

Module 2 • Overview • Habitats

Brief Overview

This module continues the habitats unit by engaging students in further understanding interactions of animals and their habitats within the urban ecosystem. Students will continue their exploration of basic ecological concepts and definitions as they explore their immediate surroundings. They will develop an understanding of resource competition as it relates to the living things in an ecosystem. In addition, students will recognize both positive and negative impacts as a result of the interactions among living things in our urban ecosystem.

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Time

10-12 sessions (Each session is 1 – 1.5 hours)

Desired Outcomes

Students will:

- Identify what living things need from their habitats to survive.
- Identify microhabitats in their schoolyard.
- Explain ways in which living things compete for resources in the urban ecosystem.
- Describe ways in which interactions between organisms can be beneficial (i.e. squirrels and seed dispersal) and harmful (i.e. humans and rats).
- Identify ways in which habitat features can be changed to get rid of urban wildlife that are NOT wanted.

What You'll Need

Materials

- Drawing paper
- Chart paper
- Crayons

- Pens and pencils
- Hand lenses
- Live branches (if Lesson 1 will be performed indoors)
- Clipboards with pencils attached for small groups
- Paper for making Rat Bulletin or flyer
- Shoeboxes (for habitat dioramas- see if students can bring them)
- Books and other resource materials for researching animals and their habitats
- PageMaker software (optional)
- Tall kitchen size & large size trash bags (enough to distribute one of each to houses/apartments in neighborhood blocks visited)
- Large rubber bands

Worksheets and Handouts:

- *Identifying Microhabitats*
- *Habitat Diorama Graphic Organizer for Research*
- *Rats! Rats! Rats! Reading*
- *Rat/Habitat*
- *Neighborhood Trash Can Survey Form*
- *Walking Map of Schoolyard Neighborhood*
- *Trash Can Survey Tabulation Sheet*

Posters

The leader prepares posters by writing the ***title only*** across the top of a sheet of chart paper before the lesson.

People Power_____

- Adult volunteers would be helpful during Lesson 6.

New Vocabulary_____

Beneficial

Something that is helpful.

Burrow

Hole or tunnel in the ground made by a rat, rabbit, fox, or similar animal for habitation and safety

Competition

The active demand by two or more organisms for a resource.

Conditions

Characteristics of the environment that influence the survival of an organism; every organism survives within a range of environmental *conditions*; *ex:* a certain temperature range or chemical condition (salinity, dissolved oxygen, pH, turbidity, nitrogen level)

Foot Tracks

Tracks left by animals as they move; they can sometimes be used to identify the animal that made them

Gnaw

Chew on with the teeth; especially, to wear away by persistent biting or nibbling

Habitat

The place where an organism lives that provides all of its needs for survival

Indicator

Something observed or calculated that is used to show the presence or state of a condition or trend

Microhabitat

A very small, specialized habitat such as a clump of grass or a space between rocks

Plant Scientist

A biologist specializing in the study of plants

Resources

The materials and energy that living things need for growth and maintenance (water, oxygen, nutrients/food, sunlight)

Zoologist

A biologist that studies animals and all aspects of animal life

Careers

Students will learn about different occupations in ecology-related fields.

- Ecologist
- Plant Scientists
- Zoologist

Preparing for the Lessons

Leaders will:

- Review the “Background for Teachers” section in the Leader Tools.
- Review the lesson sequences and the lesson preparation directions
- Prepare areas in the classroom and hallways for hanging student work
- Clean/remove “unsafe” objects from outdoor areas where students will investigate
- Review the information found in Leader Tools including sample answer sheets and rat prevention tips.

- Make a walking map of the neighborhood to use during Lesson 5
- Identify potential parent or school adult volunteers
- Strategize about the feasibility of a school/community rat prevention campaign
- Identify possibilities for a culminating activity and arrange for any field trips or classroom visitors

Module 2 • Lesson 1 • Laying the Groundwork: Pre-Assessments

Action Synopsis

Students will express their knowledge about habitats by drawing a picture of themselves in their habitat and explaining their picture to the group.

Time

1 session (Each session is 1 to 1 ½ hours)

Desired Outcomes

Students will:

- Identify the components of a habitat.

What You'll Need

For Each Student

- Drawing Paper
- Crayons
- Pen or pencil

For Whole Class

- Poster: *What Students Need from Their Habitat*

Preparing for the Lesson

- Gather Materials
- On poster paper, write heading only: *What Students Need from Their Habitat*

New Vocabulary

- **Habitat**
The place where an organism lives that provides all of its needs for survival

Assessments

- Student drawings of their habitat
(Look for what is included in the drawings and what is left out)

Lesson Sequence

1. Explain to the students that we want to begin this unit by finding out what they think and know about habitats. What is a habitat? After they have expressed their thoughts share the New Vocabulary definition of a habitat.

2. Please pass out the drawing paper and crayons. Have the students draw a picture of themselves in their habitat. Tell them to be sure to include and label all the things they need for survival.

3. When the students have finished, have them come up, one at a time. Have each of the children describe their pictures to the class. As the children go over their drawings, write all the things they say are needed for survival on the poster: *What Students Need from Their Habitat*. At this point, write everything they say, even if some things are really wants (such as television or a computer) rather than needs.

4. When everyone has finished talking about their drawing you should have a list of student ideas about what humans need from their habitat in order to survive. Keep the poster up for the next lesson.

Maryland SC Standards (4th and 5th Grade):	
<i>Standards are presented in the following format: (Grade)Standard.Topic.Indicator.Objective – Objective Statement</i>	
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	Applying Evidence and Reasoning (4)(5)1.B.1.a – Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following) <ul style="list-style-type: none"> • Competition for space, food, and water • Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc. • Roles within food chains and webs: scavengers, decomposers, producers, consumers.

