

Designed for NGSS: Student Work Rubric

Analyze Evidence

Directions

1. Review your assigned materials to describe the path of student thinking.
2. Represent your answers to the questions in the space provided.
3. Be prepared to share the path of student thinking visually on a public chart.

Answer (in words, graphics, or both)
Answer the following questions as you describe the path of student thinking in the materials. Consider what you would expect students to be thinking about through the learning experiences. What are students figuring out/solving? A. What is driving student learning (e.g., question, scenario, problem, phenomenon, etc.)? B. What ideas and practices do students develop through these experiences? C. How do students access, engage, and use prior knowledge to further their thinking? D. How do students develop metacognitive abilities?

SW1. Phenomena/Problems.

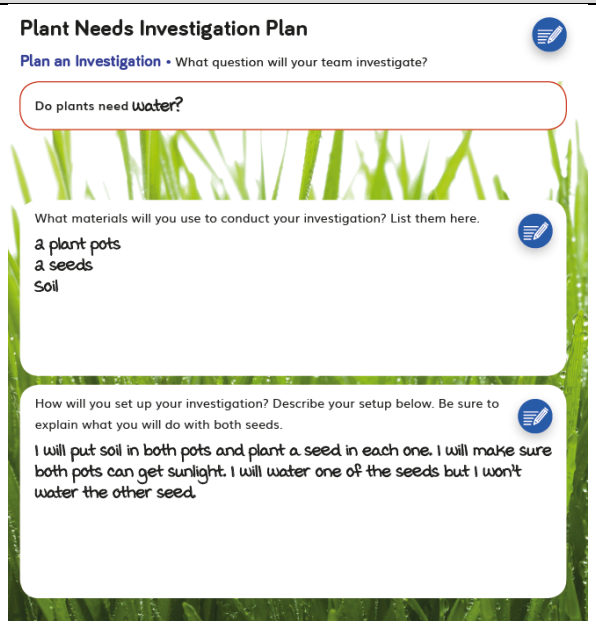
Student learning is driven by figuring out the Module Phenomenon: How are objects affected by the forces of push and pull?

In order to understand the phenomenon, students work through a series of DQs that require them to make sense of a subset of smaller phenomena/problems and then connect what they now know to the central problem. The skills and knowledge gained over these investigations culminate in a final class discussion where they address the Module Phenomenon.

DQ1: What do plants need to grow?
DQ2: What do animals need in order to grow and heal?
DQ3: Where do plants get their matter?
DQ4: Where do organisms get the energy they need to grow, heal, move, and maintain their body temperature?
DQ5: What happens to matter in an ecosystem?
DQ6: How can ecosystems change?

Evidence

- Students investigate the phenomenon of what plants need to grow by observing a series of visuals and then planning and carrying out a hands-on investigation. They close read an informational text that treats this phenomenon, which they summarize (DQ1 TB pp. 3–16).



DQ1 TB pp. 3-16

- Students explore the phenomenon of interdependent relationships in ecosystems by carrying out a video investigation (DQ2L1 TB p. 19), close reading an informational text (DQ2L2 TB pp. 23), and conducting collaborative research (DQ2L3 TB pp. 29–30). They then focus on the phenomenon of cycles of matter and energy transfer in ecosystems, modeling food chains (DQ2L4 TB p. 31) and food webs (DQ2L5 TB p. 34) before constructing scientific explanations using evidence and reasoning that answer the Driving Question (DQ2L6 TB pp. 35–36).

Close Read

Have students independently read and annotate the article. As they will complete a graphic organizer, they may need to use information from different places in the text to identify the needs of each kind of plant. Remind them to follow the article instructions.

Circulate while students read and annotate. Note areas of confusion (e.g., difficult words, misconceptions) so you can focus on these when you revisit the text. Conduct over-the-shoulder discussions to help students use and apply reading strategies, such as summarizing after each section to check understanding.

DQ2L2 TB pp. 23

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Scientific Explanation

Make a Claim • What do animals need in order to grow and heal?

In the box below, write a claim that answers the question.

Claim: Animals need to get matter from the food they eat in order to grow and heal. They can get matter by eating plants and animals.

Obtain Information • Record 3 pieces of evidence that you will use to support your explanation. Include facts and details. In the left column, record the source of the evidence (where you got it.) In the right column, record the evidence.

Source	Evidence
Carnivores video	We saw animals eating other animals to add matter to their bodies.
"Tough Cats" article	Mother cougars teach their young how to hunt. They hunt to catch and eat prey. This adds matter to their bodies.
National Park Service website	I researched bison. I found out that they eat grass and other plants to add matter to their bodies.

DQ2L6 TB pp. 35–36
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- Students explore the phenomenon of energy in chemical processes and everyday life by going on an energy hunt around the school before reflecting on the Driving Question (DQ4L1 TB pp. 69–70).

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Collect Evidence • Look for evidence of energy around your classroom and school. Record the evidence of energy and where you observed it.

Evidence of Energy	Where Evidence of Energy Observed
Light	Hallway Lighting
Heat	A heater, sunlight through a window
Sound	Other students talking, a stereo
Energy of motion	Other students walking, a moving fan
Stored energy	A charged battery

DQ4L1 TB pp. 69–70
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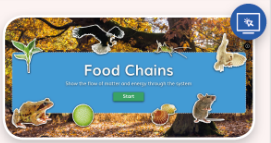
- Students investigate the phenomenon of matter and energy flow in ecosystems using an interactive, exploring how energy flows from the Sun to producers, herbivores, and carnivores (DQ4L3 TB p. 81).

You will be modeling energy flow through an ecosystem using the **Food Chain interactive**.



- Select "Start."
- Drag and drop images and arrows to make your food chain.
- There are two arrows: "Energy" and "Matter." You can have one or two arrows between each image.
- To check if your model is correct, use the "Check" button. If the model is correct, the energy and matter will flow through. If it is incorrect, it will reset.
- To start over, select the "Reset" button.
- Complete Levels 1, 2, and 3 of the interactive. Then answer the question.

Use a Model • Where do the organisms in the model get the energy they need? Be specific. **Note:** There may be more than one correct answer.

The organisms in the model get their energy from the Sun. The plants get their energy directly from the Sun. They use this energy to make their own food. The animals that eat plants get their energy from the plants. The organisms that eat animals get their energy from the animals.

DQ4L3 TB p. 81

Interwoven with this science narrative is a storyline that requires students to take on the role of ecologists working in Yellowstone National Park, observing plants and animals in order to understand this diverse ecosystem. They are introduced to the storyline through a movie-style module trailer.

The Module is complemented with *The Galápagos Islands* Leveled Reader, a magazine-style leveled reader (available in four levels and Spanish) that provides additional exposure to relevant phenomena/problems, as well as an interview with an entomologist. Packed with stunning images, cartoons, and jokes, it's designed to appeal to students with a diverse range of learning abilities.

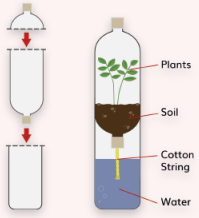
Yellowstone Uncovered Module Trailer video

The Module is complemented with *The Galápagos Islands* Leveled Reader, a magazine-style leveled reader (available in four levels and Spanish) that provides additional exposure to relevant phenomena/problems, as well as an interview with an entomologist. Packed with stunning images, cartoons, and jokes, it's designed to appeal to students with a diverse range of learning abilities.

The Galapagos Islands Leveled Reader (Front Cover)

The Galapagos Islands Leveled Reader pp. 16-17

SW2. Three-Dimensional Conceptual Framework. Students experiences consistently support them to use their prior knowledge to negotiate new understandings and abilities and apply their understandings in a variety of ways.
In DQ1, students start by exploring what plants need to grow. They set up an investigation into plant needs, applying the concepts of scale, proportion, and quantity (CCC-3), and observe the Van Helmont experiment set up in Module 1. Through observations and reading an informational text, they explore the phenomena of matter and energy flow in organisms (LS1.C). In DQ2, students explore the phenomenon of matter and energy flow in ecosystems, engaging in video and reading investigations. They apply the concepts of energy and matter (CCC-5) and systems and system models (CCC-4) to model food chains and food webs. This culminates in students writing scientific explanations to answer the Driving Question. In DQ3, students review and analyze the data from their two hands-on plant investigations and evaluate their findings. They consolidate their learning of matter and energy flow in organisms (LS1.C) by writing arguments from evidence that explain where plants get matter to grow. In DQ4, students activate prior knowledge of energy, exploring the phenomenon of energy in chemical processes and everyday life (PS3.D). They close read an informational text and use an interactive to model food chains, and apply the concept of cause and effect (CCC-2) to construct explanations about how energy moves through the food chain. In DQ5, students turn to decomposition. They apply the concept of energy and matter (CCC-5) as they observe a guided experiment and then embark on a hands-on investigation to observe decomposition in the field. Their explorations and data collection culminate in written arguments they share with the class, demonstrating their understanding of cycles of matter and energy transfers in an ecosystem (LS2.B). In DQ6, students close the module with a focus on the interdependent relationships in ecosystems (LS2.A). They apply the concepts of cause and effect (CCC-2) and stability and change (CCC-7) to examine what happens when a non-native species is introduced to an ecosystem. They explore this idea using an interactive and a final digital and video investigation. The SEPs and CCCs that the students are using in each learning activity are labeled at point of use in the student addition called the Twig Book in grade-appropriate language.

