

Garden Habitats

Fourth Grade Science Exploration

Finding animal homes and close inspection of habitats helps students to learn more about the diversity of life in the garden.



GARDEN HABITATS

FOURTH GRADE SCIENCE INVESTIGATIONS



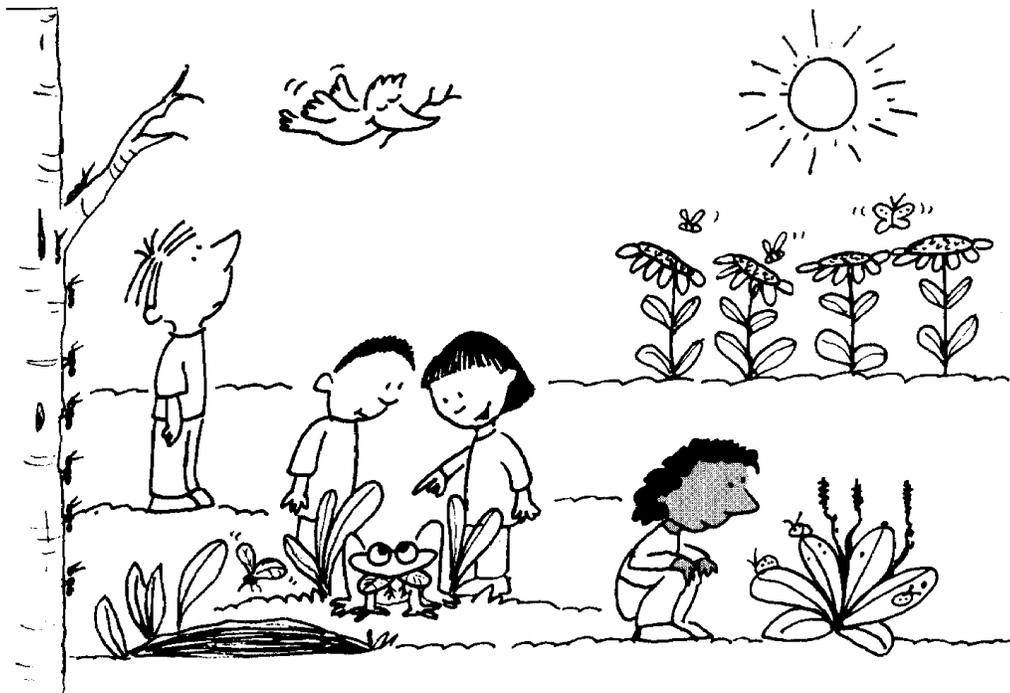
Contents

Teacher Introduction.....	1
Science Standards.....	2
Recommended Literature.....	2
Materials List.....	3
A Habitat is Where...(Pre-Assessment Activity).....	4
Living Dangerously.....	6
Habitat Hunt	8
Garden Food Web	10
Make More Habitat	12
Mystery Habitats	14
Homing In (Post-Assessment Activity).....	16
Lab Sheets.....	18

Teacher Introduction

A habitat is more than the sum of its parts. Natural habitats are a tapestry of nooks and crannies that are home and sustenance to birds, insects, mammals, mosses, fungi, worms, crustaceans, mollusks, flowering plants, bacteria, millipedes, centipedes, reptiles, and more. Cut down a tree or strip away topsoil and the homes and livelihoods of many organisms are lost. Many students will know that a habitat is a home that provides food, water, shelter and living space for a plant or animal. In this unit students expand on their knowledge, exploring how plants and animals interact with their habitat to meet their survival needs and respond to the habitat's physical challenges.

Students will learn to observe closely and ask questions. They will learn about the direct relationship between essential resources, such as water, food and shelter, and the population of animal species. Students will examine different microhabitats and observe the plant and animal interactions. They will learn about the benefits of a diverse habitat in the garden, and take cuttings from beneficial garden plants in order to create new habitat in their garden.



Science Standards

Life Sciences

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:
- Students know plants are the primary source of matter and energy entering most food chains.
 - Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
 - Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Investigation and Experimentation

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
- Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
 - Formulate and justify predictions based on cause-and-effect relationships.
 - Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

Resource List

Children's Stories

Bluebird Summer

Deborah Hopkinson, illustrated by Bethanne Andersen. Greenwillow, 2001

A beautifully illustrated and touching story about two children who restore the habitat in their grandmother's garden to attract back the bluebirds, who have been gone since their grandmother passed away.

