



Coherence and Alignment Among Science Curriculum, Instruction, and Assessment (CASCIA) Project

Grade 5 Unit 2: Matter and Energy in Organisms and Ecosystems

Family Guidance and Learning Resources for Performance Category 1

October 2023

Grade 5 Unit 2: Matter and Energy in Organisms and Ecosystems, Family Guidance and Learning Resources for Performance Category 1 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: Coherence and Alignment Among Science Curriculum, Instruction, and Assessment (CASCIA) Project. (2023). *Grade 5 Unit 2: Matter and Energy in Organisms and Ecosystems, Family Guidance and Learning Resources for Performance Category 1*. Lincoln, NE: Nebraska Department of Education.

Purpose

The purpose of this document is to help families understand their student's performance on the Grade 5 Unit 2 Science Assessment and to provide resources and recommendations for engaging their student in science learning at home.

Unit Overview

By engaging in this unit, 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 their experience and skills with evaluation and explanation through constructing explanations, models, and arguments.

Performance Category 1: Support Arguments About Energy Flow and Matter Cycles Among Plants and Animals

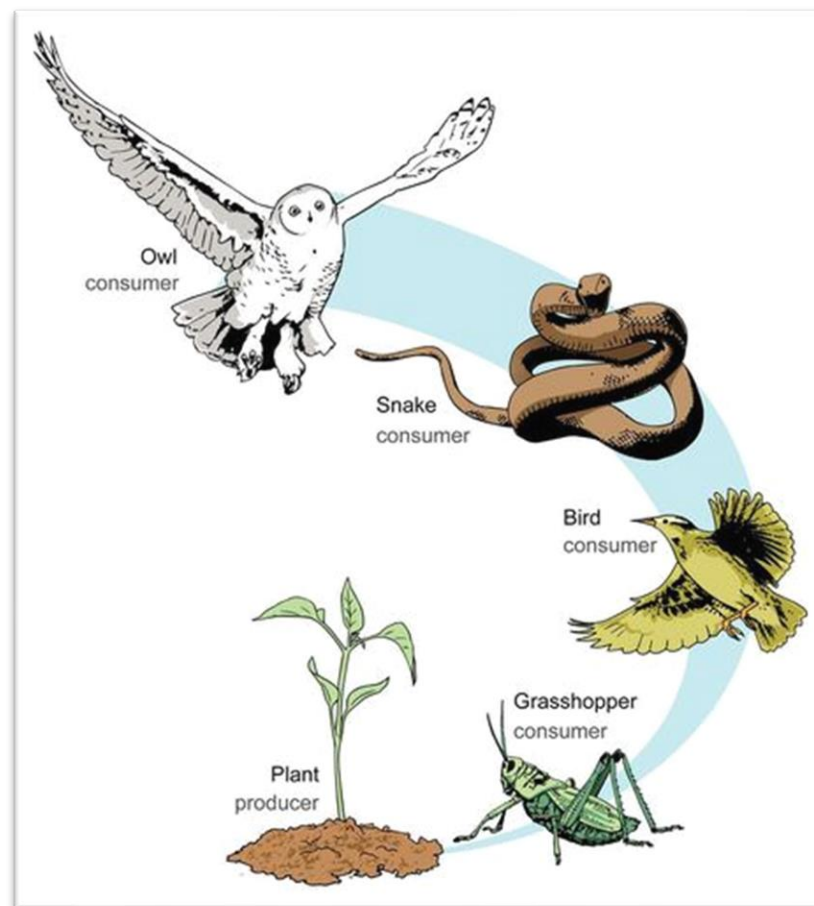
Prompts for this performance category require students to support an argument with evidence, data, or a model to explain how:

- plants get the materials they need for growth chiefly from air and water
- matter cycles and/or energy flows among plants and animals
- a newly introduced species may disrupt the balance of a healthy ecosystem

Instructions for Parents/Guardians

1. Refer to your student's score report to determine their instructional needs level—green, yellow, or red—for this performance category.
2. Use the [Interpretive Guidance](#) (see pages 2-3) to understand what your student likely knows and is able to do based on their instructional needs level.
3. Use the [Family Resources and Recommendations](#) (see pages 4-8) to engage with and support your student's science learning at home.

Grade 5 Unit 2: Matter and Energy in Organisms and Ecosystems



Credit: Mariana Ruiz Villarreal (LadyofHats) for CK-12 Foundation

Source: CK-12 Foundation

License: [CC BY-NC 3.0](#)

**Interpretive Guidance for Performance Category 1:
Support Arguments About Energy and Matter Flow Among Plants and Animals**

Red (0-4 score points earned)

- **Extensive** additional instruction and reteaching of these skills is recommended.
- The student needs significant opportunities to reinforce and apply these skills in future learning.