Evidence • Students build physical ecosystem models (DQ2L7 TB p. 38) which they return to throughout the module, connecting their models to concepts like dead matter and decomposition.	**Build an Ecosystem Model** 1 Place the cotton string through the hole in the tape. Make sure to leave a few centimeters of string sitting in the neck of the bottle. 2 Add water to the bottom section. It should be just below the lid that is hanging down with the string. Test this by placing the bottle pieces together as shown. Add more water or remove water as needed. 3 Tape the bottom and middle sections together. 4 Place soil into the middle section. You should fill this section about halfway. 5 Plant seeds or plants that your teacher distributes. Spray the newly planted seeds or plants with water. 6 Place small pieces of ripped up leaves in your ecosystem. These will be food for your worms and other invertebrates. 7 Place a few pebbles into your ecosystem, on top of the soil. 8 Gently take the worms and other invertebrates from your teacher and place on top of the soil in the ecosystem. 9 Tape the top section onto the ecosystem model as shown. **Materials** • String • Plastic bottle • Tape • Soil • Seeds/plants • Water spray • Leaf litter • Pebbles • Spray bottle of water • Worms/pillbugs **Word Wall** • ecosystem  DQ2L7 TB p. 38
• Students revisit their plant needs investigation, set up in DQ1, analyzing and interpreting data before representing that data in a bar graph (DQ3L1 TB pp. 45–48).	**Interpret Data** • Look at the data you recorded for your Plant Needs Investigation. Show information in a line graph: • Label the x-axis with the dates that you collected data. • Add red dots to record the height of your experimental plant on each date. • Add blue dots to record the height of your control plant on each date. • Use a ruler and blue colored pencil to connect the blue dots. Connect them from one date to the next date. Do the same for the red dots, using a red colored pencil. Make a key for the 2 colors in the box. DQ3L1 TB pp. 45–48

- Student pairs create physical models of matter cycling in an ecosystem (DQ5L3 TB p. 104) and observe a guided experiment (DQ5L4 TB p. 107) in order to understand the concept of decomposition.

Matter and Nutrients Cycling through an Ecosystem

1. Cut out the images on page 1 of the **Matter Cycling handout**.
2. Page 2 of the handout is the background for your model. Place it face-up.
3. Discuss with your partner how matter and nutrients move through the ecosystem. Decide where you will put the images on the background to show your ideas. You will add arrows to show the movement of matter and nutrients later, so imagine where these arrows will go.
4. Once you have decided where you want to put the cards, glue the cards to the background.
5. Think about where each organism in the ecosystem gets matter. Then, draw arrows that show the movement of matter and nutrients in the ecosystem.
6. Label each arrow *matter and nutrients* or *nutrients* to show the flow of matter and nutrients from one part of the ecosystem to the next.

Example arrow:

Matter and Nutrients

DQ5L3 TB p. 104

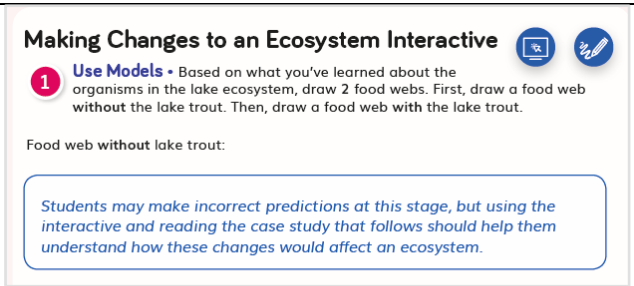
Decomposition Observations

Make Observations • Use the magnifying glass to observe what has happened to the contents of each bag after sitting in the dark for approximately **1 week**. Record your observations in the table.

Bag	Contents	Observations
1	Fruit, No Soil	The fruit looks slimy and a bit moldy.
2	Fruit, Soil	The fruit and soil look slimy and there is a lot of mold.
3	Cottage Cheese, No Soil	The cottage cheese looks slimy and a bit moldy.
4	Cottage Cheese, Soil	The cottage cheese and soil look slimy and there is a lot of mold.
5	Soil, Water	The soil looks the same.

DQ5L4 TB p. 107

- Students use an interactive to model what happens when a non-native species is introduced to an ecosystem (DQ6L1 TB pp. 115–118), consolidating their understanding of the Module Phenomenon.


Making Changes to an Ecosystem Interactive

1 **Use Models** • Based on what you've learned about the organisms in the lake ecosystem, draw 2 food webs. First, draw a food web **without** the lake trout. Then, draw a food web **with** the lake trout.

Food web **without** lake trout:

Students may make incorrect predictions at this stage, but using the interactive and reading the case study that follows should help them understand how these changes would affect an ecosystem.

DQ6L1 TB pp. 115–118

SW3. Prior Knowledge.

Materials consistently leverage student prior knowledge and experiences to motivate their learning.

Across Program

Yellowstone: Uncovered builds on prior knowledge of how plants and animals live and survive in their environments in Grade K Module 1, Grade 2 Module 4, and Grade 3 Module 3.

Within Module

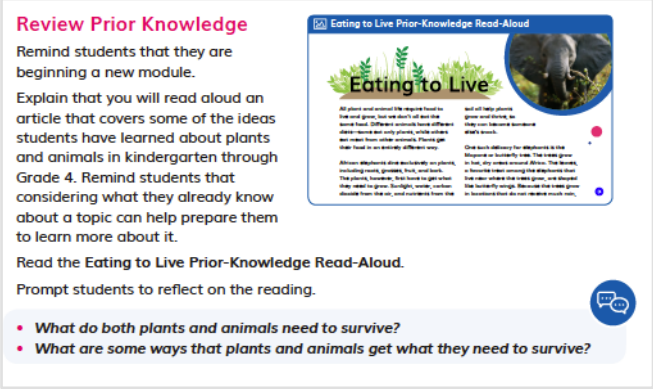
In DQ1L1, students activate their prior knowledge of Yellowstone as well as plants, animals, and matter by observing a visual featuring scenes from Yellowstone and reading a Prior-Knowledge Read-Aloud. They are prompted to think back to their exploration of energy and matter in Grade 5, Module 1, Matter Mysteries Hotline (CCC-5).

Throughout the module students are consistently supported to revise their claims and relate their new understandings to answering the Driving Questions and solving the Module Phenomenon.

Throughout the module students refer and add to their classroom Science Tools Poster, which explicitly details their growing use of the SEPs, and motivates them by helping them visualise their progression.

Evidence

- Students engage with a Prior-Knowledge Read-Aloud about animals, plants, and matter (DQ1L1 TE p. 8).


Review Prior Knowledge

Remind students that they are beginning a new module.

Explain that you will read aloud an article that covers some of the ideas students have learned about plants and animals in kindergarten through Grade 4. Remind students that considering what they already know about a topic can help prepare them to learn more about it.

Eating to Live Prior-Knowledge Read-Aloud

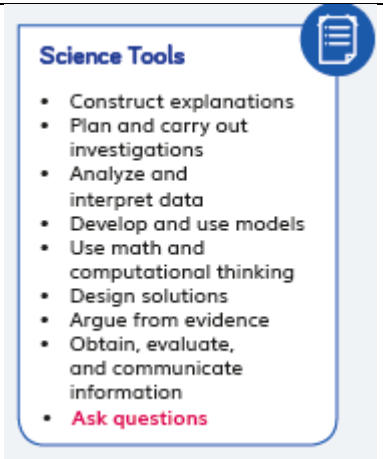
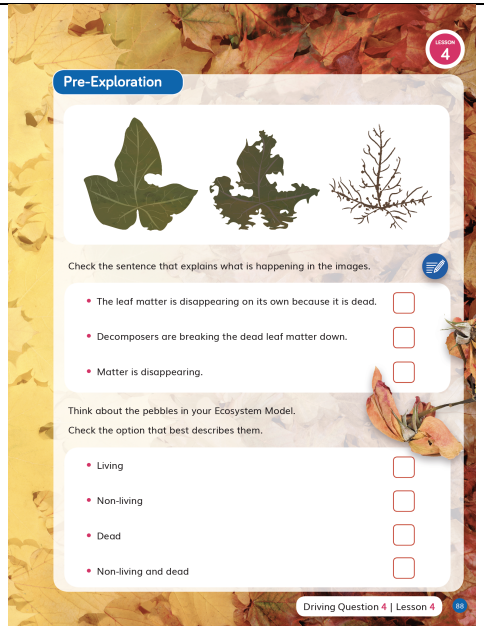
Eating to Live

Read the **Eating to Live Prior-Knowledge Read-Aloud**.

Prompt students to reflect on the reading.

- ***What do both plants and animals need to survive?***
- ***What are some ways that plants and animals get what they need to survive?***

	DQ1L1 TE p. 8
• Students observe a series of slides from Yellowstone, activating their prior knowledge of the national park, its features, and some of the organisms that live in it (DQ1L1 TE p. 9).	**Introduce the Activity** Today, students will examine 9 slides that show different areas in Yellowstone National Park and then record their observations in their Twig Books. Explain that you will share some facts about each slide. **Make Ecological Observations** Display the Yellowstone National Park Slideshow visual, one slide at a time. Have students examine and discuss the living and non-living things in each slide, and take a few minutes to record their observations on page 3 in their Twig Books. • Slide 1: The Grand Prismatic Spring ◦ Largest hot spring in the United States ◦ Since much of Yellowstone is on top of a huge volcano, underground magma heats the water in the spring to 70°C (158°F) ◦ Water is not boiling but is too hot for humans or other mammals to touch or drink. Twig Book, p. 3 **Slideshow: Introduction to Yellowstone** **Make Observations** • Look at the images from around Yellowstone and record the living and non-living things that you see. What do you notice? Slide / Living Things / Non-Living Things 1 / Lots of trees and people / A big pool of water by rocky ground, mostly gray but red by the water 2 / Lots of trees and grass / A big rock with water shooting out of it (a geyser) 3 / People behind a fence and lots of trees / Pools of water and rocky ground surrounded by a fence 4 / Grass, trees, and flowers and leaves on top of water / A pool of water 5 / A beaver, fish, herd of bison, and grass. / Water and rocks 6 / Lots of trees / Rocky cliffs and a waterfall 7 / Deer by a river, grass, and trees / Two rivers and snowy mountains 8 / A bear with bear cubs, a herd of bison, and grass / Snowy mountains 9 / Trees growing out of a snowy hillside / Wooden fences, buildings, and snow DQ1L1 TE p. 9
• Students review all the evidence they have gathered throughout the Driving Question and use it to construct scientific explanations (DQ2L6 TE p. 78, TB pp. 35–36).	**Write Supporting Evidence** Ask students to independently write their scientific explanations on page 36 in their Twig Books. Encourage students to write in pencil so they can make revisions, as needed. Remind them to explain how the evidence supports their claim. They must provide their reasoning and include a conclusion that sums up their findings. **Stronger and Clearer Each Time (Language Routine)** Once their explanations have been drafted, have students work together to give and receive feedback. First, they will share with their current partners and then they will refine their work and share with two other partners in succession. Explain that during this process, they should be referring to the rubric on page 35 in their Twig Books. 1. Partner 1 tells their ideas while Partner 2 listens. Partner 2 asks questions and tries to get more detail, clarifications, and input from Partner 1. Give pairs 30–45 seconds for this step. Give Partner 1 time to revise. 2. Partner 2 tells their ideas while Partner 1 listens. Partner 1 asks questions and should try to get more details, clarifications, and input from Partner 2. Give pairs 30–45 seconds for this step. Give Partner 2 time to revise. 3. Students switch to a new partner. They follow the same process as in steps 1 and 2, but use what they heard from their first partner to strengthen what they share with their new partner (e.g., add more detail and be clearer). DQ2L6 TE p. 78