Mr. Carey's Garden

Jane Cutter, illustrated by Brian Karas. Houghton Mifflin Co., 1996

Illustrated story about 4 different neighborhood gardens and gardeners who each create and appreciate different types of gardens.

Hey, Little Ant

Phillip and Hannah Hoose, illustrated by Debbie Tilley. Tricycle Press

A funny, thought-provoking story about a boy's dilemma about whether or not to squish an ant crossing the sidewalk.

Herman and Marguerite: An Earth Story

Jay O'Callahan, illustrated by Laura O'Callahan. Peachtree Press, 1996

Illustrated using collage, this book tells the story of how a worm and a caterpillar work together to bring life back into a lonely orchard through their friendship and songs.

MATERIALS LIST: GARDEN HABITATS

A Habitat is Where...

- Chart paper or blackboard

Living Dangerously

- Ball of string
- Paper and pen

Habitat Hunt

- Habitat Cards
- Colored pencils
- Habitat Homes Chart (from A Habitat is Where....)
- Field Log

Garden Food Web

- Dry erase board/ pens
- Food chain labels
- String
- Field Log

Make More Habitat

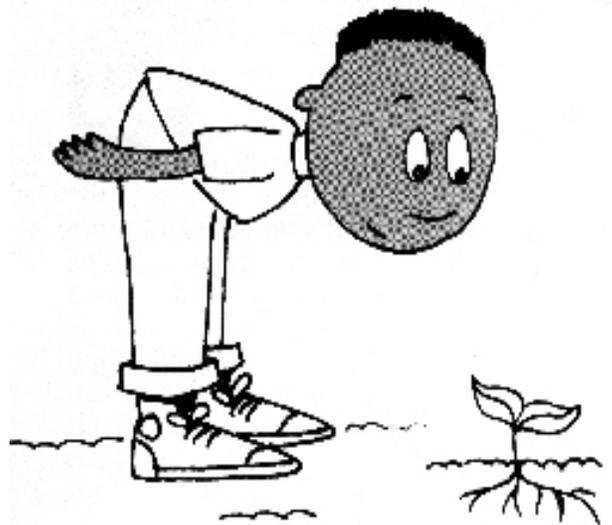
- Garden clippers
- Moist cutting mix (soil or equal parts vermiculite/perlite blend)
- Small pots, or cups
- Plant abels
- Pencils
- Plastic bags
- Twist ties
- Field Logg

Mystery Habitats

- Habitats Home Chart (from A Habitat is Where.....)
- Tape
- Habitat and Microhabitat Lab Sheet
- Mystery Habitat Lab Sheets
- Thermometer (optional)

Homing In

- Habitat Homes Chart
- Student Field Logs



A HABITAT IS WHERE...

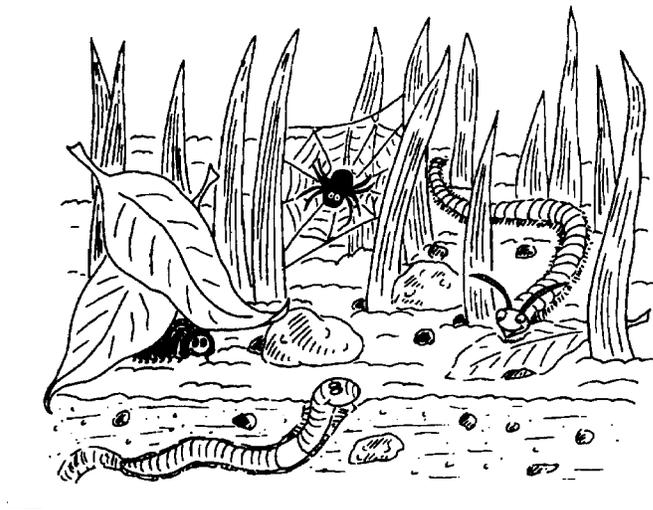
(Pre-Assessment Activity)

Description

In this activity, students list what people, other animals and plants need in order to survive. Students then draw a picture showing how the habitat of a specific plant or animal provides these essential resources.

Objective

Students describe what a habitat is and what resources living things need in order to survive in their habitat.



Teacher Background

A habitat is the particular place in which a plant or animal lives and is able to find air, water, food, shelter, and conditions suitable for reproduction. Your students will probably already know that people, plants and animals have needs that must be met, even if they do not know the word habitat. Use this activity to introduce the term.