Module 2 • Lesson 2 • Microhabitats

Action Synopsis

Students will express their understanding about habitats on varying scales by identifying different microhabitats on a single plant or plant branch.

Time

1 session (Each session is 1 to 1 ½ hours)

Desired Outcomes

Students will:

- Define a microhabitat.
- Identify the components of a habitat as it relates to a microhabitat.

What You'll Need

For Each Student

- Pen or pencil
- Hand lenses

For Each Group

- If your class will be performing this lesson indoors, you will need to gather 1-2 branches per group. Each branch should have multiple twigs and contain leaves (the branches can be from different types of plants). Try to avoid clipping branches from young trees or shrubs that have few branches to begin with.
- Worksheet: *Identifying Microhabitats*
- Clipboard with pen or pencil attached

For Whole Class

- Poster: *What Students Need from Their Habitat*

Preparing for the Lesson

- Gather Materials
- Copy Worksheet: *Identifying Microhabitats* (enough for each group of students)
- Review Sample Answer Sheet for Worksheet: *Identifying Microhabitats* found in Leader Tools

New Vocabulary

- **Microhabitat**
A very small, specialized habitat such as a clump of grass or a space between rocks

Assessments

- Responses on the worksheet: *Identifying Microhabitats* (look for completeness and variety of responses)

Lesson Sequence

1. Briefly review the previous activity by going over the poster “*What Students Need from Their Habitat.*”
5. Introduce the concept of Microhabitat. Tell the students that for the rest of the lesson, they will become Plant Scientists. Ask the students if they know what a plant scientist studies. They should be able to answer that question but you can read them the New Vocabulary definition if they have trouble. They are going to work in teams to study a plant and identify microhabitats. Explain that microhabitats are very small specialized habitats. If the students are interested, review the different parts of a plant (branches, twigs, leaves, buds, bark, flowers, fruit, etc). Remind the students that plants provide habitats for many living things (insects, birds, mammals, reptiles, even aquatic life).
6. Divide the class into groups and pass out the *Identifying Microhabitats* worksheets and clipboards. If hand lenses are available, pass one out to each student or group of students. If you are going outside with your class, go over outdoor rules. If outdoors, scan the school grounds and locate common trees or shrub species with broad leaves rather than needles. Remember to avoid plants with poison ivy nearby. Assign one plant to each group. Ask the students to look closely at their plant and identify the different types of microhabitats. Encourage

students to examine the entire plant (bark, living leaves, dead leaves, flowers, branches, seeds or nuts and have them think about sunny or shady areas of the plant). If you decide to remain indoors, pass out one or two branches to each group. Have them fill out their worksheet accordingly.

7. Review the worksheet with the students and encourage discussion. How many different types of microhabitats did they find? What kind of animals might live in these habitats? (ants, leaf bugs, caterpillars, snakes, birds, aphids, etc.) Ask the children what affect a natural disturbance such as a frost, fire, or heavy rain would have on the organisms living in some of the microhabitats they observed.

8. At the end of the lesson, collect the *Identifying Microhabitats* worksheets. Review the term habitat and microhabitat one last time and make sure the students know the definitions.

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Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	<p>Constructing Knowledge (4)(5)1.A.1.e – Follow directions carefully and keep accurate records of one's work in order to compare data gathered.</p> <p>Applying Evidence and Reasoning (4)(5)1.B.1.a – Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.</p>
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	<p>Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following)</p> <ul style="list-style-type: none"> • Competition for space, food, and water • Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc. • Roles within food chains and webs: scavengers, decomposers, producers, consumers.

Module 2 • Lesson 3 • Urban Animals & Their Habitats

Action Synopsis

Students will review what they have learned about habitats to urban wildlife. They will classify animal survival needs as either resources or conditions. They will extend their knowledge by creating a shoebox diorama of a chosen animal in its habitat.

Time

3 - 4 sessions (Each session is 1 to 1 ½ hours)

Desired Outcomes

Students will:

- Demonstrate an understanding of resources and conditions by correctly listing animal survival needs in each of these categories.

What You'll Need

For Each Student

- Worksheet: *What Do Animals Need from Their Habitat to Survive?*
- Shoeboxes (for habitat dioramas- see if students can bring them)

For Whole Class

- Drawing paper
- Crayons
- Books and other resource materials for researching animals and their habitats

Preparing for the Lesson

Leaders will:

- Prior to the activity, collect shoeboxes from students who are interested in creating habitat dioramas. Otherwise, they can do a poster illustrating the same information
- Copy Worksheet: *What Animals Need from Their Habitat to Survive* (Enough copies for each student)
- Review Sample Answer Sheet for Worksheet: *What Do Animals Need from Their Habitat to Survive?* found in Leader Tools
- Gather drawing paper and crayons

New Vocabulary

Burrow

Hole or tunnel in the ground made by a rat, rabbit, fox, or similar animal for habitation and safety

Foot Tracks

Tracks left by animals as they move; they can sometimes be used to identify the animal that made them

Gnaw

Chew on with the teeth; especially, to wear away by persistent biting or nibbling

Indicator

Something observed or calculated that is used to show the presence or state of a condition or trend

Zoologist

A biologist that studies animals and all aspects of animal life

Assessments

- Student responses on Worksheet: *What Do Animals Need from Their Habitat to Survive?*
- Student drawing of an animal in its habitat
(Look for what is included in the drawings and what is left out)

Lesson Sequence

1. Introduce the subject of urban animals. Ask the children to name animals that they see in their neighborhood, excluding pets such as dogs and cats. List the animals noted on the board. Separate pets from animals found in nature. Ask the children what they think about these animals. Are they good for the neighborhood or bad for the neighborhood or, in some ways good and other ways bad? Why?
2. Ask the students to name indicators of urban animals. Write their responses on the board. Explain that an animal indicator is something we can see that tells us an animal has been in the area. (reference the New Vocabulary definition of indicator). Elicit the words **gnaw**, **foot tracks**, and **burrow** as visual evidence of animal presence.