• Students review the science tools they've used and add "Ask questions" to the Science Tools poster (DQ3L1 TE p. 97).	 DQ3L1 TE p. 97
• Students complete a diagnostic pre-assessment to elicit awareness of their prior knowledge and misconceptions of dead matter and decomposition (DQ4L4 TB p. 88).	 DQ4L4 TB p. 88

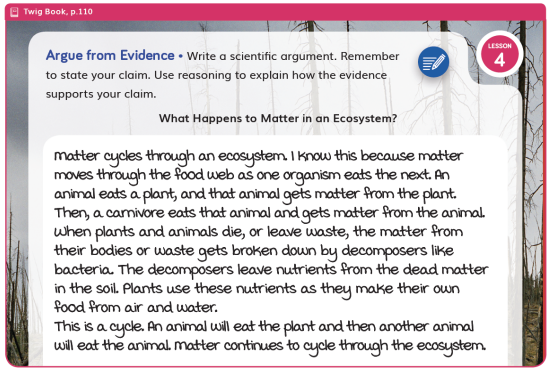
- Following a collaborative language routine, students revise their explanations about how matter moves through an ecosystem (DQ5L4 TE p. 182, TB p. 110).

Stronger and Clearer Each Time (Language Routine)

Use successive pair-shares for students to refine and strengthen their arguments. Students should write their argument, and then successively meet with two partners who will ask questions aloud to try and get more detail as follows.

They should then share the argument with their partner. As students take turns sharing their arguments, ask the listening partner to use the rubrics to identify whether the argument could be strengthened. Tell them to pay close attention to the claim, evidence, reasoning, and conclusion they provide. Briefly review the four discussion prompts that you recorded on the board during the Lesson Preparation. This exercise will help students clarify where they might need to strengthen their arguments.

Allow time for students to make revisions based on peer feedback.


Twig Book, p.110

Argue from Evidence • Write a scientific argument. Remember to state your claim. Use reasoning to explain how the evidence supports your claim.

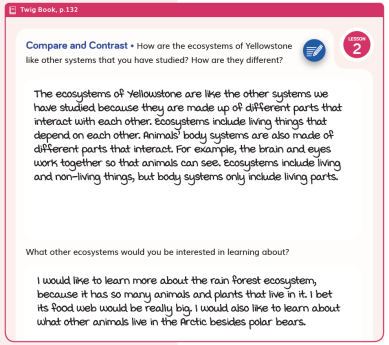
LESSON 4

What Happens to Matter in an Ecosystem?

matter cycles through an ecosystem. I know this because matter moves through the food web as one organism eats the next. An animal eats a plant, and that animal gets matter from the plant. Then, a carnivore eats that animal and gets matter from the animal. When plants and animals die, or leave waste, the matter from their bodies or waste gets broken down by decomposers like bacteria. The decomposers leave nutrients from the dead matter in the soil. Plants use these nutrients as they make their own food from air and water.
This is a cycle. An animal will eat the plant and then another animal will eat the animal. Matter continues to cycle through the ecosystem.

DQ5L4 TE p. 182

- Students reflect on their new understandings and ideas about ecosystems, comparing and contrasting the Yellowstone ecosystem with other ecosystems they've studied in science class (DQ6L2 TE p. 208, TB p. 132).


Twig Book, p.132

Compare and Contrast • How are the ecosystems of Yellowstone like other systems that you have studied? How are they different?

LESSON 2

The ecosystems of Yellowstone are like the other systems we have studied because they are made up of different parts that interact with each other. Ecosystems include living things that depend on each other. Animals' body systems are also made of different parts that interact. For example, the brain and eyes work together so that animals can see. Ecosystems include living and non-living things, but body systems only include living parts.

What other ecosystems would you be interested in learning about?

I would like to learn more about the rain forest ecosystem, because it has so many animals and plants that live in it. I bet its food web would be really big. I would also like to learn about what other animals live in the Arctic besides polar bears.

Reflect on the Module

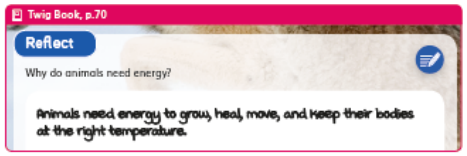
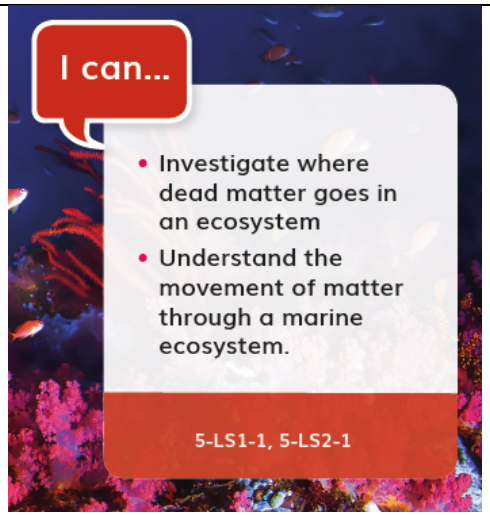
Have students respond to the prompts on pages 131–132 in their Twig Books.

Congratulate students on their work as ecologists investigating the flow of matter and energy through the Yellowstone National Park ecosystem.

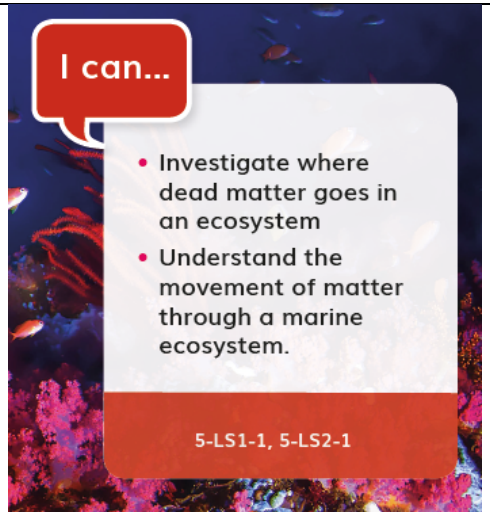
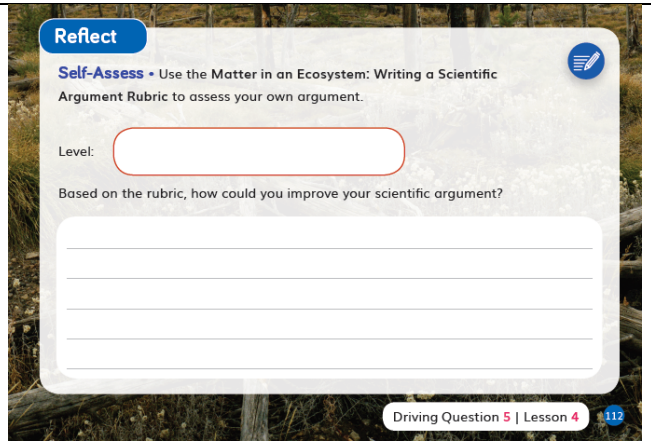
DQ6L2 TE p. 208

SW4. Metacognitive Abilities.

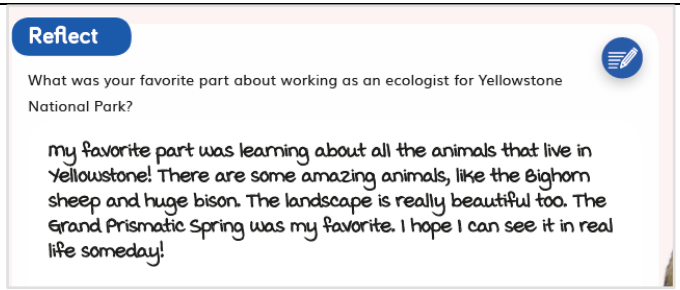
Yellowstone: Uncovered regularly provides students with explicit opportunities to consider how their learning experiences have changed their thinking.