Materials

- Chart paper or blackboard

Class Discussion

On one sheet of chart paper labeled Habitat Homes, make three columns and label them with the headings "People," "Other Animals" and "Plants". Tape up the chart. On the second sheet of paper write the heading "A Habitat is Where..." Introduce the activity by asking students what they think people need in order to live. Accept all ideas, writing them in the "People" chart. What do people need in order to live? What are the basic things we need? What else do we need to survive? Do you think other animals and plants have similar needs?

Action

1. Divide the class into groups of four students. Assign half of the groups to brainstorm things animals need in order to live and the other half to brainstorm things plants need in order to live. Encourage groups to think of as many things as they can, listing ideas on a piece of paper. Have each group choose a reporter.
2. Ask the reporter from one group to read aloud from the group's list while you record ideas on the chart in the appropriate column. Ask other groups' reporters to share any ideas they have on their lists, and add these to the chart.
3. Ask students to identify any items that appear on all three lists. Circle them. The most basic needs should be the same for all three groups.
4. Have each student choose a favorite plant, animal or person. Ask students to draw a picture or a design that shows how their chosen organism gets these essential needs met by their surroundings. Make sure the students understand that drawing an accurate picture is not important; the drawing is a way to communicate ideas.

Wrap Up

Assess students' understanding of habitats by having them share their drawing with their groups. How would you complete the sentence "A habitat is where..."? What is a habitat? Are all habitats the same? How are different plants and animals able to survive in different habitats?

LIVING DANGEROUSLY

Description

In this game students discover how the availability of habitat resources affects populations of living things.

Objective

Students relate the availability of habitat resources to the size and fate of animal populations.



Teacher Background

Habitat loss is the main reason plants and animals become endangered. Often the loss is as simple and drastic as a bulldozer mowing down everything in its path. But changes may occur slowly, too, gradually diminishing one or more habitat resources. For example, on the UCSC Farm live the endangered Red Legged Frog and the Ohlone Tiger Beetle. Being so limited in their habitats, they are vulnerable to any disturbance—natural or human caused. This game helps students to consider the dependence of plants and animals upon specific resources in their habitat.

Materials

Ball of string
Paper & pen

Class Discussion

Ask students what they think a habitat must provide for its animals and plants. What do animals need to survive within their habitat (food, water, shelter) What happens to plants and animals when resources they need become scarce? What sorts of animal shelters/homes can you identify? What would happen if some animals in a habitat could not find shelter, food, water? What happens if the habitat itself gets smaller? What might decrease the area of a habitat?

Action

1. In an open area divide the group so that 1/4 are designated as the endangered Red-Legged Frog, or another local species.
2. The remaining students are the resources—Food, Water and Shelter. For each round of the game they can be whichever resource they wish. They signal what resources they are by linking hands over their stomachs for Food, hands over their mouths for Water, and hands over their head for Shelter.
3. The endangered animal must find each of these resources to survive. To start the game, the frogs go to one end of the field and turn their backs while the resources position themselves in the meadow. They then make the signal for the resource they want to represent. They must hold the sign and stay in the same spot until they are tagged or the round ends.
4. On your signal, the frogs turn around and begin to find and tag—gently!—the habitat resources they need. Each frog must tag Food, Water and Shelter, in any order, so that they can survive. When a resource is tagged, the frog must call out the name of the resource. Once tagged the resource student goes to the sidelines and waits for the next round. Each resource can only be tagged once per round.
5. If a frog succeeds in tagging all three resources—Food, Water and Shelter—it can reproduce. The third resource it tags joins the frogs for the next round. If a frog cannot find all three resources that it needs, it dies and joins the resource students for the next round.
6. Play a few rounds of the game so that everyone gets an opportunity to play both roles. Keep count of the surviving frogs at the end of each round.
7. After a few rounds, designate 2–3 students to be the Community. The Community has decided to build something on this land—a school, housing, hospital. What will happen to the habitat and its resources?

To take this activity to a deeper level continue with steps 8 and 9.

8. Give the Community the ball of string. After the habitat resources have positioned themselves on the field, the Community students use the string to mark out a section of the habitat that will be developed. All the habitat resources within the area are off limits to the frogs. The frogs, in their search for resources, must avoid the area. Continue to keep count of the surviving animals.
9. With new construction and people in the area, the Community needs more resources itself. Appoint some of the displaced habitat students as additional Community developers. Give them the lengths of string you cut and let them join the Community students in marking out areas for development. As before, the resource students in these areas cannot be tagged by frogs. Play one or two final rounds until students connect impact of habitat with survival of wildlife.

