



Module 6: Interdependence and Garden Life

The Organic Garden as a Habitat

Objectives

Students will be able to:

- list 3 or more creatures that live in the garden and how they are connected;
- plan and implement a population count for their garden
- list 3 or more ways they can improve the garden habitat for animal life

Oregon Content

Standards:

- K-8.MP Mathematical Practices*
- K.CC Counting and Cardinality*
- K.MD.G Classify objects and count the number of objects in each category.*
- K.1P.1 Compare and contrast characteristics of living and non-living things.*
- K.3S.2 Make observations about the natural world*
 - 1.2L.1 Describe the basic needs of living things.*
 - 1.3S.1 Identify and use tools to make careful observations and answer questions about the natural world.*
 - 1.3S.2 Record observations with pictures, numbers, or written statements.*
- 2.OA.C Work with equal groups of objects to gain foundations for multiplication.*
- 2.3S.3 Make, describe, and compare observations, and organize recorded data.*
- 3.OA.A Represent and solve problems involving multiplication and division.*

Background

Habitats are an area or environment where an organism or ecological community normally lives or occurs. Within the habitat is everything an organism needs to survive: **water, food, shelter and space**. Gardens are a habitat for many different creatures. Some are big (people, cats, raccoons, birds) and some are very small (worms, ladybugs, butterflies, bees). All of the creatures that live in the garden, both plants and animals, are connected through the garden food chain.

Sun → chard → aphid → ladybug → robin → worms

Above is an example of a garden food chain. Plants like chard are **producers**. They use the energy from the sun to create food through photosynthesis. Animals, on the other hand, cannot create their own food. They get their energy from eating other creatures and are called **consumers**. Aphids are a type of **herbivore**- they love to eat chard and use its leaves as shelter. Ladybugs are **carnivores**- they eat other animals to survive- and aphids are one of their favorite snacks. In turn, ladybugs are eaten by birds, who are often **omnivores**. They'll eat other animals (usually insects) and parts of plants like seeds. When the bird passes away or is killed by something else, **decomposers** like worms, bacteria and fungus will break it down. They help release the stored nutrients in the bird back into the soil, which will ultimately feed the food chain again. Within the habitat of the garden, nothing can exist without something else.

In the garden, students spend a lot of time intimately involved with the plants they're growing. The up close and personal reality of gardening makes it a great place to focus in on invertebrates.

Invertebrates are animals without bones.

Insects are a type of invertebrate. They have a chitinous exoskeleton, a three-part body (head, thorax, and abdomen), three pairs of jointed legs, compound eyes, and two antennae. There are more than a million different insects and they represent more than half of all the living organisms in the world! Unfortunately, insects

Oregon Content

Standards:

3.3S.1 Plan a simple investigation based on a testable question, match measuring tools to their uses, and collect and record data from a scientific investigation.

3.3S.2 Use the data collected from a scientific investigation to explain the results and draw conclusions.

4.2L.1 Describe the interactions of organisms and the environment where they live.

4.3 Scientific Inquiry

5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival.

5.3 Scientific Inquiry

6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.

6.3 Scientific Inquiry

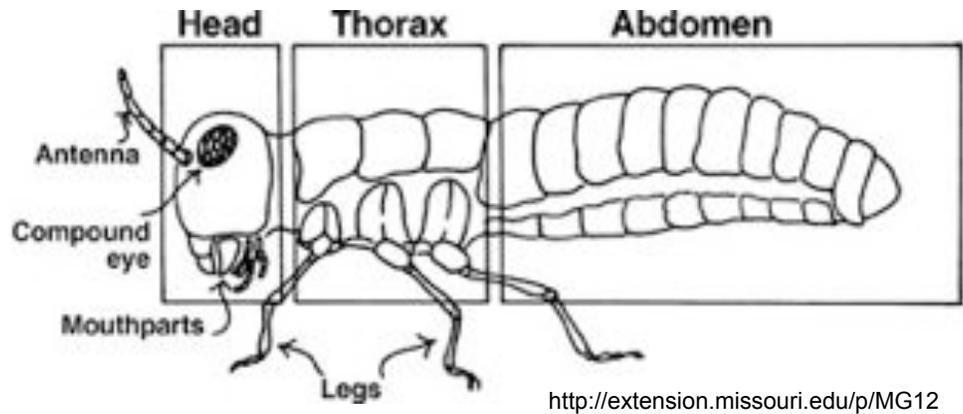
ET.3.B Locate, organize and use information ethically from a variety of sources and media.