3. Remind the students of the previous discussion about habitats, resources and conditions.
4. Pass out the Worksheet: *What Do Animals Need from Their Habitat?* Have the students work individually. While they are working label two columns on the board: (1) Resources and (2) Conditions. Be sure to have space to write student responses under these two columns. When the students are ready, ask for their responses. Write each response on the board exactly as the students have classified it, either resources or conditions. (Don't do any correcting until you get all responses.)
5. When you have all the students' responses, go down the list, discussing whether the item is in the correct category (resource or condition) and whether it is really essential for survival. This should go quickly as students will see that all animals (including humans) need the same basic things for survival.
6. Tell the students that for the remainder of the lesson, they will become Zoologists studying urban animals. Ask the students if they know what a Zoologist studies (reference the New Vocabulary definition of Zoologist). As Zoologists, the students must be able to describe in detail an animal of their choice, in its habitat. Students may also become a Plant Scientist and study a plant of their choice. This part of the lesson requires taking the students outside.
7. The students should take paper and clipboards with pencils attached outside. Each student should have their own clipboard. Allow the students to spend time observing the schoolyard ecosystem. Have them identify one living thing in the schoolyard (plant or animal). Using their knowledge of resources and conditions, have the students identify through observation, the resources that their living thing of choice needs to survive in its schoolyard habitat. Encourage the students to be as specific as possible. For instance, squirrels eat acorns, plants get nutrients from soil, birds eat worms or seeds. Have the students list these resources on their

- paper. Once the resources are listed, have the students brainstorm the types of conditions that each resource must meet in order for their living thing of choice to survive. For example, a tree requires water to survive. Water is a resource. However, if the water is full of chemicals, has too high or low a pH, has too high or low of a temperature, than the conditions are not right for that resource to be helpful for the plant's growth and survival. Another example is for an animal. Animals need oxygen to survive. But if the oxygen or air is polluted (excessive car exhaust is something the students can observe and relate to), then the animal may become sick or die.
8. Back in the classroom, introduce the research project to the students. Explain to the students that they will be choosing a living thing to research and creating a shoebox diorama showing the organism in its habitat. *For those students who do not have a shoebox, they can create a poster using butcher paper or poster board.*
 9. Pass out the graphic organizers/outlines for the students to record their research. Have resources available for students to choose from in order to conduct their research. Allow at least 2 days for this activity.
 10. Have the students present their research projects by showing their diorama/poster and reading aloud from their note-taking organizer. For students who have time, they can comprise their research into a paragraph and read it aloud.

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<p>Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.</p>	<p>Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following)</p> <ul style="list-style-type: none"> • Competition for space, food, and water • Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc. • Roles within food chains and webs: scavengers, decomposers, producers, consumers.

Module 2 • Lesson 4 • Resources and Competition

Action Synopsis

Students will act as squirrels competing for resources in their habitat. Through role-play, the students recognize that they are competing against each other for resources in their habitat. In addition, they identify natural and human-caused conditions that impact a squirrel's survival in its habitat.

Time

1 session

Desired Outcomes

Students will:

- Define the competition as it relates to resources in a habitat.
- Identify conditions that help and/or harm an animal's chance of survival.

What You'll Need

For Each Student

- Pen or pencil
- Journal

For Whole Class

- 6 "Conditions" cards (index cards created to simulate conditions that put animals in habitat at an advantage or disadvantage for survival)
- Green construction paper (1 sheet per student)
- Blue construction paper squares (any size, 15 per student)
- Brown construction paper squares (any size, 15 per student)
- Orange cones or chairs to establish boundaries for playing area

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of the module.
- Gather all materials needed for the lesson.
- Create materials for the game using the directions in the Leader Tools.

- Select an area outside as a location for playing the game/activity. (In case of bad weather, select an open area in the school building in which to do the activity.)

New Vocabulary

Competition

The active demand by two or more organisms for a resource.

Resources

The materials and energy living things need for growth and maintenance (food, water, shelter, air/space).

Assessments

Student discussion following the activity will provide an informal evaluation of their understandings about competition for resources.

Lesson Sequence

1. Review the meaning of “habitat” with the students. Ask them to explain how this relates to resources? If students aren’t sure about the meaning of “resource,” explain the meaning to them and continue with the brief discussion.
2. Ask students to explain what it means to “compete” for something. Remind students that people compete against each other when they play games, teams compete against each other, etc. Ask the students if they think that animals compete. Allow for several answers, then explain to students that all living things engage in competition. Ask the students:

“What are some things that animals compete for?”

3. Bring the students outside. Explain to them that they are going to be playing a game about competition. They will be squirrels in the schoolyard habitat.
4. Play the activity with the students, following the directions in the Leader Tools.
5. When all rounds have been played and/or time is running out, gather the students together and discuss the game. Possible questions can be:

“How was this activity a *competition*?”

“How do animals *compete*?”

“What happened if you didn’t have ALL of your resources?” (Answer: You didn’t survive.)

“What were some natural conditions that impacted your habitat?” (Answer: Drought)

“What were some conditions that were caused by humans that impacted your habitat?” (Answer: Litter, Tearing down trees)

Students should recognize that they are competing against each other for resources in their habitat. In addition, students should be able to identify natural and human-caused conditions that impact a squirrel’s survival in its habitat.