Yellow (5-8 score points earned)

- **Moderate** additional instruction on these skills is recommended.
- The student needs additional opportunities to strengthen these skills in future learning.

Green (9-11 score points earned)

- **Minimal to no** additional instruction on these skills is recommended.
- The student is ready to extend these skills in future learning.

What These Results Mean

This student is likely able to:

- Provide a statement in an attempt to support an argument, with **little to no** evidence related to materials plants need for growth or energy transfer in an ecosystem.
- State **some** science ideas or information to provide a description or conclusion.
- Demonstrate **partial** understanding of the component parts within an ecosystem, such as that plants acquire their materials for growth chiefly from air and water and that the sun is a source of energy, and **show limited understanding** of how matter cycles and energy flows among organisms.
- Demonstrate **partial** understanding of the impacts of the introduction of new species into a balanced ecosystem.

This student is likely able to:

- Present **limited** evidence to support an argument related to materials plants need for growth or energy transfer in an ecosystem.
- Use **some relevant** science concepts, theories, or information as reasoning to construct an argument with evidence, data, or a model.
- Demonstrate **partial** understanding of the component parts within an ecosystem, such as that plants acquire their materials for growth chiefly from air and water and that the energy released from food was once energy from the sun, and **apply some of these concepts** to describe how matter cycles and energy flows among organisms.

This student is likely able to:

- Present **convincing, valid, and reliable** evidence to support an argument related to materials plants need for growth or energy transfer in an ecosystem.
- Use **relevant** science concepts, theories, or information as reasoning to construct a **clear and convincing** argument with evidence, data, or a model.
- Demonstrate understanding of the component parts within an ecosystem, such as that plants acquire their materials for growth chiefly from air and water and that the energy released from food was once energy from the sun, and **clearly relate these ideas** to how energy flows and matter cycles among organisms.
- Demonstrate **complete and accurate** understanding of the impacts of the

Interpretive Guidance for Performance Category 1: Support Arguments About Energy and Matter Flow Among Plants and Animals		
Red (0-4 score points earned) ➤ Extensive additional instruction and reteaching of these skills is recommended. ➤ The student needs significant opportunities to reinforce and apply these skills in future learning.	Yellow (5-8 score points earned) ➤ Moderate additional instruction on these skills is recommended. ➤ The student needs additional opportunities to strengthen these skills in future learning.	Green (9-11 score points earned) ➤ Minimal to no additional instruction on these skills is recommended. ➤ The student is ready to extend these skills in future learning.
	• Demonstrate partial understanding of the impacts of the introduction of new species into a balanced ecosystem.	introduction of new species into a balanced ecosystem.

**Family Resources and Recommendations for Performance Category 1:
Support Arguments About Energy and Matter Flow Among Plants and Animals**

Resources and Recommendations to Support Science Learning at Home	
Explore the Topic <i>What do plants need to grow?</i>	• Use this simulation to collect evidence that plants need air, water, and sunlight to grow. For each trial, put a bean plant in each pot. Then, change only one variable (e.g., the amount of water and the amount of light) at a time. ○ For the Trial One Simulation, change the amount of water available for each bean from none to full. Run the test for 50 days. ○ For the Trial Two Simulation, change the amount of light from zero bulbs to three bulbs on. Run the test for 50 days. ○ After each trial, collect and record data about plant growth in each container.
Explain with Evidence <i>How do you know?</i>	• Ask your student to identify factors important in plant growth based on the evidence from the trials.
Explore the Topic <i>What do animals need to grow?</i>	• Use this food web to collect evidence about what animals need to grow. ○ Identify the plants in the food web. ○ Review what plants need to grow based on the simulation. ○ Talk about how sun, air, and water are also part of this food web. • Ask your student to explain how the sun, water, air, and plants all play a part in animal growth.
Explain with Evidence <i>How do you know?</i>	• Ask your student to put it all together. Use evidence from the food web AND the simulation to support an argument that energy and matter plants and animals need to live comes from the sun. Have them explain in various ways: writing, drawing, and speaking.
Evaluate the Evidence: <i>How strong is the evidence?</i>	• Ask your student: ○ How strong is the evidence from the simulation to support the argument? ○ How do we know plants don't need soil to grow? ○ What about animals that don't eat plants, like foxes? ○ How do we know they get energy ultimately from the sun?

