

**ELA: Grade 5, Lesson 5, Ecology**

**Lesson Focus:** Students will create a food web

**Practice Focus:** Today we will learn about food chains and food webs.

**TN Standards:** 5.RI.KID.2, 5.RI.KID.3, 5.FL.VA.VA.7a

**Teacher Materials:**

- ELA, Grade 5, Lesson 5 – Teacher Packet

**Student Materials:**

- Two pieces of paper
- Pen or pencil

Teacher Do	Student Do
<p><b>Opening</b>  <b>Hello! Welcome to Tennessee’s At Home Learning Series for literacy! Today’s lesson is for all our 5<sup>th</sup> graders out there, though all children are welcome to tune in. This lesson is the fifth in our series.</b></p> <p><b>My name is ____ and I’m a ____ grade teacher in Tennessee schools! I’m so excited to be your teacher for this lesson! Welcome to my virtual classroom!</b></p> <p><b>Today we will be learning about ecology! Before we get started, to participate fully in our lesson today, you will need:</b></p> <ul style="list-style-type: none"> <li>• Pencil or pen</li> <li>• Two pieces of paper</li> </ul> <p><b>Ok, let’s begin!</b></p>	<p>Collects materials needed to engage in the lesson.</p>
<p><b>Intro</b>  <b>What Have We Already Learned?</b></p> <ul style="list-style-type: none"> <li>• <b>What is an ecosystem?</b> [Pause] <b>Yes, you’re right. It is a community of living organisms, including plants and animals, all interacting with one another and their physical environments.</b></li> <li>• <b>What is a habitat?</b> [Pause] <b>Exactly, a home within an ecosystem.</b></li> <li>• <b>What are trophic levels?</b> [Pause] <b>Strong thinking! It is connecting steps in a food chain.</b></li> <li>• <b>At least how many trophic levels exist in a food chain?</b> [Pause] <b>Yes, two!</b></li> </ul> <p>[Show image 2A-8: Full Cycle Completed]</p> <ul style="list-style-type: none"> <li>• <b>In this illustration, which organism is a producer?</b> [Pause]</li> </ul>	<p>Student interacts with teacher’s questions as posed.</p>

Yes, the berry bush.

- How does a producer get its food? [Pause] Yes, it makes its own food through photosynthesis.
- In this illustration, which organisms are the consumers? [Pause] Correct, the boar, mouse, and wolf.
- How does a consumer get its food? [Pause] Yes, it eats other plants and/or animals.
- In this illustration, which organisms are the decomposers? [Pause] Great thinking. It is worms, snail, and beetle.
- What is the role of a decomposer in a food chain? [Pause] Yes, breaks down dead plants and animals.

Essential Background Information or Terms

Today you will be looking at different ways that we organize information about feeding relationships in nature. When we have a lot of information on one topic, it is helpful to organize that information on paper in certain ways. There is more than one way we can organize information on paper.

- How might you organize the information about the classification of animals? [Pause]  
Yes, exactly! In a chart! When the information is in a chart, you could then see possible patterns and differences among the various classifications of animals.
- What other ways might you organize information? [Pause] Right, KWL (Know-Wonder-Learn) charts, T-charts, Venn diagrams, your food web, and brainstorming links, etc.
- What is one way that you have already seen the feeding relationships in ecosystems organized? [Pause] That's right, a food chain.

Remember that at the end of the last lesson, you heard that you will learn more about food webs, which are overlapping food chains. You will see one additional way to organize information about the feeding relationships in ecosystems: an energy pyramid.

The energy pyramid shows the trophic levels or feeding levels in a food chain. It also illustrates the amount of energy available to the different organisms.

Be sure to grade your paper and pencil. I'm going to give you a couple of directions. I will repeat the directions twice.

- Draw a simple pyramid on chart paper or on the board [Pause and repeat the directions twice]