Wrap Up

Using the figures on how many frogs survived each round, discuss what students experienced during the game. How were the habitat resources and animals balanced at the beginning of the game? Could each frog find what it needed for survival? What happened when the frogs reproduced and there were fewer resources? Do you think that the changes in the frog population that we found in the activity are similar to what happens in the wild? What changes occur when the frogs start losing their habitat? How does habitat destruction threaten wildlife?

HABITAT HUNT

Description

Students look for evidence of how plants or animals use their habitat for food, water, shelter and living space.

Objective

Students practice using Field Logs and demonstrate what they know about habitats.



Teacher Background

Every living thing needs a home—not just a shelter but a resource base that provides food, water, safety and space to live and produce young. Just as we look for homes near jobs, schools, transportation, shops, parks and services, each animal needs a habitat where it can obtain the things it needs for survival. Plants, too require certain soil types, light, nutrients, water and temperature ranges. By spending time in the garden, students can learn to recognize the microhabitats in the garden and the diversity of plant and animal populations they support.

Materials

Habitat Cards
Field Log
Colored pencils
Habitat Homes Chart (from A Habitat is Where....)

Class Discussion

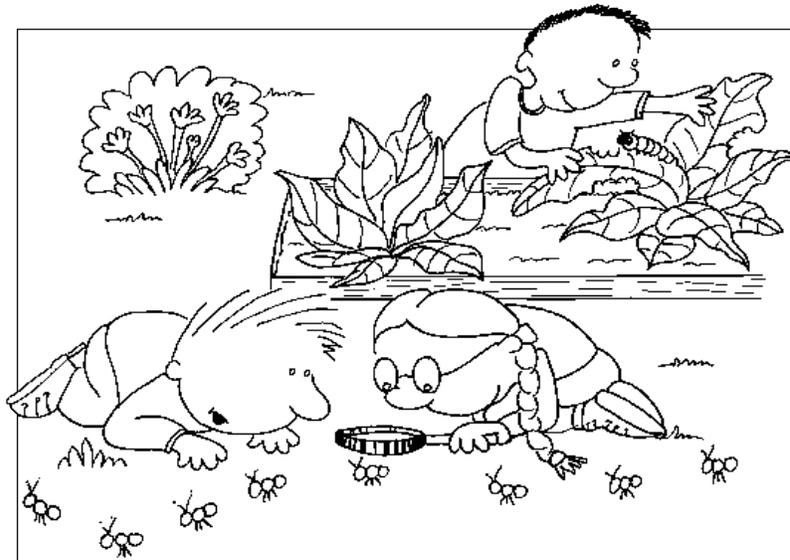
Ask students if they know what the place where particular plants and animals live is called— a HABITAT. Introduce them to the word if they are not familiar with it. Ask students what humans, plants and animals need for survival and record their ideas on the Habitat Homes Chart. What do you need for survival? How do you meet your survival needs? Could you live anywhere? How about plants and animals? What do the plants in our garden need for survival? What do the animals need? How does our garden help them to survive? What resources do the plants provide for the animals? (food, shelter) What resources do the animals provide for the plants? (pollination, beneficial predation, seed dispersal)

Action

1. Divide students into groups of two or three.
2. Give each group a Habitat Card. Explain that when they finish making and recording their observations in their log, they should come back for a second card.

Wrap Up

Gather the students together and ask each pair to report what they observed. Have each pair choose one habitat that they visited. What was unique about that habitat? What animals and plants live in the habitat? How does that habitat provide shelter, food, water for its inhabitants? Are the plants getting what they need to grow well? How can you tell? What does the habitat provide for its animal inhabitants? Are these natural habitats? How can you tell?