Diagnostic pre-assessments (Pre-Explorations) in DQ1–DQ4 support students to think about the three dimensions they are already familiar with and those they are not. Additional opportunities to develop students' metacognitive abilities are frequently found in the Reflect of each lesson. Here, students use different means to think about what they have learned so far and how they can use their new understandings to figure out phenomena/problems. For example, in DQ4, students reflect on why animals need energy and then share their ideas with the class (DQ4L1 TE p. 129).	**Reflect on Energy** Have students turn to page 70 in their Twig Books and respond to the prompt. Ask some students to share their responses with the class.  DQ4L1 TE p. 129
"I can" statements written in grade appropriate language are detailed for each DQ, supporting students' awareness of their growing skills and knowledge and of the three dimensions that they will use to figure out phenomenon/solve problems. For example, in DQ5, "I can... Investigate where dead matter goes in an ecosystem" (DQ5 TB p. 90).	 DQ5 TB p. 90
Evidence • Students close read and annotate an informational text, which the class works to summarize following a discussion (DQ1L3 TE pp. 23–24).	**Close Read** Have students independently read and annotate the article. As they will complete a graphic organizer, they may need to use information from different places in the text to identify the needs of each kind of plant. Remind them to follow the article instructions. Circulate while students read and annotate. Note areas of confusion (e.g., difficult words, misconceptions) so you can focus on these when you revisit the text. Conduct over-the-shoulder discussions to help students use and apply reading strategies, such as summarizing after each section to check understanding. DQ1L3 TE pp. 23–24

• Students consider how their learning experiences have changed their understanding of what animals need to grow and heal, and share what they still wonder (DQ2L6 TB p. 37).	**Reflect** What new ideas do you have about what animals need in order to grow and heal? What do you still wonder? Animals need to eat food to grow and heal. Eating food is how animals add matter to their bodies. Some animals eat animals. Some animals eat plants. Some animals eat both plants and animals. I wonder if animals need water to grow and heal too. DQ2L6 TB p. 37
• Students reflect on their two hands-on plant investigations as they consider how they know if a plant has grown or not (DQ3L2 TE pp. 100–101, TB p. 52).	**Discuss Where Plants Get Matter** Refer to Module 1, where students investigated the properties of substances and learned that all substances, including gases like air, are made of matter. Remind students that they have been investigating where plants get their matter. Prompt students to think about where the matter in plants might come from. • ***Is air made of matter? What about water?*** • Yes, air and water are made of matter. • ***What about sunlight?*** • Sunlight is not made of matter. • We do not know if sunlight is made of matter. • ***Are plants made of matter? How do you know?*** • ***Where do you think this matter comes from?*** Introduce Jan Baptist van Helmont (1580–1644), a scientist who wondered where plants got their matter. In the 1600s, people believed that plants got their matter from eating soil. Van Helmont wondered if plants got their matter from soil, water, or both. Display the first image from the **Van Helmont's Plant visual** and read it aloud. Then, display slides 2–4. Discuss each of the steps of Van Helmont's investigation. Pause on slide 4. • ***If plants get their matter from soil, what would we expect to see in the results?*** • The weight of the soil would go down by the same amount that the weight of the plant went up.  Remind students of the seeds they planted Module 1. Ask students what parts of the investigation they have completed so far. Students may respond that they have weighed the soil and the seeds, planted the seeds, and watered the seeds. Encourage students to think about the slides from the visual. • ***What steps do we need to take now to complete our investigation?*** • We need to weigh the soil and the plant.

• The “I can” statement details use of the three dimensions students will use in this DQ. "I can… Investigate where dead matter goes in an ecosystem" (DQ5 TB p. 90).	 DQ5 TB p. 90
• Students use a rubric to reflect on and self-assess their scientific arguments, writing how they think they could improve them (DQ5L4 TB p. 112).	 DQ5L4 TB p. 112

- Students reflect on all they learned in the module, sharing their favorite learning (DQ6L2 TB p. 131).



Reflect

What was your favorite part about working as an ecologist for Yellowstone National Park?

my favorite part was learning about all the animals that live in Yellowstone! There are some amazing animals, like the Bighorn sheep and huge bison. The landscape is really beautiful too. The Grand Prismatic Spring was my favorite. I hope I can see it in real life someday!

DQ6L2 TB p. 131

SW5. Equitable Learning Opportunities.

Most learning experiences across Yellowstone: Uncovered are multimodal in approach with numerous cross curricular connections, designed to engage students meaningfully in a variety of ways, with multiple access points, and with supports for students.

The learning experiences in the module are designed to appeal to students of all learning styles and abilities and include tasks in all domains—writing, reading, listening (read-alouds and videos), speaking (discussion and presentations), drawing, as well as digital, text, video, and hands-on investigations.

Instructional materials frequently provide support for language scaffolding for EL students at point of use in the Teacher Edition, as well as research-based integrated language routines to support all students to "talk science" using grade level appropriate scientific vocabulary. The digital version of the Twig Book (TB) includes a text to speech function.

Suggestions for extra access points for students with special needs are provided frequently at point of use.

Culturally-relevant content is core to the module, as students explore matter and energy through the prism of one of the United States' most magnificent national parks, with additional Cultural Connections added at point of use in the Teacher Edition (TE).

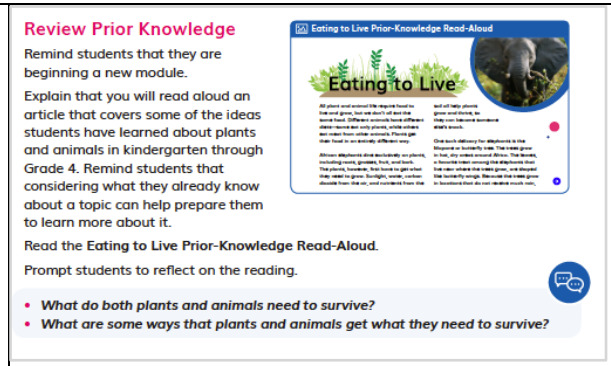
Higher Order Challenges for GATE student that have already met the learning goals are interspersed through the learning activities.

The frequent use of videos helps all students access and engage with phenomena and science concepts. Key words are overlaid as on-screen text. They can access the ideas visually as well as via the spoken and written word. Captions are provided in both English and Spanish.

The Galápagos Islands Leveled Reader has been designed to capture the imagination of young readers with jokes and cartoons and it provides an alternative means to access the scientific content. The reader is available in four levels (Below, On, Above, EL) and in Spanish, with complementary lessons to build language acquisition and develop informational text reading skills. On level lessons are in the TE, while other levels are available digitally. The reader features many positive role models in the field of science and engineering, designed to cultivate interest in STEM careers for all students. Chapter 2 is dedicated to an interview with an entomologist who advocates for disabled scientists. The digital version of the reader includes a text to speech function.

Evidence

- Integrated EL sidebars offer teachers guidance to support students' engagement with the material (DQ1L1 TE p. 8, DQ2L3 TE p. 54, DQ3L4 TE p. 115, DQ4L4 TE p. 147).


Review Prior Knowledge

Remind students that they are beginning a new module.

Explain that you will read aloud an article that covers some of the ideas students have learned about plants and animals in kindergarten through Grade 4. Remind students that considering what they already know about a topic can help prepare them to learn more about it.

Eating to Live Prior-Knowledge Read-Aloud

Eating to Live

Read the **Eating to Live Prior-Knowledge Read-Aloud**.

Prompt students to reflect on the reading.

- ***What do both plants and animals need to survive?***
- ***What are some ways that plants and animals get what they need to survive?***

DQ1L1 TE p. 8

English Learners

Substantial Support (Emerging Proficiency)

ELs can benefit from working with a student of higher English proficiency who speaks their native language. They can discuss the work in their native language and translate to English as they write in their Twig Books. If possible, provide useful books in the students' native language.

Moderate Support (Expanding Proficiency)

Pair these students with a student of higher English proficiency.

DQ2L3 TE p. 54

English Learners

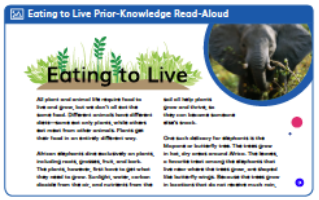
Acknowledge that the rubric for writing a scientific argument is very similar to the rubric for writing a scientific explanation. Let students know that many of the same skills are needed for both types of writing. Read through each section of the rubric and ask students which seem familiar. Have them explain each domain in their own words.

DQ3L4 TE p. 115

English Learners

Before beginning the Stronger and Clearer Each Time routine, ask students to think back to other experiences with this routine. What questions helped to elicit detail, explanation, and elaboration? As students engage in the routine, listen for examples of other successful dialogue and add to the list you are posting.

DQ4L4 TE p. 147

• Integrated Cultural Connection sidebars offer teachers guidance to engage students of all backgrounds (DQ1L1 TE p. 8, DQ2L3 TE p. 55, DQ3L3 TE p. 106, DQ5L3 TE p. 172).	**Review Prior Knowledge** Remind students that they are beginning a new module. Explain that you will read aloud an article that covers some of the ideas students have learned about plants and animals in kindergarten through Grade 4. Remind students that considering what they already know about a topic can help prepare them to learn more about it.  Read the **Eating to Live Prior-Knowledge Read-Aloud**. Prompt students to reflect on the reading. • ***What do both plants and animals need to survive?*** • ***What are some ways that plants and animals get what they need to survive?*** DQ1L1 TE p. 8

- Integrated Special Needs sidebars offer teachers guidance to support students of all abilities as they participation in class activities and grasp key concepts (DQ1L2 TE p. 18, DQ2L3 TE p. 56, DQ4L4 TE p. 148).

English Learners

Provide support as needed for ELs as they share.

Substantial Support (Emerging Proficiency)

Provide students with sentence frames such as:

- I <pushed/pulled> the _____ and it _____ (rolled, moved, fell down, etc.).

Moderate Support (Expanding Proficiency)

Prompt students to describe both what they did to the object and how the object moved. Help students with sentence frames if needed, such as:

- I _____ the _____, and it _____.

