></p> <ul style="list-style-type: none"><li>• 5Es: Explore &amp; Explain</li><li>• Time: 50 minutes</li><li>• AGs: A20; A21</li></ul> <p>In this lesson, students watch a video on decomposers and decomposition. As a whole class, students use what they saw in the video to predict what happens to a fruit that is left untouched for several weeks. The teacher lists what students share on a poster titled, "What happens to fruit over time"?</p> <p>Next, students watch a timelapse of fruit in various stages of decomposition. In small groups, students use what they see in the video and the timelapse to make a claim about what causes the fruit to decompose over time using a Claim, Evidence, Reasoning (C-E-R) graphic organizer that supports the development of an evidence-based argument. Students then incorporate information from the C-E-R and other learning into their explanatory models.</p> <p><b>[SIPS Sample Lesson: <a href="#">Matter Cycles through Decomposition: What's the Breakdown?</a>]</b></p> <p><b>Where Does the Energy and Matter an Owl Needs Come From?</b></p> <ul style="list-style-type: none"><li>• 5Es: Explain &amp; Evaluate</li><li>• Time: 100 minutes</li><li>• AGs: A3; A12; A13; A14; A16</li></ul> <p>Having worked over the last several weeks on their explanatory models, students present and defend their models to the class. Before having students finalize their models, the teacher discusses with the students what the models should all include. As a class, students develop a checklist and then self-evaluate their models (see <a href="#">Gotta Have Checklist</a>). Next, students evaluate their peers' models and provide feedback. The teacher supports the students by asking them to provide constructive feedback. The peer</p>
A3	
A10	
A11	
A12	
A13	
A14	
A16	
A20	
A21	

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

evaluation could be done through a gallery walk, where students take turns defending their model and evaluating others through whole group presentations, comments, and notes on an online document, or through other means that work well for the students. After the feedback session, students revisit and make final revisions to their models and submit them to the teacher for final evaluation.

**Constructing an Ecosystem**

- 5Es: Evaluate
- Estimated Time: 120 minutes
- AGs: A11, A12, A20, A21

In this lesson, students attach two large plastic bottles to create a decomposition eco-column. Students revisit their understanding of living and nonliving factors within ecosystems, the characteristics and classification of living organisms, and how plants and animals obtain and use energy to fulfill their needs.

Then, over the course of 1 to 2 weeks, students collect data on the observed changes to the ecosystem and delve deeper to examine the interdependent relationships within the eco-column and the movement and decomposition of matter.

Finally, students use evidence from their observations and completed data table to support the claim that there are interdependent relationships among organisms/elements within an ecosystem.

Enrichment Idea: At the end of this unit, students study ways that individual communities can use scientific ideas to protect Earth's resources and environment.

Resources:

- [Bottle Biology – An Instructional Materials Development Program \(National Science Foundation\)](https://www.bottlebiology.org/)  
[https://www.bottlebiology.org/]
- [Constructing Ecosystem Models](https://teaching.betterlesson.com/lesson/631082/constructing-ecosystem-models?from=breadcrumb_lesson)  
[https://teaching.betterlesson.com/lesson/631082/constructing-ecosystem-models?from=breadcrumb\_lesson]
- [Do the Rot Thing – A Teacher’s Guide to Compost Activities \(kidsgardening.org\)](https://www.cvswwd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwd1.pdf)  
[https://www.cvswwd.org/uploads/6/1/2/6/6126179/do\_the\_rot\_thing\_cvswwd1.pdf]

**Uninvited Guest: What Happens When Someone New Moves In?**

- 5Es: Elaborate
- Time: 120 minutes
- AGs: A13

Students engage with resources to learn about the effects of invasive species on different environments. They do so by extending their understanding of an ecosystem to characterizing how new species can cause changes to the system.



Image in the Public Domain.  
Source: National Science Foundation

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

- Consider adding additional resources that are relevant to your area. For example, kudzu vine or Spanish moss in the Southeastern US, English ivy in the Northeast, lamprey eels in the Great Lakes, Asian carp in the Mississippi watershed, phragmites, and others.

The teacher shows students a picture of purple loosestrife, phragmites, or some other locally significant invasive plant and asks them to describe what they are seeing and what they think about the plants in the picture.

The teacher shares information about the individual plant (for example, [purple loosestrife](#)). Purple loosestrife was at one time a common garden plant. But it has been found to be taking over wetlands and pushing plants out of their spaces. The teacher asks students to consider: “What might happen to the owl’s ecosystem if a plant came in and pushed out other plants?” Students look at their explanatory models and share what some possible outcomes could be.

Introduce the class to working definitions of invasive species such as:

- Invasive species are species that have been introduced into areas outside their native range and can cause—or have caused—changes in the relationship of producers, consumers, and decomposers in their new area.
- Invasive species may outcompete native species for resources or habitat, altering community structure and potentially leading to local extinctions.