Class Discussion

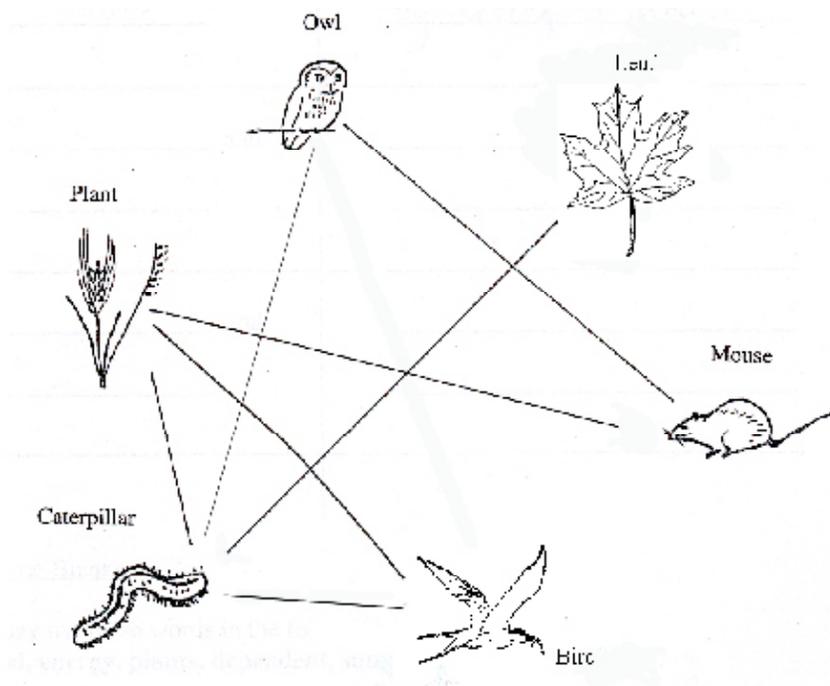
Seat your group in a circle in a quiet spot in the garden. Introduce the concept of a garden food chain. Where do plants in our garden get the energy they need to grow? The sun! Are you able to get your energy from the sun? Can sunlight fill up your belly? What can get energy directly from the sun? Plants! Plants are called producers because they get their energy directly from the sun. Who eats plants? Who eats the animals that eat plants? Animals are called consumers because they rely on plants and other animals for their food. Are you a producer or a consumer? Why? What happens to these animals when they die? Where do the energy and nutrients go? Introduce the terms herbivore, carnivore, omnivore and decomposer.

Action

1. Have your students choose a prominent plant or animal in the garden. Write it in the center of the dry erase board. Then build a food chain around it. Where does this plant or animal get its energy? Who eats this plant or animal? What does it eat? Repeat a couple of times until students are comfortable with the concept.
2. Have each student choose a Food Chain Label and hang it around his/her neck. Ask each student to explain who he or she is, what they eat and who eats them. Then, starting with the sun, have your students spin a garden food web by passing the ball of string from one person to any person that is connected (i.e. sun to plants to aphid, etc...). Once the web is spun, ask students to tug gently on the string. How does the web feel? Is the web supporting you? What would happen if one piece of the web were to be wiped out. Have one student led go of the string. What happens to the strength of the web? How is this true in the garden? Can you give an example?
3. Have students draw a picture of a garden food web in their Field Log.

Wrap Up

Diverse garden habitats support diverse garden food webs. Why is this important? If you could choose to be a different part of the food web, what would you be? Why?



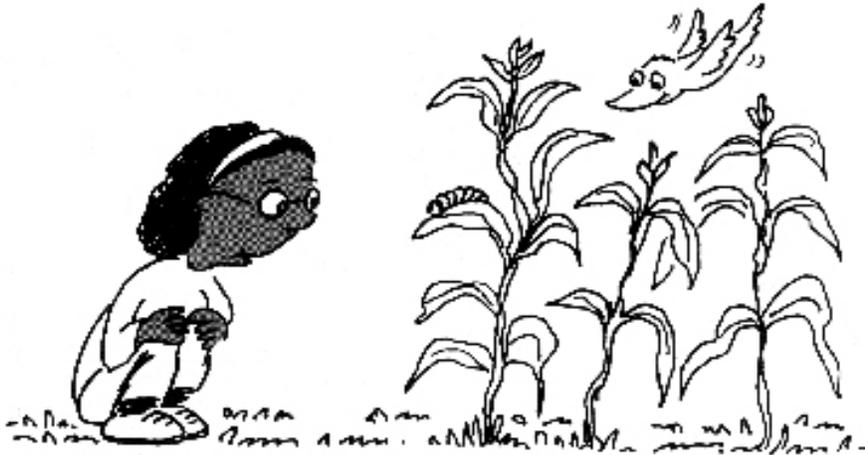
MAKE MORE HABITAT!