Light Support (Bridging Proficiency)

Use questioning to help students describe how the item moved and the action taken, such as:

- ***What happened when you pushed the button?***

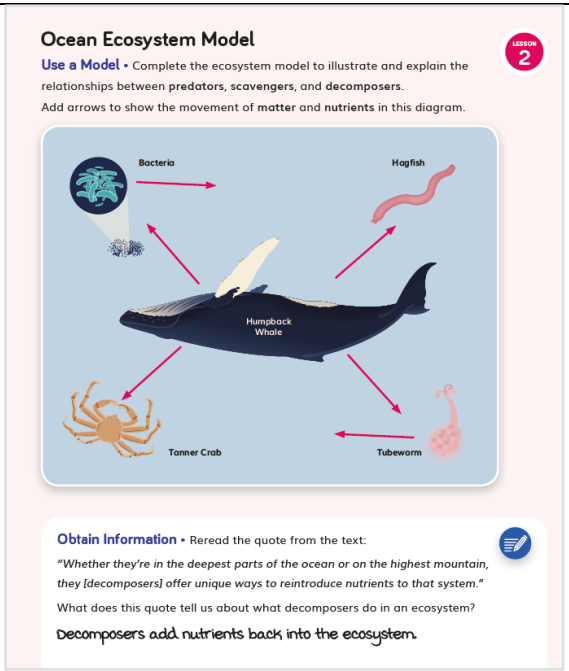
DQ1L2 TE p. 18

3-D LEARNING OBJECTIVES

Students will:

- Identify similarities and differences between young plants and their parents
- Explain that young plants are similar to their parents, but not exactly alike.

DQ4L4 TE p. 148

• Integrated Challenges interspersed throughout the TB support GATE students who have met the learning goals (DQ1L1 TB p. 4, DQ2L2 TB p. 28, DQ3L2 TB p. 51, DQ5L2 TB p. 103).	 DQ5L2 TB p. 103
• Videos like Time-Lapse of a Plant (DQ1L1), Butterfly's Breakfast (DQ2L5), Decomposers: Breaking it Down (DQ5L2), and Wolves in Yellowstone (DQ6L2) bring phenomena and concepts to life for all students.	 Time-Lapse of a Plant (DQ1L1)

Designed for the NGSS: Foundations	High Quality 5	Medium Quality 3	Low Quality 1
SW1. Phenomena/Problems. Materials provide phenomena/problems that: • engage students as directly as possible in authentic and relevant experiences; • are matched to targeted learning goals; • can be figured out/solved using scientifically accurate understandings and abilities; • make connections beyond and to their daily lives, including to their homes, neighborhoods, communities, and/or cultures.	Materials consistently offer quality phenomena/problems sufficient to motivate and drive student learning.	Materials sometimes offer quality phenomena/problems sufficient to motivate and drive student learning.	Materials rarely offer quality phenomena/problems sufficient to motivate and drive student learning.
SW2. Three-dimensional Conceptual Framework. Materials include learning experiences that help students to build scientifically accurate understandings and abilities through opportunities for students to: • link prior knowledge to negotiated new understanding and abilities; • use reasoning to connect grade-appropriate SEP, DCI, and CCC elements; • ask and answer questions that link learning over time; • negotiate new understandings and abilities by comparing their ideas, their peers' ideas, and ideas encountered in the learning experience(s); • apply their understandings and abilities in a variety of ways.	Materials consistently include learning experiences that help students build from prior experiences to negotiate new understandings and abilities, and apply their understandings in a variety of ways.	Materials sometimes include learning experiences that help students build from prior experiences to negotiate new understandings and abilities, and apply their understandings in a variety of ways.	Materials rarely include learning experiences that help students build from prior experiences to negotiate new understandings and abilities, and apply their understandings in a variety of ways.
SW3. Prior Knowledge. Materials leverage students' prior knowledge and experiences to motivate student learning in ways that: • make visible students' prior knowledge and experiences related to the phenomena/problems and relevant SEPs, DCIs, and CCCs; • revisit students' early ideas to see how they have changed (or not) as they figure out phenomena/solve problems; • make explicit links to new ideas and practices being developed by students.	Materials consistently leverage student prior knowledge and experiences to motivate their learning.	Materials sometimes leverage student prior knowledge and experiences to motivate their learning.	Materials rarely leverage student prior knowledge and experiences, and when included, they do not relate to the phenomena or problems.

SW4. Metacognitive Abilities. Materials include learning experiences for students to: ● set and monitor their learning in light of the targeted learning goals; ● consider, over time, **what** and **how** they have learned across the three dimensions; ● articulate how the three dimensions helped them figure out phenomena/solve problems.	The materials provide students with regular, explicit opportunities to consider how their learning experiences changed their thinking.	The materials provide students with some opportunities to consider how their learning experiences changed their thinking.	The materials provide few opportunities for students to consider how their learning experiences changed their thinking.
SW5. Equitable Learning Opportunities. Materials ensure that ***all*** students, including those from non-dominant groups and with diverse learning needs, have access to the targeted learning goals and experiences, including: ● appropriate reading, writing, listening, and/or speaking alternatives for students who are English language learners, have special needs, read below the grade level, or have high interest and have already met the intended learning goals; ● culturally-relevant contexts and examples that support all students; ● opportunities to cultivate interest and confidence as scientists and engineers for all students.	Most learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.	Some learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.	Few learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.

Designed for NGSS: Student Work

Analyze Evidence

Directions:

1. Review your assigned materials to describe the path of student thinking.
2. Represent your answers to the questions in the space provided.
3. Be prepared to share the path of student thinking visually on a public chart.

Strengths

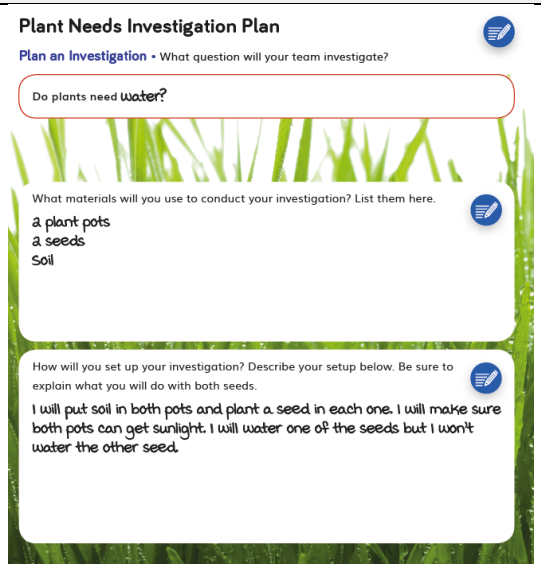
SW 1: Phenomena/ Problems

The Student Work is High Quality (5) in terms of SW1

Materials consistently offer quality phenomena/ problems sufficient to motivate and drive student learning.

Evidence

- Students investigate the phenomenon of what plants need to grow by observing a series of visuals and then planning and carrying out a hands-on investigation (DQ1 TB p. 5). They close read an informational text that treats this phenomenon, which they summarize (DQ1 TB pp. 10–16).



DQ1 TB p. 5

- Students explore the phenomenon of interdependent relationships in ecosystems by carrying out a video investigation (DQ2L1 TB p. 19), close reading an informational text (DQ2L2 TB pp. 22–26), and conducting collaborative research (DQ2L3 TB pp. 29–30). They then focus on the phenomenon of cycles of matter and energy transfer in ecosystems, modeling food chains (DQ2L4 TB p. 31) and food webs (DQ2L5 TB p. 34) before constructing scientific explanations using evidence and reasoning that answer the Driving Question (DQ2L6 TB pp. 35–36).

Make Inferences • Determine the meaning of the words and phrases from the article. Write the textual evidence you found in the article that helped you infer meaning.

Unfamiliar Word or Phrase	Inferred Meaning	Textual Evidence
fend for themselves	take care of themselves	Survival tips, be quiet, hide, follow, learn
Key Details: Learning to hunt by watching mother cougar, may have picked up some survival tips already, mother cougar teaches them to hunt and fend for themselves		
conservation	protection	Cougar researcher working out how they learn to hunt, tracking collars
kept tabs on	kept track of	They followed her electronic collar
Key Details: Tracking cats to determine how they hunt		
predators	animals that might hunt them	Brown and black spots help them blend in with the forest, protecting them from this
venture out	come out	Ready to, out of their hideaway.
stalk	sneak up on, silently hunt	Learn how to search for food, select an animal to do this to, watch how she caught prey
prey	animal hunted for	Learn how to search for food, select an animal to stalk, observe how she caught it.

DQ2L2 TB pp. 22–26

- Students explore the phenomenon of energy in chemical processes and everyday life by going on an energy hunt around the school before reflecting on the Driving Question (DQ4L1 TB pp. 69–70).

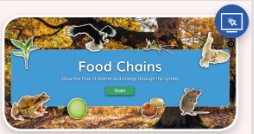
Collect Evidence • Look for evidence of energy around your classroom and school. Record the evidence of energy and where you observed it.

Evidence of Energy	Where Evidence of Energy Observed
Light	Hallway Lighting
Heat	A heater, sunlight through a window
Sound	Other students talking, a stereo
Energy of motion	Other students walking, a moving fan
Stored energy	A charged battery

DQ4L1 TB pp. 69–70

- Students explore the phenomenon of matter and energy flow in ecosystems using an interactive, discovering that energy flows from the Sun to producers, herbivores, and carnivores (DQ4L3 TB p. 81).

You will be modeling energy flow through an ecosystem using the **Food Chain interactive**.



- Select "Start."
- Drag and drop images and arrows to make your food chain.
- There are two arrows: "Energy" and "Matter." You can have one or two arrows between each image.
- To check if your model is correct, use the "Check" button. If the model is correct, the energy and matter will flow through. If it is incorrect, it will reset.
- To start over, select the "Reset" button.
- Complete Levels 1, 2, and 3 of the interactive. Then answer the question.

Use a Model • Where do the organisms in the model get the energy they need? Be specific. **Note:** There may be more than one correct answer.

The organisms in the model get their energy from the Sun. The plants get their energy directly from the Sun. They use this energy to make their own food. The animals that eat plants get their energy from the plants. The organisms that eat animals get their energy from the animals.