<ul style="list-style-type: none"> <li>• Which part of a pyramid is the widest, the base or the top? [Pause and repeat the question twice] Yes, the base.</li> <li>• Producers, organisms that have the most energy, are shown at the base of the pyramid. With sunshine and water, producers are able to make their own food, so they have the most energy available for themselves. We will hear about these three types of organizers today: energy pyramids, food chains, and food webs. All three of these things help us to understand and view patterns of feeding relationships within an ecosystem.</li> <li>• Purpose for Listening</li> </ul> <p>Be sure to listen carefully to learn more about food chains, food webs, and energy pyramids. Before we get started. Please write down the terms food web, food chain, and energy pyramid. Beside each of those terms sketch an early idea of what each of those might look like.</p>	
<p><b>Teacher Model:</b></p> <ul style="list-style-type: none"> <li>• [Show image 3A-1: Child with Plate Zeke] Well, students, did anyone find examples of food chains in your own habitat or ecosystem? Think about what you ate for dinner last night. Where did the food that gave you energy get its own energy? [Pause] Where do you belong in the food chain? [Pause] Remember that ecosystems include all living and nonliving things in a particular community. All parts are interconnected. All living things in an ecosystem are essential and depend upon one another, and all nonliving things—the soil, climate, and amount of rainfall that an ecosystem receives—help determine what lives there. Today, we’re going to look at food chains and food webs to see what they tell us about the eating relationships among different animals in different ecosystems. First, I want to explain an energy pyramid to you, because I think it is a good way to view the trophic levels in a food chain.</li> <li>• [Show image 3A-2: Energy Pyramid] You already know that food chains cycle energy and nutrients through an ecosystem from one organism to another and back to the soil again. You already know that food chains have different trophic levels. Now think of these levels arranged in a pyramid. The bottom tier of the pyramid consists of plants. Notice</li> </ul>	<p>Student interacts with teacher’s questions as posed. Student uses appropriate note-taking strategy to capture information from today’s learning</p>