Description

Students learn how to take cuttings from mature plants in the garden to produce new plants, which will create new beneficial habitat when planted out in the garden.

Objectives

To learn about the different ways that plants can reproduce. To gain appreciation for how a diverse habitat in the garden attracts beneficial insects and predators.



Teacher Background

Plants can reproduce in two different ways. Sexual reproduction happens when the stamen in a flower is pollinated with pollen from the pistil, either by wind or by an animal pollinator. This produces a plant with genes from both parents—a plant that looks like a combination of these parents, just like humans. Plants can also reproduce asexually. By taking cutting from perennial, woody plants, you can reproduce exact replicas of the parent plant. Each piece of the plant has all the information it needs to grow into a mature plant. Gardeners use this technique to make new plants.

Cuttings are pieces of plants that you root in wet soil or a perlite/vermiculite mix. As the new roots grow, the cutting will grow leaves and shoots, and soon become another plant, which you can plant in your garden or give away. Cuttings can be started indoors or outside. The key to success is to watch them carefully to make sure the rooting medium does not dry out. Make several cuttings of each type of plant, as not all cuttings will survive.

In this activity you will be making stem cuttings. The plants should be perennials (those that grow year after year) and have woody stems at the base. Cut pieces from the new growth on the plant. Make sure each cutting has 4–5 sets of nodes (spots where leaves will eventually grow.) Common garden plants that work well for taking cuttings include Sage, Geranium, Lavender, Mint, Penstemons and some Salvias.

Materials

Garden clippers
Moist cutting mix (soil or equal parts vermiculite/perlite blend)
Small pots, cups
Plant Labels
Pencils
Plastic bags
Twist ties

Class Discussion

Explain that there are different ways that a plant can reproduce (sexual reproduction and asexual reproduction/cuttings.) Can you think of a way that a plant can reproduce? A seed can grow into a whole new plant. The plant grown from a seed is a combination of both of its parents, just like you! But sometimes we want a new plant to be exactly like a specific plant. We want an exact replica, so then we use a different technique called cuttings. Each piece of a plant has all the information it needs to grow into an entirely new plant. Once these plants grow roots and more shoots, we can transplant them into our garden. What will these new plants create in our garden? More Habitat! Why is a diverse habitat important in the garden? Who will these new plants attract? Why will they attract helpful animals? (Because they provide nectar for insects to eat as well as shelter.)

Action

1. Explain that each student is going to take one cutting from one of the plants around the garden.
2. Direct students to fill their pots 3/4 full with potting mix and then poke a whole in the center 1" deep.
3. Demonstrate how to take a cutting (how long, from what part of the plant, etc...) Show the students how to gently cut off the bottom leaves (because they will rot in the potting mix) and then bury the bottom half of the cutting.
4. Instruct students to make a label with the plant name and their name and stick it in the pot. Students will put their pots in a tray and then seal the tray in a plastic bag to send back to school. All the plant labels should hold the bag off of the plants
5. Have students record planting information in their Field Log.

Wrap Up

How do you think growing plants from cuttings is different from growing plants from seeds? Which way do you think will be faster? What will these plants need to survive back in the classroom? Review the concept of creating new habitat. When you plant these new plants in your garden what are you creating? Why is that important?

Follow-Up

Back at school place the tray of cuttings in a warm spot, out of direct sunlight. Check the pots regularly to make sure they are still moist. If they seem too damp, open the bag slightly to give them some air. Your plants will be ready for transplant when they have developed many roots. After about a month dig down in the mix and check for roots. Be patient! You may have to wait a month or more for signs of roots. Allow the plants to mature for several months before planting out into the garden.

MYSTERY HABITAT

Description

Student teams develop Mystery Habitat Cards by investigating and then describing the physical conditions, plant and animal life found in a specific schoolyard microhabitat. Then student teams switch cards and guess which Mystery Habitat is being described.

Objective

For student teams to practice relating the physical conditions of a habitat to what lives there.



Teacher Background

The school garden, with its paths, borders, variety of plant life and alternations of sun, shade, moisture, dryness and soil types is a treasure trove of microhabitats. These microhabitats offer opportunities for a wide range of plants and animals to thrive in special niche habitats found all over the schoolyard. Students will observe, firsthand, how physical conditions influence which plants and animals can live in both small and large habitats.