DQ4L3 TB p. 81

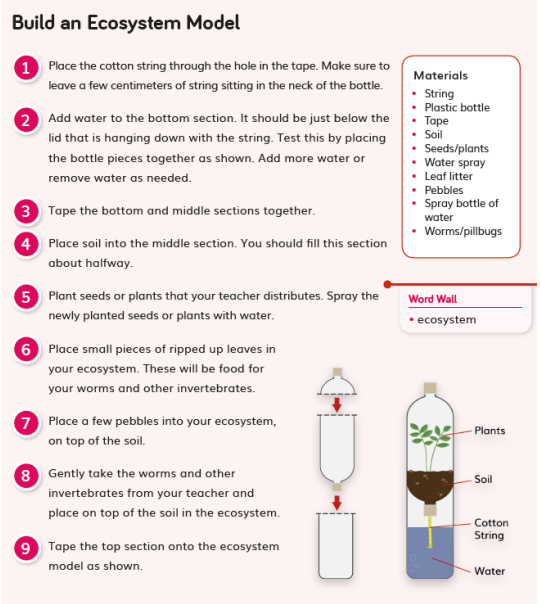
SW 2: Three-Dimensional Conceptual Framework

The Student Work is High Quality (5) in terms of SW2

Materials consistently leverage student prior knowledge and experiences to motivate their learning.

Evidence

- Students build physical ecosystem models (DQ2L7 TB p. 38) which they return to throughout the module, connecting their models to concepts like dead matter and decomposition.



Build an Ecosystem Model

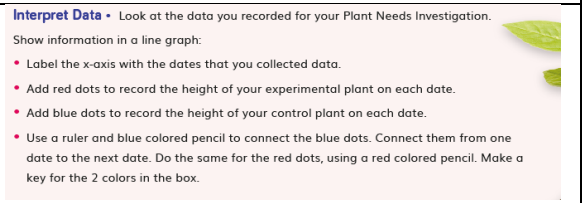
1. Place the cotton string through the hole in the tape. Make sure to leave a few centimeters of string sitting in the neck of the bottle.
2. Add water to the bottom section. It should be just below the lid that is hanging down with the string. Test this by placing the bottle pieces together as shown. Add more water or remove water as needed.
3. Tape the bottom and middle sections together.
4. Place soil into the middle section. You should fill this section about halfway.
5. Plant seeds or plants that your teacher distributes. Spray the newly planted seeds or plants with water.
6. Place small pieces of ripped up leaves in your ecosystem. These will be food for your worms and other invertebrates.
7. Place a few pebbles into your ecosystem, on top of the soil.
8. Gently take the worms and other invertebrates from your teacher and place on top of the soil in the ecosystem.
9. Tape the top section onto the ecosystem model as shown.

Materials
- String
- Plastic bottle
- Tape
- Soil
- Seeds/plants
- Water spray
- Leaf litter
- Pebbles
- Spray bottle of water
- Worms/pillbugs

Word Wall
- ecosystem

DQ2L7 TB p. 38

- Students revisit their plant needs investigation set up in DQ1, analyzing and interpreting data before representing that data in a bar graph (DQ3L1 TB pp. 45–48).



Interpret Data • Look at the data you recorded for your Plant Needs Investigation.

Show information in a line graph:

- Label the x-axis with the dates that you collected data.
- Add red dots to record the height of your experimental plant on each date.
- Add blue dots to record the height of your control plant on each date.
- Use a ruler and blue colored pencil to connect the blue dots. Connect them from one date to the next date. Do the same for the red dots, using a red colored pencil. Make a key for the 2 colors in the box.

DQ3L1 TB pp. 45–48

- In pairs, students create physical models of matter cycling in an ecosystem (DQ5L3 TB p. 104) and observe a guided experiment (DQ5L4 TB p. 107) in order to understand the concept of decomposition.

Matter and Nutrients Cycling through an Ecosystem

1. Cut out the images on page 1 of the **Matter Cycling handout**.
2. Page 2 of the handout is the background for your model. Place it face-up.
3. Discuss with your partner how matter and nutrients move through the ecosystem. Decide where you will put the images on the background to show your ideas. You will add arrows to show the movement of matter and nutrients later, so imagine where these arrows will go.
4. Once you have decided where you want to put the cards, glue the cards to the background.
5. Think about where each organism in the ecosystem gets matter. Then, draw arrows that show the movement of matter and nutrients in the ecosystem.
6. Label each arrow *matter and nutrients* or *nutrients* to show the flow of matter and nutrients from one part of the ecosystem to the next.

Example arrow:

Matter and Nutrients

DQ5L3 TB p. 104

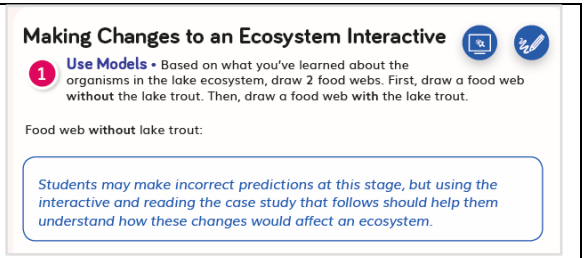
Decomposition Observations

Make Observations • Use the magnifying glass to observe what has happened to the contents of each bag after sitting in the dark for approximately **1 week**. Record your observations in the table.

Bag	Contents	Observations
1	Fruit, No Soil	The fruit looks slimy and a bit moldy.
2	Fruit, Soil	The fruit and soil look slimy and there is a lot of mold.
3	Cottage Cheese, No Soil	The cottage cheese looks slimy and a bit moldy.
4	Cottage Cheese, Soil	The cottage cheese and soil look slimy and there is a lot of mold.
5	Soil, Water	The soil looks the same.

DQ5L4 TB p. 107

- Students use an interactive to model what happens when a non-native species is introduced to an ecosystem (DQ6L1 TB pp. 115–118), consolidating their understanding of the Module Phenomenon.


Making Changes to an Ecosystem Interactive

1 **Use Models** • Based on what you've learned about the organisms in the lake ecosystem, draw 2 food webs. First, draw a food web **without** the lake trout. Then, draw a food web **with** the lake trout.

Food web **without** lake trout:

Students may make incorrect predictions at this stage, but using the interactive and reading the case study that follows should help them understand how these changes would affect an ecosystem.

DQ6L1 TB pp. 115–118

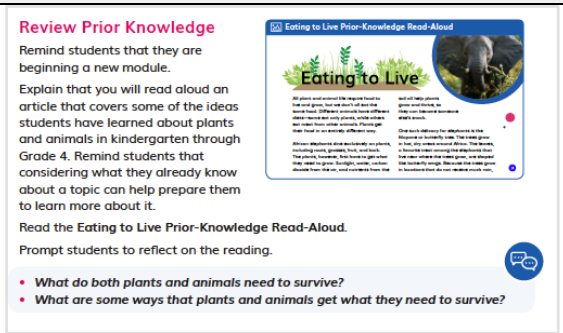
SW 3: Prior Knowledge

The Student Work is High Quality (5) in terms of SW3

Materials consistently leverage student prior knowledge and experiences to motivate their learning.

Evidence

- Students engage with a Prior-Knowledge Read-Aloud about animals, plants, and matter (DQ1L1 TE p. 8).


Review Prior Knowledge

Remind students that they are beginning a new module.

Explain that you will read aloud an article that covers some of the ideas students have learned about plants and animals in kindergarten through Grade 4. Remind students that considering what they already know about a topic can help prepare them to learn more about it.

Eating to Live Prior-Knowledge Read-Aloud

Eating to Live

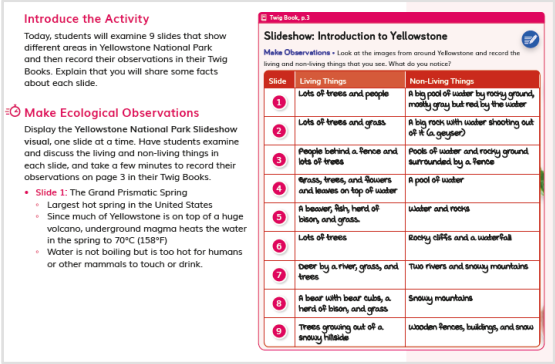
Read the **Eating to Live Prior-Knowledge Read-Aloud**.

Prompt students to reflect on the reading.

- ***What do both plants and animals need to survive?***
- ***What are some ways that plants and animals get what they need to survive?***

DQ1L1 TE p. 8

- Students observe a series of slides from Yellowstone, activating their prior knowledge of the national park, its features, and some of the organisms that live in it (DQ1L1 TE p. 9).


Introduce the Activity

Today, students will examine 9 slides that show different areas in Yellowstone National Park and then record their observations in their Twig Books. Explain that you will share some facts about each slide.

Make Ecological Observations

Display the Yellowstone National Park Slideshow visual, one slide at a time. Have students examine and discuss the living and non-living things in each slide, and take a few minutes to record their observations on page 3 in their Twig Books.

- Slide 1: The Grand Prismatic Spring
  - Largest hot spring in the United States
  - Since much of Yellowstone is on top of a huge volcano, underground magma heats the water in the spring to 70°C (158°F)
  - Water is not boiling but is too hot for humans or other mammals to touch or drink.