- If time allows, students can use folder paper and reflect on their experience as a squirrel competing for resources in their journal.

Students can also brainstorm additional conditions that could be added as a “conditions card.”

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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following) <ul style="list-style-type: none"> • <u>Competition for space, food, and water</u> • Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc. • Roles within food chains and webs: scavengers, decomposers, producers, consumers.

Module 2 • Lesson 5 • Friends and Foes

Action Synopsis

Students will brainstorm and illustrate ways in which interactions among living things are helpful and harmful in their habitats.

Time

1 session (Each session is 1 to 1 ½ hours)

Desired Outcomes

Students will:

- Identify at least 1 example of a beneficial interaction between organisms in a habitat.
- Identify at least 1 example of a negative interaction between organisms in a habitat.

What You'll Need

For Each Student

- Drawing paper
- Pencil
- Crayons

For Each Small Group (4 groups needed)

- 1 marker (colors must differ between groups)

For Whole Class

- 4 sheets of chart paper, each one with the following titles written at the top:
 - “Squirrels and Trees”
 - “Insects and Plants”
 - “Rats and Humans”
 - “Humans and Squirrels”
- 1 sheet of chart paper titled “Beneficial and Harmful Relationships in Habitats” divided into 2 columns: “Beneficial” and “Harmful”

Preparing for the Lesson

Leaders will:

- Read the “Background Information for Teachers” in the Leader Tools.
- Gather all materials needed for the lesson.
- Establish 4 work areas (corners in a classroom, 4 different tables, etc.) in which to have students work.

New Vocabulary

Beneficial

Something that is helpful.

Assessments

Student drawings following the activity will evaluate their understanding of positive and negative interactions between organisms in a habitat.

Lesson Sequence

1. Introduce the activity to the students by telling them that they are going to talk about relationships. Ask the students to share their ideas about what a relationship is. (Students will likely share their own experiences regarding relationships between people, i.e. family, friends, teachers, etc.)
2. Explain to the students that while people have relationships with each other, all living things that live in the same area have relationships with one another. Ask students to recall living things in our urban ecosystem. (Some answers may include people, squirrels, trees, grass, insects, rats, cats, dogs, etc.)
3. Tell the students that they are going to work together in teams/groups to brainstorm about some of these relationships. Introduce the charts and the “4 Corners” activity:
 - Announce the topic on each of the 4 charts and explain that each chart describes a relationship between two living things.
 - Place each chart in a separate area
4. Assign each group to one of those areas and allow the groups 5 minutes to brainstorm all of their thoughts about the particular relationship by writing ideas or drawing them. If students struggle with this task, suggest for them to think about whether or not the two organisms, help each other, one harms the other, and/or how they do so.
5. Once 5 minutes have passed, have the groups rotate to another chart (moving clockwise is suggested for classroom management). Allow 5 minutes for each

group to review the ideas that have been written/drawn on the chart already and ADD their own ideas to the chart.

6. Repeat this process 2 more times so that all students have added ideas to each of the 4 charts.
7. Once students have finished this part of the activity, have the groups bring their charts and sit together in front of the board. The chart titled “Beneficial and Negative Relationships in Habitats” should be mounted to the board for the students to see.
8. Have each student group present a chart to the class, sharing the ideas compiled by the entire class. After the presentation, briefly discuss the following questions:
 - “Is this relationship beneficial?” “Why?”
 - “Is this relationship harmful?” “Why?”
 - “Can this relationship be both helpful and harmful at times?” “Why?”

* Categorize the thoughts regarding the relationship as either “beneficial” or “harmful” on the chart posted on the board.

9. Repeat this for the remaining 3 charts.

By the end of this discussion, the students should have formulated a list of both helpful and harmful relationships between living things in the urban habitat.

10. Distribute drawing paper to the students. Have them fold their paper into to columns and label one column “Beneficial Relationships” and the other column “Harmful Relationships.” Have the students choose one from each category on the board, write them on their paper, and illustrate them.

(See Leader Tools for sample charts)

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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following) <ul style="list-style-type: none"> • Competition for space, food, and water • <u>Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc.</u> • Roles within food chains and webs: scavengers, decomposers, producers, consumers.
Standard 6.0 Environmental Science: Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.	Environmental Issues (5)6.B.1.a – Explain how human activities may have positive consequences on the natural environment. <ul style="list-style-type: none"> • Recycling centers • Native plantings • Good farming practice (5)6.B.1.b – Explain how human activities may have a negative consequence on the natural environment. <ul style="list-style-type: none"> • Damage or destruction done to habitats • Air, water, and land pollution

Module 2 • Lesson 6 • Rats & Habitat

Action Synopsis

Students will begin by thinking about habitat for rats. They will then strategize about ways to remove rats' habitat conditions and resources from their neighborhood. Students will engage the community in one or more rat prevention activities.

Time

2 – 3 sessions (Each session is 1 to 1 ½ hours)

Desired Outcomes

Students will demonstrate an understanding of habitat requirements by identifying ways to manipulate the urban environment to get rid of rats. They will begin developing their community outreach skills.

What You'll Need

For Each Student

- Handout: *Rats! Rats! Rats!* Reading
- Worksheet: *Rat Habitat*

For Each Small Group

- Neighborhood Trash Can Survey Form
- Clipboard with pencil
- Large rubber bands
- Walking map of neighborhood to be surveyed

For Whole Class

- Tall kitchen size & large size trash bags (enough to distribute one of each to houses/apartments in neighborhood blocks visited)

If doing newsletter:

- Paper for making Rat Bulletin
- Computer with Microsoft PageMaker software if possible

If doing flyer:

- Paper only

People Power

- Adult volunteers would be helpful during neighborhood education effort.

