

**Place-Based Education at Our Table Cooperative Farm
Fall 2020: Heroes and Villains in the Garden**

Elementary School (Grades 3-5) LS2: Ecosystems: Interactions, Energy and Dynamics

LS2.A: Interdependent Relationships in Ecosystems

The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs and food chains in which some animals eat plants for food and other animals eat the animals that eat the plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

Lesson:

Videos:

Fabulous Food Chains: by Crash Course Kids:

<https://www.youtube.com/watch?v=MUKs9o1s8h8>

Think Garden: Pests and Helpers:

<https://net.pbslearningmedia.org/resource/thnkgard.sci.ess.pests/think-garden-garden-pests-and-helpers/>

The Dirt on Decomposers: by Crash Course Kids:

<https://www.youtube.com/watch?v=uB61rfeeAsM>

Books:

Secrets of the Garden: Food Chains and the Food Web in Our Backyard: By Kathleen Weidner Zoefeld

<https://www.youtube.com/watch?v=YxkUa3noVTq&feature=youtu.be>

Up in the Garden and Down in the Dirt: By Kate Messner

<https://www.youtube.com/watch?v=lq7hkJ0VitA>

Discussion: Talk about how the garden is an interconnected community. Every garden is a part of an ecosystem composed of sunlight, water, plants, insects, birds and lots of other organisms. Everything in the garden has a job to do and most of the time that job is focused on either growing or eating (getting energy). Plants use sun and water to make energy. Insects and animals eat plants and other animals to make energy in order to survive. The connection between plants and animals needing each other for energy is called a food chain. Discuss and brainstorm a food chain that can be specifically found in a garden or on a farm.

Most of the creatures in a garden are considered helpful heroes and play a vital role in keeping

the garden healthy, but there are a few we may think of as endlessly hungry and mischievous villains that can sometimes disrupt the food chain if they get out of balance.

How are animals and plants dependent on one another?

Give some examples of food chains in a garden habitat.

Which creatures do you think are garden heroes? Which are the villains? Might there be a few double agents in there too? Why?

What things tell us a garden is healthy?

What can farmers do to help balance the ecosystem and keep the fields and crops healthy?

Do you have a favorite garden character? What is their role in the food chain?

Spend some time learning more about your favorite garden creature: study its life cycle, what does it look like, where does it live, what does it like to eat, where is it on the food chain and what role does it play in the garden? Is it a hero, villain or double agent?

Some of our favorite characters to learn about up in the air are:

Song-Birds: While fun to listen to, song-birds are great at snacking on pesky insects like crickets, beetles and grubs that can eat a farmer's crop. Many gardeners will try to draw song-birds in by providing bird houses for nesting and leaving a portion of their crops in the field a little longer so it goes to seed, a very tempting treat for the tiny birds.

Hawks and Kestrels: These powerhouse birds of prey help keep larger flocks of birds like crows from devouring crops like blueberries and grapes. They chase larger flocks of these hungry birds away and keep them from spending too much time in the ripening fields. They also have excellent eyesight and can help keep rodent populations in check by hunting the ground dwellers that like to feed on the farmer's fresh leafy greens and roots. In order to encourage more of these birds to come to the farm, Our Table Cooperative has built predator perches in several areas of our growing fields so the stealthy fliers have a handy place to perch and look for their next meal.

Some of our favorite characters to learn about around the garden are:

Ladybugs: These adorable and heroic red beetles are a gardener's delight. Their favorite treat to eat are plant destroying aphids. One ladybug can eat up to 5,000 insects in its lifetime.

Praying Mantis: Just like the ladybug, praying mantis is a welcome guest in the garden. It happily devours aphids and grasshoppers. The downside of having this amazing hunter in your garden, is that it will eat almost anything it can catch, and that includes the beneficial bugs you do want in your garden, Fun fact: mantids are masters of camouflage and some species can even resemble a leaf, stick, tree bark or a flower.

Bees: There are over 20,000 different types of bees in the world! These beautiful and busy creatures play a vital role as pollinators. Without pollination, plants could not produce fruits for animals and humans to eat or seeds to grow for more plants. Pollinators are essential for making sure every living thing has a steady food supply to survive.

Some of our favorite garden characters to learn about down in the dirt are:

Snakes: Not always a favorite critter to find, garden snakes are incredible hunters and not only eat hungry insects like grasshoppers, but they can help keep strawberry munching mice populations in check, too.

Worms: These super tunnel builders and dirt eaters are a favorite! They eat soil full of rotting roots and decomposing leaves at one end and cast out finer more nutrient dense soil from the other. Worms help build healthy soil for plants to thrive in.

Gophers and Moles: For the most part we consider gophers and moles a pesky villain, they dig up gardens, leave holes in the lawn, eat our carrots, and snack on helpful earthworms.... but they do good things for the earth, too. They help dredge up important nutrients that plants need to grow and survive from deep in the earth and their tunnels help aerate the soil to keep water moving and oxygen flowing... and the snakes get to make their homes in the tunnels as well.

And don't forget the FBI! (Fungus, Bacteria and Insects)

Decomposers may not seem like much, but they are essential to the cycle of life. They are kind of like the Earth's cleanup crew and without them, dead leaves, dead insects and dead animals would pile up everywhere. They also help recycle essential nutrients to plants. Let's check out a few here:

Mushrooms: Mushrooms are a type of fungus that helps break down dead organic materials like rotting bark chips and fallen leaves. As they break down these materials, they add nitrogen to the soil, an essential nutrient for healthy plants.

Bacteria: Now bacteria usually get a pretty bad wrap and are often considered the bad guys...but there are plenty of types of bacteria that get to be the good guy, they help decompose the dead stuff and add vital nutrients back to the soil so plants can grow up healthy. While we can usually see fungi and insects working their magic in the garden, bacteria are so small, you'd need a microscope to see them. In fact, they are so tiny that there could be billions of them in just one teaspoon of soil.

Insects: Pill Bugs: AKA: Rolly Polly Bug: Okay, a lot of us think of roly polly bugs as insects and love finding them under rocks and rotting logs...but these little guys are actually part of the crustacean family (an arthropod like a crab or shrimp). They have a cool exoskeleton made up of scales that look a lot like a lobster tail and they are often known for curling up into a little ball for protection when they feel threatened. Because they like to eat dead insects and rotting vegetables, they play a significant role in the garden ecosystem as a decomposer. Scientists have even discovered that pill bugs are important for ridding the soil of heavy metal ions by taking in copper, zinc, lead, arsenic, and cadmium, which they crystallize in their midgut.

As you can see, everything in the garden serves a purpose and has its place in the food web...and that's long before those tasty fruits and veggies from the field even have a chance to make it to your plate.

Hands-on Activities:

Food Chain Handout

Bug Observation Sheet

Organism Scavenger Hunt