ET.4.C Collect and analyze data to identify solutions and make informed decisions.

Vocabulary

Habitat, food chain, producer, consumer, herbivore, carnivore, decomposer, invertebrate, insect, beneficial, pest

are often viewed with distaste and considered “bad”. Many people don’t understand the important roles they play in ecosystems, especially in gardens.



For the purpose of the garden we can split insects into two different types- pests and beneficials. A **beneficial** insect is one that is obviously helpful to our gardens- they are pollinators, decomposers, or predators of pests. A **pest** is an insect that is harmful in the garden. They may sting us or damage our plants (by eating or nesting in them). Both these terms- beneficial and pest- are completely subjective. Every insect in the garden has an important role to play.

Common Insect Pests (*considered pests because most are herbivores and they eat plants*): Aphids, Cutworm, Cabbage maggot, Flea beetle, Cabbage worm, Garden symphylan, Cucumber beetle

Common Beneficial Insects (*usually these are predators*): Western damsel bug, Lady beetle, Green lacewing, Minute pirate bug

Project

Creating Garden Habitat

Length- three 1 hour sessions

Materials- four corners signs, clipboards, paper, garden map, string/stakes or hoola hoops, insect/bird/amphibian/reptile books, various materials for creating shelter/water/food

Preparation- make a garden map with a grid, gather materials

1) In this project, students will be trying to improve the habitat in

their garden. Start by getting them to think about what is in the garden with the Four Corners Habitat activity listed below.

2) Explain that they are going to be working to improve the garden habitat for the animals in the garden. In order to do that, they first need to know what's living in the garden. Have students brainstorm ways that they can figure this out.

You're probably going to end up simply looking to see what's living in the garden. Scientists would call this a survey. Surveying the entire garden is going to be rather difficult because most of the animals you're going to find will be very small invertebrates. In order to make sure that you don't miss the small things, you'll need to be searching systematically. Challenge the students to come up with a way to do that. Let them brainstorm as a whole group thinking about these questions:

- Are they going to search the whole garden?
- Parts of the garden?
- Where will they look?
- How will they choose where they look?

Now give them a couple examples of surveys that scientists use and let the students decide how they want to do their survey.

Block Sample Counts- In this type of survey the garden is broken up into equal sized squares on a map. Then 5 or 6 squares are chosen at random. (An easy way is to have a student close their eyes and randomly pick a spot on the map.) The squares are staked out with string and the students will search for animals in their square, writing down and counting every animal they see there. Then you can multiply their findings by the number of squares in the garden to figure out the population of each animal they found.

Strip Counts- Stake out strips equal distance apart running through the garden. Pick either every other strip or pick a few strips at random. Students will walk in their strip, writing down every animal they notice in that space. Once again, their findings are multiplied to figure out how many animals there are in the whole garden.

3) Now students will need to decide how to use the data they collected. Do they want to increase the habitat for all the animals they found in the garden? Are there some animals that are more helpful for the garden that they want to increase the population of? Are there animals that they found that they don't know anything about and need to learn about before they can decide what they want to do? Was there an animal that they would like to have in the garden that wasn't there? In the end, have each group pick one animal that they are going to try to improve the garden habitat for.

4) Now that they have their animal picked out, students will research what that animal eats, what it likes to live in, etc. and make a plan for how they can help it

do better in the garden. Some ideas for how they can help improve the habitat for their animal:

- grow a plant that it likes to live on or lay eggs on (monarch butterflies need milkweed for their young)
- build it a house/shelter (make a bee house, bird house, toad house)
- give it a better water source (build a bird bath)
- give it more food (bird or hummingbird feeder, plant more flowers/hedge row)

5) Lastly, students will implement their plan. Older students can do a second population survey a few weeks or months later to see if their efforts did in fact help to increase the population or not.

STEM Professional Connection: If you can find a researcher who does population surveys to come talk to the students, that might be really helpful. Otherwise, once the students decide which animal they want to increase the population of in the garden, have them connect with a scientist who is an expert on that creature to get ideas for how they can help their animal.

Activities

The activities below can be used to introduce or review the project concepts.

Four Corners Habitat Activity

Length- 10 minutes

Materials- signs, paper, pencils, clipboards

Preparation- make signs

Post the following words up in the four corners of the garden: “Plants”, “Animals”, “Non-Living Things”, “Human Made Things”. Divide the class into four smaller groups. Each group will travel to the four corners of the garden brainstorming a list of what they observe in the garden for each category. Give them a couple minutes at each spot. Then explain that all of the things they listed make up the habitat of the garden. They’re all connected. Habitats have to have food, water, shelter and space for the organisms living in them. Have each group pick one organism from their list and connect that organism to other things on their list. What provides that organism with food, water, shelter and space?