Provide students with additional information and sources to explore invasive species, solutions to invasive species, and identify what they can do to help limit the spread of invasive species. Do so as an extension to work done to characterize the ecosystem(s) they have been studying.

Resources:

- [Search | BetterLesson Coaching](#)

[<https://teaching.betterlesson.com/search?q=ecosystems%20and%20non%20native%20species&salt=a367d63c16&from=header>]

- [Introduced species and biodiversity \(video\) | Khan Academy](#)

[<https://www.khanacademy.org/science/biology/ecology/community-structure-and-diversity/v/introduced-species-and-biodiversity>]

- [Invasive Species 101 | National Geographic](#)

[<https://www.nationalgeographic.co.uk/video/tv/invasive-species-101>]

- [Invasive Species: The Basics](#)

[<https://www.youtube.com/watch?v=yIgyS25Hho8>]

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

***Accessibility and Differentiation for Diverse Learners***

“Universal Design for Learning (UDL) is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn” (CAST, 2022). Taking time to reflect on prior instruction when planning for accessible, differentiated, and culturally responsive instruction for diverse learners and culturally diverse classrooms serves to identify ways to improve future instructional practices. The [UDL Guidelines](#) provide a framework for this reflection. The guidelines include three principles, Multiple Means of Engagement, Multiple Means of Representation, and Multiple Means of Action & Expression as ways to focus on variety and flexibility in instructional practices. By examining instruction and instructional materials through the lens of each of these principles, we can identify and thus reduce or remove barriers to diverse learners.

Providing Multiple Means of Engagement (e.g., allowing choices, authentic scenarios, varying demands, and clear goals), broadens the opportunities for gaining and sustaining students’ interest and cognitive engagement in learning the content. Providing Multiple Means of Representation (e.g., variety of presentation modes, clarifying vocabulary, activating background knowledge) allows students to receive and comprehend the content. Providing Multiple Means of Action & Expression (e.g., a variety of methods to respond to instruction, and a variety of ways to interact with the instructional materials) helps students to use their strengths and abilities to access the instructional materials and express what they understand. Accommodations typically reserved for students receiving special education, students who have a 504 plan, and English Learners can be made available to all students using the UDL principles, thus allowing all students to benefit from the accommodations.

The [SIPS Grade 5 Unit 2 Instructional Framework Differentiation Strategies and Resources](#) support educators’ intentional planning of accessible, differentiated, and culturally responsive instruction for all students aligned to the specific performance expectations in focus for this unit.

***Core Text Connections***

- [Barn Owl Overview, All About Birds, Cornell Lab of Ornithology](https://www.allaboutbirds.org/guide/Barn_Owl/overview)  
[https://www.allaboutbirds.org/guide/Barn\_Owl/overview]
- [Barn owl, facts and photos \(nationalgeographic.com\)](https://www.nationalgeographic.com/animals/birds/facts/barn-owl/)  
[https://www.nationalgeographic.com/animals/birds/facts/barn-owl/]
- [Barn Owl facts - All you need to know about Barn Owls \(barnowltrust.org.uk\)](https://www.barnowltrust.org.uk/barn-owl-facts/)  
[https://www.barnowltrust.org.uk/barn-owl-facts/]
- [The Field Vole Cycle - The Barn Owl Trust](https://www.barnowltrust.org.uk/barn-owl-facts/barn-owl-hunting-feeding/the-field-vole-cycle/)  
[https://www.barnowltrust.org.uk/barn-owl-facts/barn-owl-hunting-feeding/the-field-vole-cycle/]
- [Field vole | The Wildlife Trusts](https://www.wildlifetrusts.org/wildlife-explorer/mammals/field-vole)  
[https://www.wildlifetrusts.org/wildlife-explorer/mammals/field-vole]
- [Wood mouse | The Wildlife Trusts](https://www.wildlifetrusts.org/wildlife-explorer/mammals/wood-mouse)  
[https://www.wildlifetrusts.org/wildlife-explorer/mammals/wood-mouse]
- [Owl Facts: Barn Owl food chain - The Barn Owl Trust](https://www.barnowltrust.org.uk/owl-facts-for-kids/owl-food-chain/)  
[https://www.barnowltrust.org.uk/owl-facts-for-kids/owl-food-chain/]
- [The Ron Finley Project](https://ronfinley.com)  
[https://ronfinley.com]
- [What are the requirements for plant growth? - BBC Bitesize](#)

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

[<https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/z98jpbk>]