<p>that this trophic level is the widest, showing that plants have the most energy available for the major plant activity of life—growth.</p> <ul style="list-style-type: none"> <li>• You know that green plants, the producers, get their energy from the sun. Omnivores and herbivores, plant consumers, make up the second tier, or trophic level. Notice that the second tier of the pyramid is narrower than the bottom level of producers. That's because there are fewer organisms and less energy at this level. Most herbivores have to work very hard to get all the food energy that they need from plants. Moving about, staying warm, and reproduction—their activities of life—use up a lot of energy. Plus, less energy is stored in their bodies compared to the energy stored in plants. By the time carnivores enter the food chain at the third tier or trophic level, there is even less food energy available. Carnivores use a lot of energy for physical movement. Because there is less energy available and consumers use so much of it, the third tier of the pyramid is the smallest. This represents the least amount of energy of all the levels of the pyramid. The energy pyramid shows how much energy flows from one organism to another in a food chain. Because energy is lost as it is passed along the food chain, there are usually fewer animals at the top of the pyramid. Those at the top of the pyramid may have to travel over large areas within an ecosystem to find enough food energy to survive. Think about that as we explore a variety of ecosystems. Let's take a look at the eating relationships and how energy is passed along in several different ecosystems.</li> <li>• [Show image 3A-3: Sonoran Desert] First, we'll travel to the Sonoran Desert in the southwestern part of the United States to visit a desert ecosystem. Even though the Sonoran Desert is one of the largest and hottest deserts in the Americas, it has more plant and animal species than any other desert in the world. Each one of these species has its own habitat within the ecosystem, but we will look at the ecosystem as a whole.</li> <li>• [Show 3A-4: Sonoran Desert Energy Pyramid] What do you see in this image? [Pause] Yes, an energy pyramid. The main producers in this ecosystem are shrubs and cacti. The plant consumers, both herbivores and omnivores, include ground squirrels, rabbits, kangaroo rats, mice, lizards, desert tortoises, and birds. Carnivores include kit foxes, elf</li> </ul>	
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<p>owls, red-tailed hawks, roadrunners, scorpions, coyotes, badgers, raccoons, skunks, and rattlesnakes. Though they do not live in the driest parts of the desert, mountain lions often come down from surrounding mountain areas to hunt. Where they exist, mountain lions are at the top of the food chain. Vultures and beetles are some of the scavengers of the desert. Remains left to rot by the scavengers become food for the decomposers—mushrooms, insects, and microorganisms.</p> <ul style="list-style-type: none"> <li>• [Show image 3A-5: Sonoran Desert Food Chains] With so much diverse plant and animal life, there are many food chains in the Sonoran Desert. Let's look at two simple examples.</li> <li>• Ants eat desert plants. Next, the scorpion eats the ants. Then, the rat eats the scorpion. Then, the hawk eats the rat. Finally, beetles and fungi break down the hawk when it dies, returning nutrients to desert plants.</li> <li>• Ants eat desert plants. Next, the scorpion eats the ants. Then, the bird eats the scorpion. Then, the fox eats the bird. Finally, beetles and fungi break down the fox when it dies, returning nutrients to desert plants. Remember that the decomposers, like this beetle and fungi, play an important role in the food chain. They break down dead animals and plants into nutrients, and those nutrients are released into the soil.</li> <li>• Do you see any connections between these food chains? [Pause] Right, both food chains begin with ants feeding on plants, and in both chains, a scorpion eats the ants. When food chains connect, as they surely do, food webs are created. Here is what one possible desert food web may look like.</li> <li>• [Show image 3A-6: Sonoran Desert Food Web] <ul style="list-style-type: none"> <li>• The kangaroo rat eats desert plants. Next, the snake eats the kangaroo rat. Then, the coyote eats the snake.</li> <li>• The lizard eats desert plants. Next, the snake eats the lizard. Then, the roadrunner eats the snake. Then, the hawk eats the roadrunner.</li> <li>• The tortoise eats desert plants. Then, the fox eats the tortoise. The lizard eats desert plants. Then, the hawk eats the lizard.</li> <li>• The lizard eats plants. Next, the roadrunner eats the lizard. Then, the bobcat eats the roadrunner.</li> </ul> </li> </ul>	
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<ul style="list-style-type: none"> <li>• The ant eats desert plants. Next, the scorpion eats the ant. Then, the rat eats the scorpion. Then, the hawk eats the rat.</li> <li>• The ant eats desert plants. Next, the scorpion eats the ant. Then, the bird eats the scorpion. Then, the fox eats the bird.</li> <li>• Finally, scavengers and decomposers eat the dead coyote, hawk, tortoise, roadrunner, etc., returning nutrients to the soil.</li> </ul> <p>Can you identify the producers in each link? [Pause] Yes, the producers are the desert plants with their seeds, nectar, and fruit.</p> <p>And who are the decomposers? [Pause] Great thinking! They are the beetles and termites, and they are also the bacteria and fungi that produce carbon dioxide and water, returning nutrients to the ground to nourish the producers.</p> <ul style="list-style-type: none"> <li>• [Show image 3A-7: The Everglades] Let's move from the dry desert to a very different ecosystem, one that is far from being dry! Can you guess which ecosystem I am thinking about? [Pause] Good guesses! We'll take a peek at the Florida Everglades, the biggest freshwater marsh in North America.</li> <li>• [Show image 3A-8: Everglades Energy Pyramid]</li> <li>• What do you see in this image? [Pause] Yes, an energy pyramid. Low-lying aquatic plants are the producers in this giant wetland ecosystem.</li> <li>• What consumers do you think live in the marsh? In other words, who eats the reeds, cattails, and water lilies that live there? [Pause] Wow, love all the thinking happening. Representatives from each of the five groups of vertebrate animals live here. Amphibians, mammals, birds, fish, and reptiles all live in marshlands.</li> <li>• We'll take a look at some of those hungry eaters who consume water plants and see who then feasts on them. Here are some examples of food chains in a wetland.</li> <li>• [Show image 3A-9: Everglades Food Chain]</li> <li>• Tadpoles eat plants. Next, the turtle eats the tadpoles. Then, the alligator eats the turtle. Finally, the decomposers break down the alligator, returning nutrients to the soil for producers.</li> <li>• The grasshopper eats plants. Next, the frog eats the grasshopper. Then, the alligator eats the frog. Finally, decomposers break down the alligator, returning</li> </ul>	