Twig Book, p.3

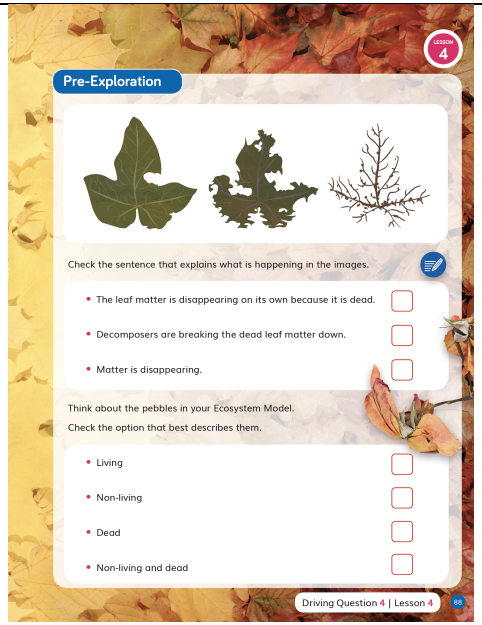
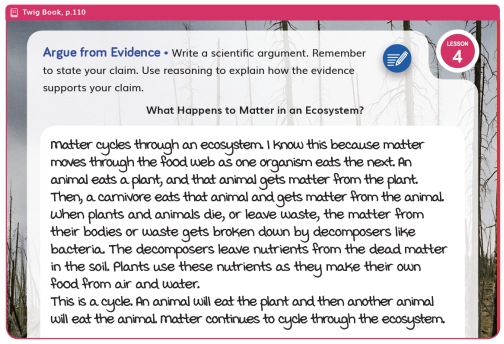
Slideshow: Introduction to Yellowstone

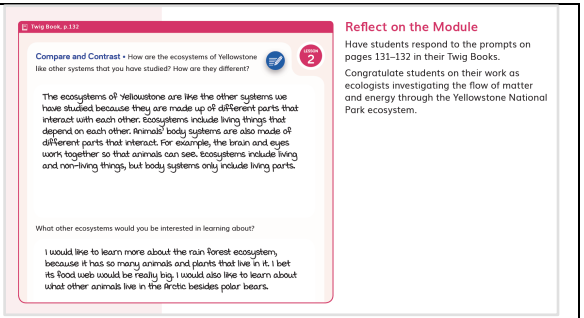
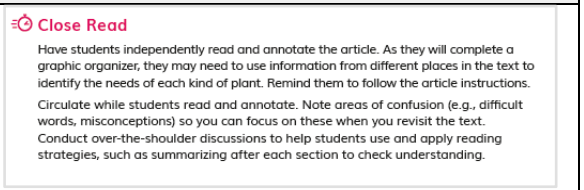
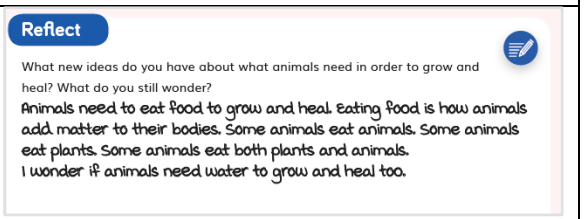
Make Observations • Look at the images from around Yellowstone and record the living and non-living things that you see. What do you notice?

Slide	Living Things	Non-Living Things
1	Lots of trees and people	A big pool of water by rocky ground, mostly gray but red by the water
2	Lots of trees and grass.	A big rock with water shooting out of it (a geyser)
3	People behind a fence and lots of trees	Pools of water and rocky ground surrounded by a fence
4	Grass, trees, and flowers and leaves on top of water	A pool of water
5	A beaver, fish, herd of bison, and grass.	Water and rocks
6	Lots of trees	Rocky cliffs and a waterfall
7	Deer by a river, grass, and trees	Two rivers and snowy mountains
8	A bear with bear cubs, a herd of bison, and grass	Snowy mountains
9	Trees growing out of a snowy hillside	Wooden fences, buildings, and snow

DQ1L1 TE p. 9

• Students review all the evidence they have gathered throughout the Driving Question and use it to construct scientific explanations (DQ2L6 TE p. 78, TB pp. 35–36).	**Write Supporting Evidence** Ask students to independently write their scientific explanations on page 36 in their Twig Books. Encourage students to write in pencil so they can make revisions, as needed. Remind them to explain how the evidence supports their claim. They must provide their reasoning and include a conclusion that sums up their findings. **Stronger and Clearer Each Time (Language Routine)** Once their explanations have been drafted, have students work together to give and receive feedback. First, they will share with their current partners and then they will refine their work and share with two other partners in succession. Explain that during this process, they should be referring to the rubric on page 35 in their Twig Books. 1. Partner 1 tells their ideas while Partner 2 listens. Partner 2 asks questions and tries to get more detail, clarifications, and input from Partner 1. Give pairs 30–45 seconds for this step. Give Partner 1 time to revise. 2. Partner 2 tells their ideas while Partner 1 listens. Partner 1 asks questions and should try to get more details, clarifications, and input from Partner 2. Give pairs 30–45 seconds for this step. Give Partner 2 time to revise. 3. Students switch to a new partner. They follow the same process as in steps 1 and 2, but use what they heard from their first partner to strengthen what they share with their new partner (e.g., add more detail and be clearer). DQ2L6 TE p. 78
• Students review the science tools they've used and add "Ask questions" to the Science Tools poster (DQ3L1 TE p. 97).	**Science Tools** • Construct explanations • Plan and carry out investigations • Analyze and interpret data • Develop and use models • Use math and computational thinking • Design solutions • Argue from evidence • Obtain, evaluate, and communicate information • Ask questions DQ3L1 TE p. 97

• Students complete a diagnostic pre-assessment to elicit awareness of their prior knowledge and misconceptions of dead matter and decomposition (DQ4L4 TB p. 88).	 LESSON 4 Pre-Exploration Check the sentence that explains what is happening in the images. • The leaf matter is disappearing on its own because it is dead. • Decomposers are breaking the dead leaf matter down. • Matter is disappearing. Think about the pebbles in your Ecosystem Model. Check the option that best describes them. • Living • Non-living • Dead • Non-living and dead Driving Question 4 | Lesson 4 88 DQ4L4 TB p. 88
• Following a collaborative language routine, students revise their explanations about how matter moves through an ecosystem (DQ5L4 TE p. 182, TB p. 110).	**Stronger and Clearer Each Time (Language Routine)** Use successive pair-shares for students to refine and strengthen their arguments. Students should write their argument, and then successively meet with two partners who will ask questions aloud to try and get more detail as follows. They should then share the argument with their partner. As students take turns sharing their arguments, ask the listening partner to use the rubrics to identify whether the argument could be strengthened. Tell them to pay close attention to the claim, evidence, reasoning, and conclusion they provide. Briefly review the four discussion prompts that you recorded on the board during the Lesson Preparation. This exercise will help students clarify where they might need to strengthen their arguments. Allow time for students to make revisions based on peer feedback.  Twig Book, p.110 LESSON 4 Argue from Evidence • Write a scientific argument. Remember to state your claim. Use reasoning to explain how the evidence supports your claim. What Happens to Matter in an Ecosystem? matter cycles through an ecosystem. I know this because matter moves through the food web as one organism eats the next. An animal eats a plant, and that animal gets matter from the plant. Then, a carnivore eats that animal and gets matter from the animal. When plants and animals die, or leave waste, the matter from their bodies or waste gets broken down by decomposers like bacteria. The decomposers leave nutrients from the dead matter in the soil. Plants use these nutrients as they make their own food from air and water. This is a cycle. An animal will eat the plant and then another animal will eat the animal. Matter continues to cycle through the ecosystem. DQ5L4 TE p. 182

• Students reflect on their new understandings and ideas about ecosystems, comparing and contrasting the Yellowstone ecosystem with other ecosystems they've studied in science class (DQ6L2 TE p. 208, TB p. 132).	 Twig Book, p. 132 Compare and Contrast • How are the ecosystems of Yellowstone like other systems that you have studied? How are they different? LEVEL 2 The ecosystems of Yellowstone are like the other systems we have studied because they are made up of different parts that interact with each other. Ecosystems include living things that depend on each other. Animals' body systems are also made of different parts that interact. For example, the brain and eyes work together so that animals can see. Ecosystems include living and non-living things, but body systems only include living parts. What other ecosystems would you be interested in learning about? I would like to learn more about the rain forest ecosystem, because it has so many animals and plants that live in it. I bet its food web would be really big. I would also like to learn about what other animals live in the Arctic besides polar bears. Reflect on the Module Have students respond to the prompts on pages 131–132 in their Twig Books. Congratulate students on their work as ecologists investigating the flow of matter and energy through the Yellowstone National Park ecosystem. DQ6L2 TE p. 208
SW 4: Metacognitive Abilities	
The Student Work is High Quality (5) in terms of SW4 The materials provide students with regular, explicit opportunities to consider how their learning experiences changed their thinking.	
Evidence • Students close read and annotate an informational text, which the class works to summarize following a discussion (DQ1L3 TE pp. 23–24).	 Close Read Have students independently read and annotate the article. As they will complete a graphic organizer, they may need to use information from different places in the text to identify the needs of each kind of plant. Remind them to follow the article instructions. Circulate while students read and annotate. Note areas of confusion (e.g., difficult words, misconceptions) so you can focus on these when you revisit the text. Conduct over-the-shoulder discussions to help students use and apply reading strategies, such as summarizing after each section to check understanding. DQ1L3 TE pp. 23–24
• Students consider how their learning experiences have changed their understanding of what animals need to grow and heal, and share what they still wonder (DQ2L6 TB p. 37).	 Reflect What new ideas do you have about what animals need in order to grow and heal? What do you still wonder? Animals need to eat food to grow and heal. Eating food is how animals add matter to their bodies. Some animals eat animals. Some animals eat plants. Some animals eat both plants and animals. I wonder if animals need water to grow and heal too. DQ2L6 TB p. 37

- Students reflect on their two hands-on plant investigations as they consider how they know if a plant has grown or not (DQ3L2 TE pp. 100–101, TB p. 52).

Discuss Where Plants Get Matter

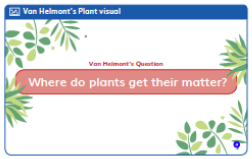
Refer to Module 1, where students investigated the properties of substances and learned that all substances, including gases like air, are made of matter.