Preparing for the Lesson

Leaders will:

- Gather clipboards with pencils attached
- Copy Handout: *Rats! Rats! Rats!* (Enough copies for each student)
- Copy Worksheet: *Rat Habitat* (Enough copies for each student)
- Review sample answer sheet for Worksheet: *Rat Habitat* found in Leader Tools
- Identify neighborhood blocks to survey
- Copy *Neighborhood Trash Can Survey* Form (Enough copies for each small group)
- Copy walking map of neighborhood (Enough copies for each small group)
- Get kitchen size & large size trash bags
- Decide whether you will do an informational newsletter (PageMaker software) or one page handout/flyer for neighborhood activity
- Check out this website (if internet access is available for background information on rat prevention program ideas)
<http://www.baltimorehealth.org/vectorcontrol.html> and read over *Rat Prevention Tips* found in Leader Tools

New Vocabulary

None for this lesson

Assessments

- Students' participation in activities
- Student responses to *Rat Habitat* worksheet

Lesson Sequence

1. Introduce today's activity: We will be thinking about habitat in a different way today! We've been working with habitats that are hospitable or welcoming to urban wildlife, like squirrels. Ask the children to remind you of the essential things a habitat must have to be suitable for a squirrel or any other living thing! (Elicit the conditions and resources that you've talked about in previous lessons.)
2. Ask the children to stop for a moment and think about an animal in the urban environment that we DON'T want to have in our neighborhood. Elicit their responses.

3. It is likely that “rats” will be a student response. If not, suggest rats. Ask the children for their thoughts on why we wouldn’t want rats in our neighborhood. Add to the discussion additional problems associated with rats.
4. Now ask the children about what they see as the connection between rats and habitat. Pass out the *Rat Habitat* sheet and ask the students to fill it out. When the children are finished collect the sheets.
5. Elicit the students’ ideas about what parts of a rat’s habitat we can alter. Pass out the *Rats! Rats! Rats!* Reading and read it over with the children.
6. Lead the children in deciding what “action” your group would like to take. This lesson includes having the children write an informational newsletter or a one-page flyer, depending on the children’s age and your access to software, computers, and copying.
7. The children should put together packets containing the newsletter/flyer and 1 tall kitchen size trash bag and 1 large size trash bag which they’ll be passing out to neighbors. Try rubber banding the flyer around the trash bags.
8. Discuss the plan for going from house to house on the block(s), which you have already pre-selected. (The specific blocks and the number of blocks to include are up to you.)
 - a. The children will be explaining why they want to get rid of rats and going over a few prevention tips (putting all trash in plastic trash bags, putting bags in a hole-free trash can with a tight fitting lid, etc.).
 - b. They will then explain that they are doing a survey on the need for trashcans in the neighborhood (See *Trashcan Survey*).
 - c. Review how to administer and complete the survey form and have the children practice with each other until they are comfortable using it.

9. On the day of the survey, divide the students into the appropriate number of small groups. Give each group a bag full of “packets” for the children to distribute to each household. Appoint a recorder, who should be a good writer. The rest of the children will take turns being the interviewer. (You can also rotate the recorder role if you like.) Give each group’s survey forms to either the recorder or the adult chaperone. Make sure each group has 1 copy of the neighborhood map. Indicate on the map the location of each group’s survey block. After a survey form is actually completed the chaperone should fill in the address on the survey form.
10. Remind the students of your expectations for their behavior and talk about any special rules for the day. Set a return time for all groups. Even if they have not been to all the houses on their block(s) everyone should be back at this time.
11. Deploy your teams. Each team should have at least one adult with them. On your mark. Get set. Go!!!
12. When you get back inside collect the survey forms. Congratulate the children on a job well done! If you have time get the children’s feedback on how they felt about this activity. Explain to them that you will be working on the survey results together.

Maryland SC Standards (4th and 5th Grade): <i>Standards are presented in the following format:</i> <i>(Grade)Standard.Topic.Indicator.Objective – Objective Statement</i>	
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	Constructing Knowledge (4)(5)1.A.1.e – Follow directions carefully and keep accurate records of one's work in order to compare data gathered. Applying Evidence and Reasoning (4)(5)1.B.1.a – Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	Ecology (4)3.F.1.a – Identify and describe the interactions of organisms present in a habitat. (Examples following) <ul style="list-style-type: none"> • Competition for space, food, and water • <u>Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc.</u> • Roles within food chains and webs: scavengers, decomposers, producers, consumers.
Standard 6.0 Environmental Science: Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.	Environmental Issues (5)6.B.1.a – Explain how human activities may have positive consequences on the natural environment. <ul style="list-style-type: none"> • Recycling centers • Native plantings • Good farming practice (5)6.B.1.b – Explain how human activities may have a negative consequence on the natural environment. <ul style="list-style-type: none"> • Damage or destruction done to habitats • Air, water, and land pollution

Module 2 • Lesson 7 • Culminating Activities

This is an opportunity for you and your students to identify a culminating activity. After you've completed tabulating your survey results consider choosing one of the other activity options!

Remember to please be sure that you have collected all student work for this Module!