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<p><b>nutrients to the soil for new producers. Just as there are many food webs in the desert, there are also many food webs in the marsh. Remember, the plant producers are at the bottom of both food chains and food webs. Not all of the consumers eat the plants, but the web of connections always returns to the producers. A food web in the marsh might look something like this.</b></p> <ul style="list-style-type: none"> <li>• <b>[Show image 3A-10: Everglades Food Web] Tadpoles eat plants. Next, the turtle eats the tadpoles. Then, the alligator eats the turtle.</b></li> <li>• <b>The grasshopper eats plants. Next, the frog eats the grasshopper. Then the alligator eats the frog.</b></li> <li>• <b>The grasshopper eats plants. Next, the frog eats the grasshopper. Then, the raccoon eats the frog.</b></li> <li>• <b>The grasshopper eats plants. Next, the crayfish eats the grasshopper. Then, the snake eats the crayfish. Then, the raccoon eats the snake.</b></li> <li>• <b>Insects eat plants. Next, the frog eats the insects. Then, the snake eats the frog. Then, the hawk eats the snake.</b></li> <li>• <b>Insects eat plants. Next, the fish eat the insects. Then, the egret eats the fish. Then, the alligator eats the egret.</b></li> <li>• <b>Finally, bacteria, earthworms, insects, and other decomposers eat the animals and plants when they die and return nutrients to the soil for new producers.</b></li> <li>• <b>[Show image 3A-11: Amazon Rainforest] Before I leave you today, we'll look at one more ecosystem. This one lies along the equator in South America.</b></li> <li>• <b>Who can make an educated guess as to what ecosystem supplies energy for monkeys and jaguars? [Pause] Yes, the Amazon Rainforest! You can see the thick canopy, or layer of top branches of trees, that covers the rainforest and provides homes to many animals.</b></li> <li>• <b>[Show image 3A-12: Amazon Rainforest Energy Pyramid]</b></li> <li>• <b>What do you see in this image? [Pause] Yes, an energy pyramid. I've already named a few of the animals in the Amazon Rainforest. Look at the pyramid with all the different plants and animals. How many producers, consumers, and decomposers can you identify? [Pause] Remember that an</b></li> </ul>	
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<p>ecosystem's diversity of plant and animal life is what helps make it strong.</p> <p>On the bottom row, you can see the producers: tree trunk, banana plant, orchids, and grasses. On the next two rows, there are consumers: tapir, frog, monkey, capybara, toucan, crocodile, hawk, and eagle. At the top of the energy pyramid is the jaguar. On the sides, there are decomposers: bacteria, earthworms, fungi, termite, and beetle.</p> <ul style="list-style-type: none"> <li>• [Show image 3A-13: Amazon Rainforest Food Chains] Where do the plants at the bottom of the chart get their energy? [Pause] Yes, the producers in the first trophic level get their energy from the sun.</li> <li>• And who might eat the plants? [Pause] Yes, the capybara or ant.</li> <li>• And who might get energy from dining on the capybara or ant? [Pause] You're right, possibly the baby crocodile or the frog.</li> <li>• Who then may eat the baby crocodile or frog? [Pause] Maybe a snake or ocelot. Then, the bodies of the snake and ocelot become food for the decomposers.</li> <li>• [Show image 3A-14: Amazon Rainforest Food Web] Look at all these plants and animals in the Amazon Rainforest! How many different combinations can you find to make a food web? [Pause] Yes, The monkey eats berries. Then, the jaguar eats the monkey.</li> <li>• The monkey eats berries. Next, the baby crocodile eats the monkey. Then, the snake eats the crocodile. The monkey eats berries. Then, the hawk eats the monkey.</li> <li>• The ant eats plants. Next, the frog eats the ant. Then, the ocelot eats the frog. Then, the snake eats the ocelot.</li> <li>• The capybara eats plants. Then, the jaguar eats the capybara.</li> <li>• The capybara eats plants. Then, the snake eats the capybara.</li> <li>• The capybara eats plants. Then, the hawk eats the capybara.</li> <li>• Finally, decomposers eat the remains of the dead animals and plants and return nutrients to the soil for new producers.</li> <li>• [Show image 3A-15: Zeke in Front of Food Chains] Every ecosystem in the world is made up of interconnected living things that are dependent upon</li> </ul>	
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<p>one another for survival. The food chains and food webs of the Sonoran Desert, the Everglades, and the Amazon Rainforest provide examples of the interdependence of organisms within each ecosystem. The ongoing, regular completion of this energy cycle in food chains determines an ecosystem's ability to survive.</p> <p>The next time we are together, we will look at ways in which ecosystems change over time.</p>	
<p><b><u>Guided Practice</u></b> Let's return to the 3 terms that you wrote down at the beginning of the lesson.</p> <p>Food chain, food web, and energy pyramid.</p> <p>What can you add to your notes to help you better understand the similarities and differences in these informational graphics? [Repeat the directions 2x and pause]</p>	<p>Student will edit their notes on food web, food chain, and energy pyramid.</p>
<p><b><u>Independent Practice</u></b></p> <ul style="list-style-type: none"> <li>• [Show image 3A-4: Sonoran Desert Energy Pyramid]</li> <li>• <b>Now you will create a food web based on the organisms shown in this energy pyramid.</b></li> <li>• <b>Remember to label the producers, consumers, and decomposers shown.</b> [Repeat 2x]</li> <li>• <b>Then you will sequence one of your food chains of at least three trophic levels.</b></li> <li>• <b>After you have completed one food chain, you should complete another food chain to see how the chains overlap to create a food web.</b> [Repeat 2x]</li> <li>• <b>As you have extra time today, you may want to illustrate your food webs.</b></li> </ul> <p>We'll talk more about food chains and food webs next time.</p>	<p>Student will access the Sonoran Desert energy pyramid to create 2 food chains that overlap to create a food web.</p>
<p><b><u>Closing</u></b></p> <ul style="list-style-type: none"> <li>• <b>I enjoyed learning about ecology with you today! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series!</b></li> <li>• <b>Bye!</b></li> </ul>	

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