Materials

- Habitats Home Chart (from A Habitat is Where....)
- Tape
- Mystery Habitat Lab Sheets
- Habitat and Microhabitat Lab Sheet
- Thermometer (optional)

Class Discussion

Divide your students into groups of two or three. Pass out one Habitats and Microhabitats Lab Sheet to each group and discuss the habitats and microhabitats in the drawing. How would you describe the light, climate, soil and other habitat conditions here? What animals do you see? What resources do they need for survival? Where do they find these resources?

Record new ideas on the Habitat Homes Chart. Focus on one of the microhabitats in the picture. Do you see any places in the habitat picture where a different community of plants and animals can find the resources it needs to live? Point out a microhabitat if students do not recognize one, like the pond or forest. What lives here? Are the light, moisture, and other conditions the same as elsewhere in the habitat? How are the plants and animals using the microhabitat's resources?

Action

1. Ask students what sort of microhabitats the garden and/or schoolyard contain. Where do you find plants and animals in unexpected places? How do they survive there? How would you describe a garden/schoolyard microhabitat with enough detail so that someone else could find it?
2. Divide students into groups of 2–3, and look over the Mystery Habitats Lab Sheet.
3. Take students to the garden or schoolyard area. Challenge the group to find a garden microhabitat that can be described with enough details so that another group can find it. Give students 10–15 minutes to look for a spot and fill out the Mystery Habitats Lab Sheet. Have them fold over and tape the flap so that the habitat's location is hidden.
4. Collect the Mystery Habitat Lab Sheets and pass them out to other groups. Have the groups look for the microhabitats described on them. Suggest that students check off clues to make sure they have the right microhabitat.
5. When everybody has found a spot that matches the clues, ask students to uncover the answer.
6. If students did not find the location specified on the Mystery Habitats Lab Sheet, encourage them to compare the habitat conditions, plants and animals in the microhabitat they selected with those in the Mystery Habitat. Are the plants and animals the same or different? Are conditions the same or different?
7. Allow time for groups to meet with the students that created their Mystery Habitat Lab Sheet so that they can examine the microhabitats together. Does the habitat you found match the description? What kind of information about plants and animals do you need in order to find the microhabitat? How could you improve your clues?
8. Give students who want to revise the clues on their Lab Sheet time to do so. Let others describe a new mystery habitat based on what they have learned about descriptions and habitats.

Wrap Up

Invite groups to share what they learned about how to describe differences in microhabitats. What different microhabitats did you find in the garden? What made the microhabitats different from the general habitat? What information do you need in order to find a microhabitat? Record new ideas and questions on the Habitat Homes Chart.

HOMING IN

(Post-Assessment Activity)

Description

In this post-assessment lesson, students write and draw enticing travel ads for a garden animal's habitat.

Objective

Students organize what they know about plant and animal habitats and the environmental factors that define them.



Teacher Background

What attracts you to a vacation spot? Beautiful natural surroundings that lift your spirit? Good food? Lovely lodgings? Whatever the attractions, chances are that the vacation spot furnishes in abundance a habitat resource that is normally in short supply in your life. Encourage students to think about their own habitats and the resources they supply. Which resources are hard to obtain? Which resources do they have that friends and relatives in other places do not have, such as good weather, beaches, parks and so on? Once students have a sense of scarce and plentiful habitat resources, they can reflect on which resources are easiest and hardest for a garden animal to obtain. What resources would its dream vacation supply?

Materials

Habitat Homes Chart
Field Logs

Preparation

Collect colorful travel magazine stories or ads that tout natural surroundings or outdoor activities, such as skiing or river rafting. Find at least one ad for each team.

Class Discussion

Ask students to review their Field Logs to name some plants or animals they have studied, and tell as much as they can about where and how the organism lives.

Name some plants or animals that you know about. Where do they live? How would you describe where they live? What other plants and animals live there? How do the plants grow? What do the animals eat? How do plants and animals interact? Record responses on the Habitat Homes Chart.

Then, have students classify the habitat factors. Write the names of the plants or animals down the left-hand side of the paper. Help students come up with habitat factors such as precipitation, terrain, temperature and climate, food sources, shelter and so on. List the resources across the top of the poster and fill in the chart, using the list students brainstormed. What have we described for these plants and animals? What is a habitat?