TABULATING RESULTS OF YOUR TRASHCAN SURVEY

What You'll Need

For Each Small Group

- Copy of their groups' completed *Trash Can Surveys*
- Worksheet: *Trash Can Survey Tabulation Sheet*

Preparing for the Lesson

Leaders will:

- Get each group's completed *Trash Can Surveys*
- Copy *Trash Can Survey Tabulation Sheet* (Enough copies for each small group)
- Identify community organization & how to make contact

Lesson Sequence

1. Give each group their completed *Trash Surveys* and a *Tabulation Sheet*. Go over the directions on the *Tabulation Sheet*. Have each group tabulate their results.
2. Have a blank tabulation form in front of you. Go through the five questions on the survey tabulation form one question at a time; having each group call out the number of hatch marks they have for each item. Write each number in the blank separated by a + sign. Tabulate the number of responses for each item.
3. Have the children decide how they would like to proceed. They may want to send the summary report to the appropriate community organization and note that they have specific addresses as well. Another option would be to invite the community organization to send a representative to talk with the children. Perhaps a City

Council representative might be interested in meeting with the children to talk about their survey and the City's Rat Prevention Programs.

Here are a few ideas to consider for other culminating activities. Let your imagination run free! Have fun!

Visit the Zoo

Arrange a fieldtrip to the zoo. This can give the students an opportunity to see some of the habitat requirements of different animals.

People Power

- You may want to enlist parent volunteers.

Preparing for the Lesson

Leaders will:

- Find out if your zoo provides zookeepers or volunteers to tour the zoo with after-school programs. Tell your guide you've been studying habitat requirements.
- Find out if there are special programs offered in the after-school hours.
- Pick up a zoo brochure/exhibit map or check their website
- Choose how many and which areas you can realistically visit in the after-school time frame.
- Do some pre-activities related to the areas/animals you've chosen to visit (The zoo may have some pre-visit activities. Otherwise come up with questions, read a book, watch a video, etc)
- Arrange for transportation.

Create Bird Habitat: Make a Bird Feeder! (might be a poor choice in neighborhoods that have an obvious rat population)

This bird feeder template comes from FamilyFun.com

What You'll Need

For Each Feeder That You Make

- Empty ½ gallon cardboard milk carton (rinsed out well)
- Enough popsicle sticks to make a roof (see picture)
- Dowel about 12 inches long
- Wire hanger or other wire

General

- Scissors
- Non toxic paint (brown will look like part of a tree)
- Glue
- Bird seed

Preparing for the Lesson

Leaders will:

- Decide how many feeders you will be making
- Send home request for well-rinsed empty ½ gallon cardboard milk containers
- Gather your supplies
- Scout out a spot or spots where you can put the feeder(s)

Lesson Sequence

1. Cut openings on opposite sides of a clean carton and coat with nontoxic paint.
2. Glue Popsicle stick shingles onto the roof.
3. For a perch, poke holes below the openings and slip a dowel through the holes.
4. Fill the bottom of the feeder with birdseed mix. (You can make your own mix by combining a variety of nuts and seeds, such as sunflower seeds, millet, thistle seeds and yellow corn.)
5. Hang the feeder with wire in a spot that's easy to view but far enough away from fences or posts to thwart predators.
6. See if the children can figure out a way to catch any falling seeds and keep it from becoming rat food.