- [How to Grow Houseplants in Water | Our House Plants](#)  
[<https://www.ourhouseplants.com/guides/growing-houseplants-in-water>]
- [Needs of Plants | Let's Talk Science \(letstalkscience.ca\)](#)  
[<https://letstalkscience.ca/educational-resources/backgrounders/needs-plants>]
- [Professor Astro Cat's Atomic Adventure: Walliman, Dr. Dominic, Newman, Ben + Free Shipping \(amazon.com\)](#)  
[<https://www.amazon.com/Professor-Astro-Cats-Atomic-Adventure/dp/19>]
- [Be a Friend to Trees \(Let's-Read-and-Find-Out, Stage 2\): Lauber, Patricia, Keller, Holly: 9780064451208: Amazon.com: Books](#)  
[<https://www.amazon.com/Friend-Trees-Lets-Read-Find-Out-Stage/dp/0064451208>]
- [Living Sunlight: How Plants Bring The Earth To Life: Molly Bang, Penny Chisholm: 9780545044226: Amazon.com: Books](#)  
[<https://www.amazon.com/Living-Sunlight-Plants-Bring-Earth/dp/0545044227>]
- [The Magic School Bus Gets Planted: A Book About Photosynthesis by Lenore Notkin \(1997-06-01\): Amazon.com: Books](#)  
[<https://www.amazon.com/Magic-School-Gets-Planted-Photosynthesis/dp/B0182QBKPC>]
- [Understanding Photosynthesis with Max Axiom, Super Scientist \(Graphic Science\): O'Donnell, Liam, Barnett III, Charles, Dominguez, Richard: 9780736878937: Amazon.com: Books](#)  
[<https://www.amazon.com/Understanding-Photosynthesis-Scientist-Graphic-Science/dp/0736878939>]
- [Butternut Hollow Pond: Heinz, Brian, Marstall, Bob \(amazon.com\)](#)  
[<https://www.amazon.com/Butternut-Hollow-Millbrook-Picture-Books/dp/0822559935>]
- [Who Eats What?: Food Chains and Food Webs \(Let's-Read-and-Find-Out Science 2\): 9780062382115: Lauber, Patricia, Keller, Holly: Books](#)  
[<https://www.amazon.com/Who-Eats-What-Lets-Read-Find-Out/dp/006238211X>]
- [Producers, Consumers and Decomposers | Population Ecology | Encyclopedia Kids by Power Kids Press: Pressberg, Dava](#)  
[<https://www.amazon.com/Producers-Consumers-Decomposers-Spotlight-Ecology/dp/1499426194>]
- [What If There Were No Gray Wolves?: A Book About the Temperate Forest Ecosystem \(Food Chain Reactions\): Slade, Suzanne Buckingham, Schwartz, Carol: 9781404863958: Amazon.com: Books](#)  
[<https://www.amazon.com/What-There-Were-Gray-Wolves/dp/1404863958>]
- [A Handful of Dirt: Bial, Raymond: 9780802786982: Amazon.com: Books](#)  
[<https://www.amazon.com/Handful-Dirt-Raymond-Bial/dp/0802786987>]

**Instructional Resources**

- General Resources shared in Segment 1:
  - [Thinking Science: Questions to Promote Thinking and Discussion](#)  
<https://www.stem.org.uk/system/files/elibrary-resources/2018/11/THINKING%20SCIENCE.pdf>
  - [Constructivism In the Classroom: Concept Mapping for NGSS](#)

**Science**  
**Grade: 5 Unit: 2**  
**18 days of instruction**

[<https://www.knowatom.com/blog/constructivism-in-the-classroom-concept-mapping-for-ngss-standards-mastery>]

- [Small Group Models](#)  
[<https://ambitioussciencelearning.org/tools-face-to-face/#Smallgroup>]
- [What is meant by engaging youth in scientific modeling?](#)  
[<https://stemteachingtools.org/brief/8>]
- [The Informal Formative Assessment Cycle as a Model for Teacher Practice](#)  
[<https://stemteachingtools.org/brief/16>]
- [How Teachers Can Develop Formative Assessments that Fit a Three-Dimensional View of Science Learning](#)  
[<https://stemteachingtools.org/brief/18>]
- [Food Fight](#)  
[<https://www.brainpop.com/games/foodfight/>]
- General Resources shared in Segment 2:
  - [How Will the Plant Grow?](#)  
[<https://www.nsta.org/lesson-plan/how-will-plant-grow>]
  - [Easy Plant Science Experiments for the Classroom](#)  
[<https://www.plt.org/educator-tips/easy-plant-science-experiments-for-the-classroom/>]
  - [Food for Plants - Photosynthesis | Science For Grade 5 Kids | Periwinkle](#)  
[<https://youtu.be/8RbJ5c3KauM>]
  - [Variation in Plants](#)  
[<https://learn.concord.org/resources/1762/evolution-variation-in-plants>]
- General Resources shared in Segment 3:
  - [Gotta Have Checklist](#)  
[<https://ambitioussciencelearning.org/tools-face-to-face/#Gottahave>]
  - [Experiments with Ecosystems](#)  
[<https://learn.concord.org/resources/1763/evolution-experiment-with-ecosystems>]