Am I an Insect?

Length- 5-10 minutes

Materials- Am I an Insect cards

Preparation- gather materials, review insect body parts

This is a good introduction to what defines an insect. Split into small groups. Give each group some Am I an Insect? cards and have them decide which they think are insects and which are not. Show them the diagram of an insect and point out the 3 body parts and the 6 legs that an animal must have to be an insect. Distinguish between pests and beneficial insects and explain that insects are really important for the health of the garden.

You can also have them sing the insect parts song to reinforce insect parts. It goes just like “Head, Shoulder, Knees and Toes”.

Head, Thorax, Abdomen,
and six legs.

Head, Thorax, Abdomen,
and six legs.

Two antennae and an exoskeleton...

Head, Thorax, Abdomen
and six legs!

Bug Hunt

Length- 15-20 minutes

Materials- bug nets (gold fish nets work fine), clear jars, insect field guides, magnifiers

Preparation- gather materials

Students will be going on a bug hunt in the garden to see what they can find. Give each pair a bug net and some clear jars to put things in. After 10 minutes or so, have them use an insect field guide to figure out what types of insects they found. They will present their insects to the rest of the group. Discuss which are beneficial insects for the garden and which are considered pests. This activity is best done on a sunny day in the fall or spring. During rainy days it will be a lot harder for the students to find insects. You can transfer this search to the compost pile on less than ideal days.

Insect Bingo

Length- 15 minutes

Materials- insect bingo cards

Preparation- get/make the bingo sheets

This is an easy way to get students to focus on the insects in the garden. Having a card/sheet with insects listed and pictured for them to find gives students a set goal, which is sometimes easier than having them looking randomly for insects. Send the students in pairs or groups with their bingo cards to search. Assign them an adult to go back to who will mark off their squares when they find something. This activity is best done on a sunny day in the fall or spring. Rain and wet makes it much harder for them to find insects and they sometimes get discouraged.

Preying Mantis Game

Length- 10-20 minutes

Materials- blindfold

Preparation- gather the blindfolds

This game helps students think about predator/prey relationships within the garden. One student is an aphid or caterpillar in the middle of the circle. They are blindfolded. Everyone around the outside of the circle is a preying mantis. Preying mantis are such successful garden predators because they are very stealthy. When you point at a student on the outside of the circle, they get to sneak up on the prey in the middle of the circle and try to tap their shoulder. If the

prey hears them coming and points at them, they have to go back and another “mantis” gets a turn. The prey has to point in the correct direction that the “mantis” is coming from. If they are pointing wildly, it doesn’t count. If the mantis does tap the prey on the shoulder they win and now get to take a turn as prey in the middle.

Habitat Critter Tag

Length- 10-15 minutes

Materials- none

Preparation- set up the boundaries for the game

This game is a good way to focus in on the key needs of organisms within a habitat. Set up the game with two even lines of kids facing one another. One line of kids will be the critters and the other line will be parts of the habitat. There are three parts to the habitat in this game:

- Shelter- hands joined together over their heads
- Water- hand up like you’re drinking from a cup
- Food- hands on belly

Have the kids practice making these signs. Now all the kids turn around so they can’t see the other line. All the critters will decide if they want to find food, water or shelter and they’ll show the sign for the thing they’re looking for. All the students who are habitat will decide if they are going to be food, water or shelter.

When you say, “Go!” the kids all turn around. Kids on the habitat line stay where they are. Kids on the critters line run to the habitat line and try to find someone who will has the same sign as them. They’ll bring that person back with them to the critter line. Any critter who doesn’t find their match dies and becomes part of the habitat. Continue to play rounds. The population of critters and the amount of habitat will fluctuate as the game goes on, which is what often happens in nature.

Web of Life

Length- 10 minutes

Materials- living and non-living cards, ball of yarn

Preparation- gather materials

Pass out a card to each student. Have them hold their cards so that everyone can see what they have. In this game the students will be trying to make as many connections between the cards as they can. Start with the student holding the sun card. They will hold onto the end of the yarn and pick one other person (based on the card they’re holding) who needs them. From there the yarn is unrolled and passed around the circle, making connections between creatures until the yarn is gone or everyone in the group is holding onto the string. If one organism or part of a habitat in the circle has a problem then everything is affected. You can simulate this by having one person tug gently on the yarn. Anyone who feels the tug also tugs until everyone feels the effects.