Module 2: Habitats

Worksheets and Handouts

Grades 4 and 5

Module 2 – Lesson 1

Identifying Microhabitats

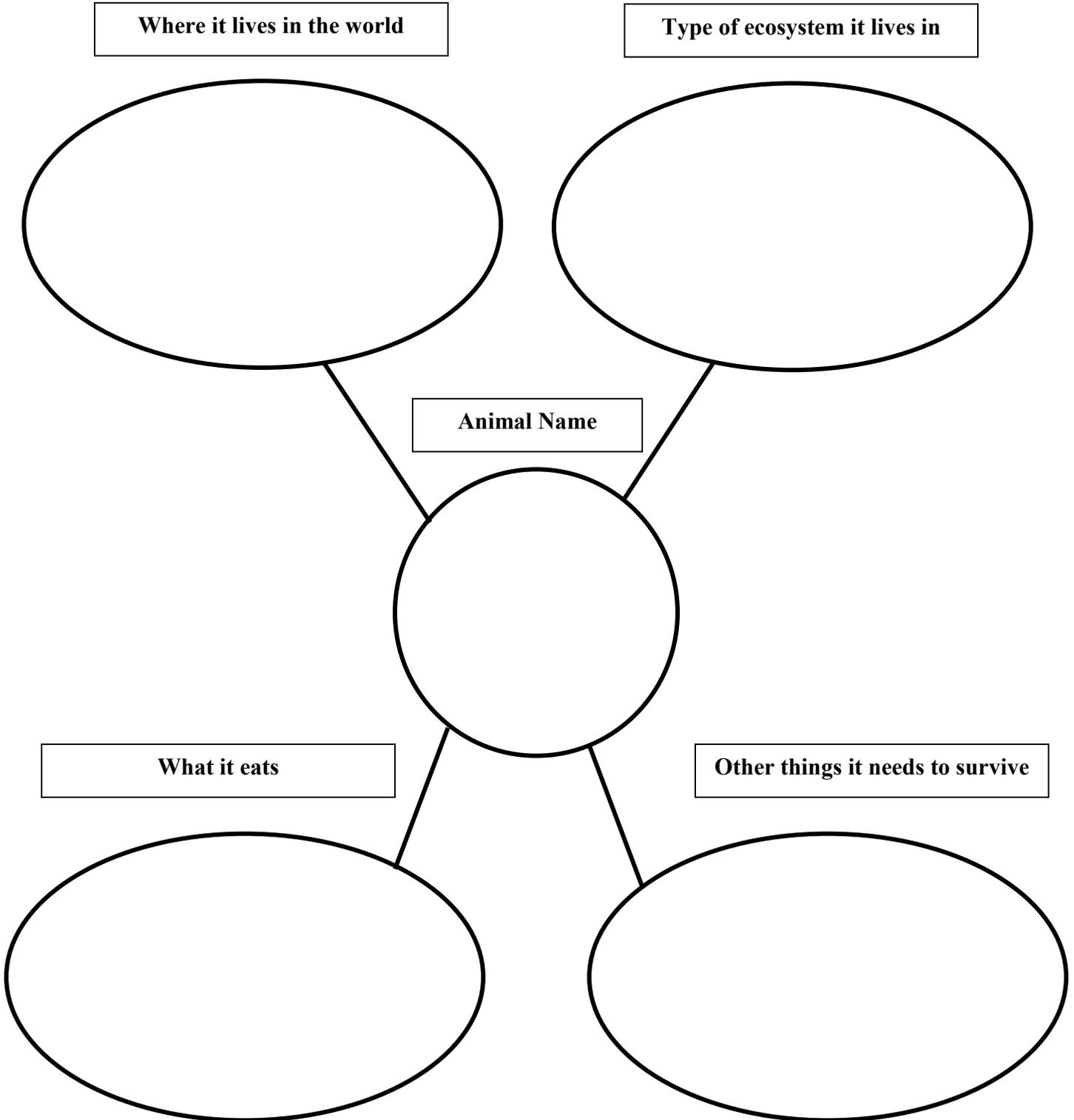
Names of team members: _____

Pretend you are an ant that is living on your plant. Describe the places on your plant that are like the ones described on this worksheet.

I LIVE IN A PLACE THAT:	LOCATION ON PLANT:
Has lots of hiding places	
Stays dry most of the time	
Has places where I blend in	
Has places where I do not blend in	
Could allow rain to wash me away	
Could protect me from strong wind	
Is shady most of the time	
Has food for me to eat	

Module 2 - Lesson 3: Habitat Diorama Graphic Organizer for Research

Name: _____



Module 2 – Lesson 5

RATS! RATS! RATS!**Why Bother With Rats???**

Good question! Rats, dead or alive, spread diseases! They leave pee (urine) and droppings (feces) everywhere. They have sharp teeth that can bite people and destroy electrical wiring by gnawing.

How Do I Know If My Neighborhood Has Rats?

Rats are most active at night; so you may or may not actually see them. You can use your senses (sight) to find signs of gnawing. If rats are around, you likely will find their droppings. Outside you can look for burrows and foot tracks.

What Does Habitat Have To Do With Rats?

Think about what you've learned about the **conditions** that all living things need from their habitat to survive! (Food, water, nest site, oxygen) If you can make the right changes in the neighborhood, you can take away what the rats need to survive!

What Should We Do So The Rats Will Not Be Able To Survive?**Take away their food!**

- Put trash in sealed plastic trash bags and then put the bags in trashcans!
- Use metal trash cans or approved plastic cans with tight fitting lids!
- Be sure trashcans don't have holes in them!
- Always put the trash can lid on tight!
- Pick up pet food dishes as soon as your pet is finished eating!
- Clean up pet feces!
- Don't litter! Your food litter is a rat's feast! Put food trash in trash bags that are later put in sealed trashcans!

Take away their nest site!

- Look around your house for openings, cracks or holes and get them fixed! (Even a tiny space is enough room for a rat!)
- Store materials (wood, lumber, tires) off the ground (Try a simple platform)
- Clean up vacant lots with tall weeds, garbage and debris

Help educate your neighborhood!

- Make an informational newsletter or flier to let your neighbors know how to get rid of rats!
- Use a survey to find out if getting good trash cans is a problem for your neighbors (Logistics-wise getting to a store and getting the can home OR having the money to buy a good trashcan!)
- Work with your community and school to keep your community rat-free.

Module 2 – Lesson 5

Your Name: _____

RAT HABITAT



WHAT DO RATS NEED FROM THEIR HABITAT TO SURVIVE?

Resources	Conditions

Which resources and/or conditions can WE try to eliminate to KEEP RATS AWAY????

Module 2 - Lesson 5 - Neighborhood Trash Can Survey

Your Group Member Names: _____

CAN THE TRASH!!!

Hello. We are from:

(Name and location of group)

We are studying ecology and learning about urban habitats. We are trying to help our neighborhood get rid of rats. Rats carry diseases that people can get. We want to try to limit food and nest sites for rats so that they will go away! One good way to do this is to use trashcans that are in good shape. That means with no holes and a tight fitting lid.



You Ask: Do you have a trashcan with no holes and a tight fitting lid?

Mark Answer

1) _____ Yes	1) _____ No
If Yes, Then Say:	If No, Then Ask
Great! Please keep on using it for all your trash! Thank You!!!! <u>END OF INTERVIEW</u>	Do you need help with transportation to get a trashcan? 2) _____ Yes No
	Ask Is the cost of a trashcan a problem for you? 3) _____ Yes No
	Then Say: Thank You!!!! <u>END OF INTERVIEW</u>

FILL IN: House/Apartment # & Street Address: _____

Module 2 - Lesson 5 - Trash Can Survey Tabulation Form

Your Group Member Names: _____

CAN THE TRASH SURVEY SUMMARY!!