Remind students that they have been investigating where plants get their matter. Prompt students to think about where the matter in plants might come from.

- ***Is air made of matter? What about water?***
- Yes, air and water are made of matter.
- ***What about sunlight?***
- Sunlight is not made of matter.
- We do not know if sunlight is made of matter.
- ***Are plants made of matter? How do you know?***
- ***Where do you think this matter comes from?***

Introduce Jan Baptist van Helmont (1580–1644), a scientist who wondered where plants got their matter. In the 1600s, people believed that plants got their matter from eating soil. Van Helmont wondered if plants got their matter from soil, water, or both.

Display the first image from the **Van Helmont's Plant visual** and read it aloud. Then, display slides 2–4.



Discuss each of the steps of Van Helmont's investigation. Pause on slide 4.

- ***If plants get their matter from soil, what would we expect to see in the results?***
- The weight of the soil would go down by the same amount that the weight of the plant went up.

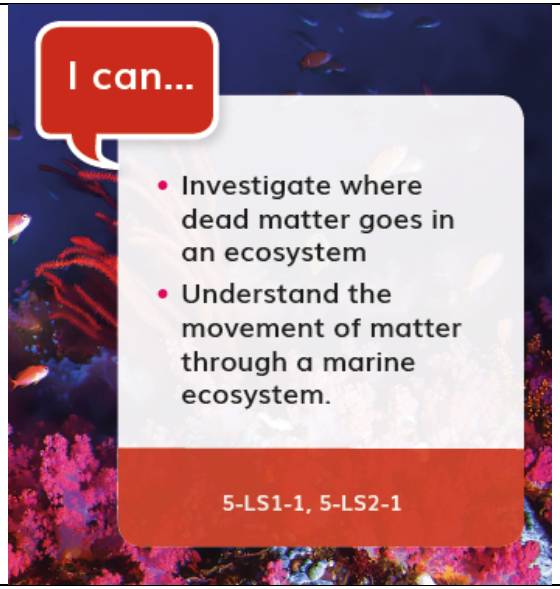
Remind students of the seeds they planted Module 1. Ask students what parts of the investigation they have completed so far. Students may respond that they have weighed the soil and the seeds, planted the seeds, and watered the seeds.

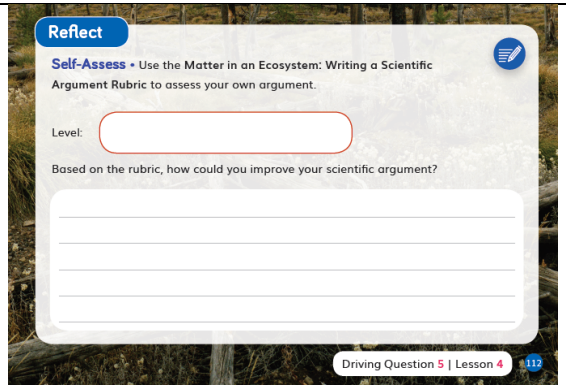
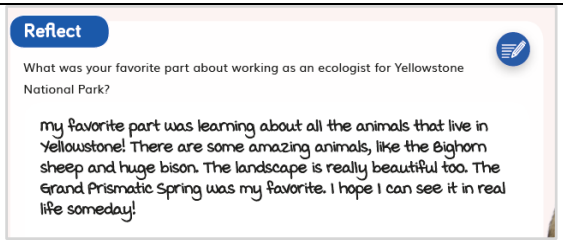
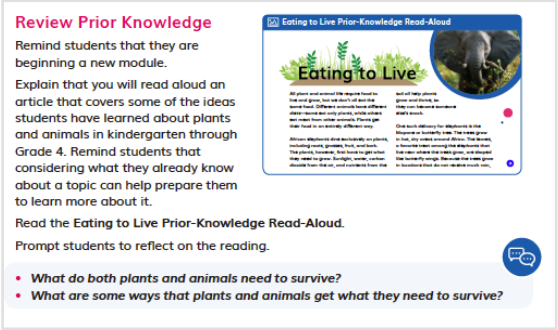
Encourage students to think about the slides from the visual.

- ***What steps do we need to take now to complete our investigation?***
- We need to weigh the soil and the plant.

DQ3L2 TE pp. 100–101

- The "I can" statement details use of the three dimensions students will use in this DQ. "I can… Investigate where dead matter goes in an ecosystem" (DQ5 TB p. 90).



• Students use a rubric to reflect on and self-assess their scientific arguments, writing how they think they could improve them (DQ5L4 TB p. 112).	 DQ5L4 TB p. 112
• Students reflect on all they learned in the module, sharing their favorite learning (DQ6L2 TB p. 131).	 DQ6L2 TB p. 131
SW 5: Equitable Learning Opportunities	
The Student Work is High Quality (5) in terms of SW5 Most learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.	
Evidence • Integrated EL sidebars offer teachers guidance to support students' engagement with the material (DQ1L1 TE p. 8, DQ2L3 TE p. 54, DQ3L4 TE p. 115, DQ4L4 TE p. 147).	 DQ1L1 TE p. 8

English Learners

Substantial Support (Emerging Proficiency)

ELs can benefit from working with a student of higher English proficiency who speaks their native language. They can discuss the work in their native language and translate to English as they write in their Twig Books. If possible, provide useful books in the students' native language.

Moderate Support (Expanding Proficiency)

Pair these students with a student of higher English proficiency.

DQ2L3 TE p. 54

English Learners

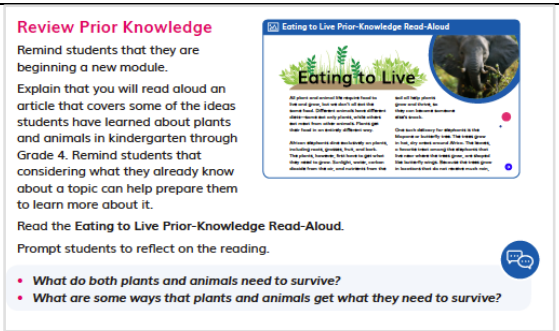
Acknowledge that the rubric for writing a scientific argument is very similar to the rubric for writing a scientific explanation. Let students know that many of the same skills are needed for both types of writing. Read through each section of the rubric and ask students which seem familiar. Have them explain each domain in their own words.

DQ3L4 TE p. 115

English Learners

Before beginning the Stronger and Clearer Each Time routine, ask students to think back to other experiences with this routine. What questions helped to elicit detail, explanation, and elaboration? As students engage in the routine, listen for examples of other successful dialogue and add to the list you are posting.

DQ4L4 TE p. 147

• Integrated Cultural Connection sidebars offer teachers guidance to engage students of all backgrounds (DQ1L1 TE p. 8, DQ2L3 TE p. 55, DQ3L3 TE p. 106, DQ5L3 TE p. 172).	 **Review Prior Knowledge** Remind students that they are beginning a new module. Explain that you will read aloud an article that covers some of the ideas students have learned about plants and animals in kindergarten through Grade 4. Remind students that considering what they already know about a topic can help prepare them to learn more about it. Read the **Eating to Live Prior-Knowledge Read-Aloud**. Prompt students to reflect on the reading. • ***What do both plants and animals need to survive?*** • ***What are some ways that plants and animals get what they need to survive?*** DQ1L1 TE p. 8

- Integrated Special Needs sidebars offer teachers guidance to support students of all abilities as they participation in class activities and grasp key concepts (DQ1L2 TE p. 18, DQ2L3 TE p. 56, DQ4L4 TE p. 148).

English Learners

Provide support as needed for ELs as they share.

Substantial Support (Emerging Proficiency)

Provide students with sentence frames such as:

- I <pushed/pulled> the _____ and it _____ (rolled, moved, fell down, etc.).

Moderate Support (Expanding Proficiency)

Prompt students to describe both what they did to the object and how the object moved. Help students with sentence frames if needed, such as:

- I _____ the _____, and it _____.

Light Support (Bridging Proficiency)

Use questioning to help students describe how the item moved and the action taken, such as:

- ***What happened when you pushed the button?***

DQ1L2 TE p. 18

3-D LEARNING OBJECTIVES

Students will:

- Identify similarities and differences between young plants and their parents
- Explain that young plants are similar to their parents, but not exactly alike.

DQ4L4 TE p. 148

- Integrated Challenges interspersed throughout the TB support GATE students who have met the learning goals (DQ1L1 TB p. 4, DQ2L2 TB p. 28, DQ3L2 TB p. 51, DQ5L2 TB p. 103).

Make Inferences • Determine the meaning of the words and phrases from the article. Write the textual evidence you found in the article that helped you infer meaning.

Unfamiliar Word or Phrase	Inferred Meaning	Textual Evidence
fend for themselves	take care of themselves	Survival tips, be quiet, hide, follow, learn
Key Details: Learning to hunt by watching mother cougar, may have picked up some survival tips already, mother cougar teaches them to hunt and fend for themselves		
conservation	protection	Cougar researcher working out how they learn to hunt, tracking collars
kept tabs on	Kept track of	They followed her electronic collar
Key Details: Tracking cats to determine how they hunt		
predators	animals that might hunt them	Brown and black spots help them blend in with the forest, protecting them from this
venture out	come out	Ready to, out of their hideaway.
stalk	sneak up on, silently hunt	Learn how to search for food, select an animal to do this to, watch how she caught prey
prey	animal hunted for	Learn how to search for food, select an animal to stalk, observe how she caught it.

DQ2L2 TB p. 28

- Videos like Time-Lapse of a Plant (DQ1L1), Butterfly's Breakfast (DQ2L5), Decomposers: Breaking it Down (DQ5L2), and Wolves in Yellowstone (DQ6L2) bring phenomena and concepts to life for all students.

Time-Lapse of a Plant video

Observe a time-lapse of seeds as they break through soil and grow into plants.

Time-Lapse of a Plant (DQ1L1)