Resources

1. [Plant Growth Interactive Lab Simulation](https://blog.explorelearning.com/teach-students-how-plants-grow/), ExploreLearning Blog
[<https://blog.explorelearning.com/teach-students-how-plants-grow/>]
2. [Who's in my Backyard? Infographic](https://education.nationalgeographic.org/resource/whos-my-backyard/), National Geographic
[<https://education.nationalgeographic.org/resource/whos-my-backyard/>]

**Family Resources and Recommendations for Performance Category 1:
Support Arguments About Energy and Matter Flow Among Plants and Animals**

Resources and Recommendations to Support Science Learning at Home

Engage in the Topic

*What is an ecosystem?
What events could affect the
balance of plants and animals
in an ecosystem?*

An [ecosystem](#) is made up of all the living and nonliving things in an area. The health of an ecosystem depends on a delicate balance among all its members and the environment. Natural events (e.g., drought), human activities, or the introduction of non-native species can threaten the plants and animals in an ecosystem. Read this [article](#) and watch the video, *Snake Charmers* [2:51], with your student to learn more about Burmese pythons, a non-native invasive species that threatens the balance of plants and animals in the Florida Everglades. Talk with your student about why Burmese pythons are a threat to the Florida ecosystem and why it's important for wildlife research biologists to study, capture, and remove the snakes from the area.

Explore the Topic

*What are invasive species?
What happens when invasive
species are introduced to an
ecosystem?*

Watch this [video](#) [4:02] with your student to learn about native species, non-native species, invasive species, and pests. Pause throughout the video to discuss the following questions with your student.

- How are native species and non-native species different? [0:49 – 1:33]
- What are invasive species? How can invasive species cause harm to the environment? [1:34 – 2:13]
- What is a pest? How is a pest different from an invasive species? Are all non-native species invasive? [2:14 – 3:20]
- Connect & Reflect: Can you think of examples of non-native invasive species in our area?

Then, watch this [video](#) [3:31] with your student on invasive species. Pause throughout the video to discuss the following questions with your student.

- How are invasive species introduced to a new ecosystem? How have zebra mussels, cane toads, and black wattles caused damage to their environment? [0:55 – 2:04]
- How can we prevent the introduction and spread of invasive species? [2:20 – 3:07]
- Connect & Reflect: How do non-native invasive species in our area threaten the environment?

Elaborate on the Topic

*How do invasive species affect
the ecosystems in my area?*

Encourage your student to select an invasive species to research in your state or region. Help your student search online resources and find information to create an [Invasive Species “Wanted” Poster](#). Use the provided instructions and template to help your student learn more about the invasive species, its background, appearance, behavior, and how it threatens other plants and animals and the overall balance of the ecosystem.

Evaluate the Topic with Evidence <i>What have I learned about invasive species and their effect on ecosystems?</i>	Reflect on and discuss the effects of invasive species on an ecosystem with your student. Present the following claim and ask your student to identify evidence from the article, videos, and their “Wanted” poster to support the claim. Claim: Invasive species are harmful to the health of an ecosystem. Evidence: • <i>Example Evidence:</i> Some invasive species, like the Black Wattle, can alter the availability of natural resources in an area, like water. This can affect the ability of other plants and animals to survive, as they depend on water to live and grow. • <i>Example Evidence:</i> Invasive species like the Burmese python disrupt the food web in an ecosystem. This is because the Burmese pythons eat mostly small mammals and birds but can also eat larger animals like pigs, goats, and alligators, thus altering the balance of plants and animals and the amount of food that organisms within that ecosystem have to survive.
---	---

Resources

1. [Ecosystem](https://kids.britannica.com/kids/article/ecosystem/433377#:~:text=An%20ecosystem%20is%20made%20up,rocks%2C%20soil%2C%20and%20sand.), Britannica Kids
[https://kids.britannica.com/kids/article/ecosystem/433377#:~:text=An%20ecosystem%20is%20made%20up,rocks%2C%20soil%2C%20and%20sand.]
2. [Burmese Python](https://kids.nationalgeographic.com/animals/reptiles/facts/burmese-python) (article and video), National Geographic Kids
[https://kids.nationalgeographic.com/animals/reptiles/facts/burmese-python]
3. [What Are Invasive Species?](https://www.youtube.com/watch?v=_ZzPM7Dw9Gg), Explore Nature: National Park Service
[https://www.youtube.com/watch?v=_ZzPM7Dw9Gg]
4. [Invasive Species 101](https://www.youtube.com/watch?v=gYNAtw1c7hI), National Geographic
[https://www.youtube.com/watch?v=gYNAtw1c7hI]
5. [Invasive Species Poster Project](https://sciencespot.net/Media/WantedPoster_InvasiveSpecies.pdf), T.Tomm 2021, Sciencespot.net
[https://sciencespot.net/Media/WantedPoster_InvasiveSpecies.pdf]