Action

1. Display or pass around the travel ads and discuss the different habitats that are being advertised. What habitats are these? What makes them attractive to people? Which ones would you like to visit? Why? What does the ad emphasize that makes you want to visit this place?
2. Look over the list of plants and animals. Could you create an ad for a habitat that would entice one of these plants or animals to visit? What would you emphasize? What habitat conditions are most important to the plant or animal?
3. Divide the class into plant and animal teams of 3–5. The teams must create a travel ad from the organism's point of view, featuring its dream habitat. The object is to persuade others of the species to come and visit.
4. Warn students not to name the plant or animal in the ad now. If they want to use the organism's name in the ad, they should leave a blank space.
5. After everyone is finished, ask teams to trade travel ads and see if they can determine what organism is giving the pitch.

Wrap Up

Encourage students to reflect on how plants and animals use their habitats. Would any of our plants or animals be enticed by the same ad? Do they live in the same or a similar habitat? What do they eat? When do they look for food and move around? How do plants use their habitats? How are plants and animals related in a habitat?

GARDEN HABITATS

LAB SHEETS





Mystery Habitats

Name(s): _____ Date: _____

Can you find this habitat?

Clue 1 Location

Use your eyes to look

- Above ground
- On the ground
- Below the ground

Clue 4 Soil

When you touch the soil in this habitat it feels

Clue 2 Temperature

The temperature at this habitat

- Can get very hot
- Never gets too hot
- Always stays cool
- Is the same as today's temperature

Clue 5 Moisture

You are looking for a habitat that is

- Wet
- Damp
- Dry

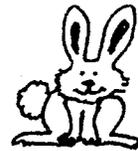
Clue 3 Light

The sunlight shining into this habitat is

- Very bright
- A little shady
- Very shady

Clue 6 Living Things

Look for this plant and animal. They will help you find the mystery habitat.



FOLD HERE AND TAPE

The Mystery Habitat is _____

Our Team members are _____

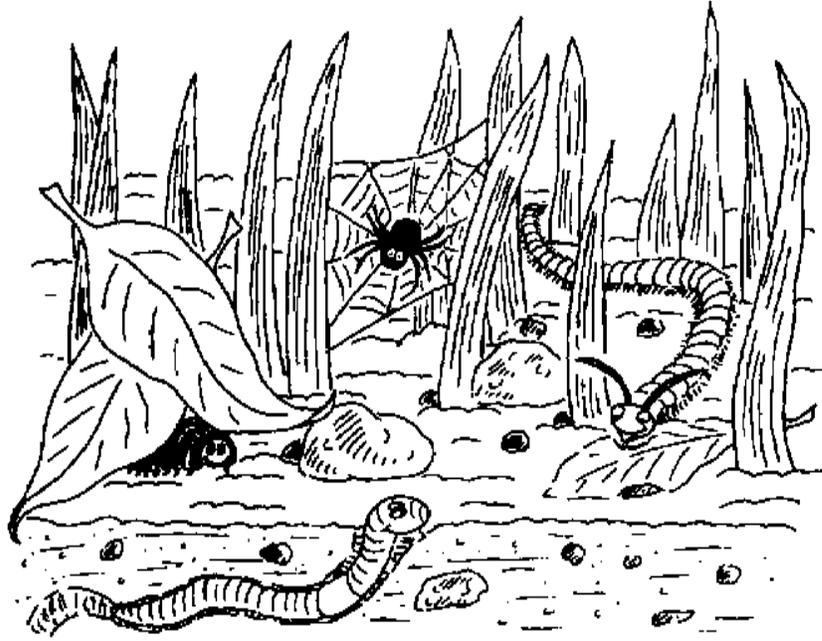
Habitats and Microhabitats





For more information, please contact Life Lab Science Program (831) 459-2001
www.lifelab.org
© Life Lab Science Program 2009

GARDEN HABITATS FIELD LOG



Name: _____

Teacher: _____



Habitat Hunt

1. Choose five words to describe your habitat.

2. What plants and animals live in your habitat?





Choose one plant or animal that lives in your habitat.

1. How does your habitat provide food for this plant or animal?

2. How does your habitat provide water?

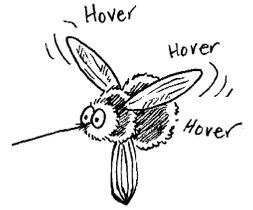
3. How does your habitat provide shelter?

Garden Food Web



Draw a picture of a garden food chain starting with energy from the sun.

Make More Habitat



Record the following information about your new plant.

Plant Name:

Date of Cutting:

Number of Leaves on your Cutting:

What animals might use your plant as habitat back in your school garden?