Make a hatch mark (l) for each survey that you count for each item below

_____ **Number of Households That Participated {Count your survey forms}**

_____ **Number Who Have Trash Can With No Holes & With A Tight Fitting Lid {Count number of surveys that have answered 1) Yes}**

_____ **Number Who DO NOT Have Trash Can With No Holes & Tight Fitting Lid {Count number of surveys that have answered 1) No}**

_____ **Number Who Need Transportation To Purchase A Trash Can {Count number of surveys that have answered 2) Yes}**

_____ **Number Who Need Financial Help To Purchase A Trash Can {Count number of surveys that have answered 3) Yes}**

Module 2: Habitats

Leader Tools

Grades 4 and 5

Background Information for Teachers

A habitat is defined as the place where an organism lives that provides all of its needs for survival. Examples of resources that are essential needs for an organism include food, water, adequate temperature, oxygen, and minerals. In more simple terms, a habitat provides food, water, shelter, and space to a population of animals. While a habitat is the place where a population of living things exists, different populations can share a habitat. For example, birds and squirrels both use trees as a habitat. If a habitat is missing one or more of these components, the following may occur:

- the population will either move to a better habitat,
- individuals within the population will compete among each other (intraspecies competition) for the missing resource,
- or the population will compete against other populations of living things (interspecies competition) for the missing resource.

Within a habitat there are both beneficial and negative interactions between populations of organisms. An example of a beneficial relationship is the interactions between squirrels and trees. Squirrels often store food resources (acorns, other nut varieties) by burying them in the ground near their nesting area. Often this food is forgotten by the squirrel and is left buried in the ground. Consequently, the acorn or nut that has been buried develops into a tree sapling and later grows to become a mature tree. Squirrels provided a benefit to trees by dispersing seeds for the tree.

Negative interactions between populations also occurs in a habitat. An example of this type of relationship can be shown between humans and rat populations in a city. Often, people leave trash exposed in city habitats which attracts rats to the area. While rats are being supplied with food resources that are important for their survival, rats carry germs and disease that have proven harmful to humans. While humans provide a benefit to rats, rats spread harmful germs to humans.

Useful websites:

The Franklin Institute

<http://www.fi.edu/tfi/units/life/habitat/habitat.html>

Module 2 - Lesson 1

Identifying Microhabitats *(Sample Answer Sheet)*

Names of team members: _____

Pretend you are an ant that is living on your plant. Describe the places on your plant that are like the ones described on this worksheet.

I LIVE IN A PLACE THAT:	LOCATION ON PLANT:
Has lots of hiding places	Bark, between leaves
Stays dry most of the time	Underneath leaves
Has places where I blend in	Bark, nuts, twigs/branchers
Has places where I do not blend it	Flower, leaves
Could allow rain to wash me away	Top of branches, top of leaves
Could protect me from strong wind	Underneath leaves
Is shady most of the time	Underneath leaves or twigs
Has food for me to eat	Fruit, nuts, flower, bark

Lesson 3: Urban Animals & Their Habitats Graphic Organizer for Research Sample

Where it lives in the world	Type of ecosystem it lives in
North America	Forested areas where trees are available for food and nests
Animal Name	
Gray Squirrel	
What it eats	Other things it needs to survive
Nuts and acorns that have fallen from trees.	

Lesson 4: Resources and Conditions:

Activity Guidelines

What you will need for the activity:

- Create 6 “Conditions” cards using index cards and the conditions below (there are 2 copies of each condition):

1) A drought has dried up most of the water in your habitat. Take away ½ of your water.

2) A drought has dried up most of the water in your habitat. Take away ½ of your water.

3) Humans have removed trees to make room for a parking lot. Take away 2 tree bases and 10 pieces of food.

4) Humans have removed trees to make room for a parking lot. Take away 2 tree bases and 10 pieces of food.

5) There’s too much trash in your habitat! Take away some space by moving your boundaries IN by 5 steps.

6) There’s too much trash in your habitat! Take away some space by moving your boundaries IN by 5 steps.

- SHELTER spaces (1 sheet of green construction paper labeled “shelter” for each student)
- WATER pieces (15 blue construction paper squares for each student)
- FOOD pieces (15 brown construction paper squares for each student)
- Orange cones or chairs to create boundaries in which the students should remain for the activity.
- Distribute the SHELTER, FOOD, and WATER pieces throughout the playing area once you’ve brought your students outside.

Purpose: Students must meet their habitat needs by collecting enough resources in order to survive from one round (condition) to the next.

Rules:

1. Each student starts the activity at a SHELTER space (there should be one per student at the beginning of the activity). **ONLY 2 STUDENTS ARE ALLOWED AT A SHELTER AT ONE TIME.**
2. Students must collect at least **10 water pieces** and **10 food pieces** in order to survive that round.
3. Begin the game by explaining the rules above and allowing the students to play one round.

4. After the first round, have a student select a “condition” by picking a card at random being held by you. The student should read the card aloud and everyone must comply with the condition (i.e., taking out space, food, water, or shelter).
5. Play another round under this condition. Some students will struggle to meet their needs under the condition, and therefore, that student will not survive.
6. If resources become too limited, bring back the original resources and continue to play the game.

Module 2 - Lesson 5

Friends and Foes (*Sample Chart*)

Beneficial and Harmful Relationships in Habitats	
<p><u>Beneficial</u></p> <p>Insects spread pollen for plants</p> <p>Squirrels spread seeds for trees</p> <p><i>Additional suggestions to discuss:</i></p> <p><i>Decomposers add nutrients to soil for plants and trees</i></p> <p><i>Birds also spread seeds from trees by eating berries and releasing them into the soil in their waste (poop).</i></p> <p><i>Ants add air to the soil, making it easier for roots from plants to spread.</i></p>	<p><u>Harmful</u></p> <p>Rats spread germs and disease to humans</p> <p>Humans destroy animal habitats when they pollute</p> <p><i>Additional suggestions to discuss:</i></p> <p><i>Some insects eat the leaves of plants, causing harm to the plant.</i></p>

Module 2 – Lesson 5

RAT HABITAT



WHAT DO RATS NEED FROM THEIR HABITAT TO SURVIVE?

Resources	Conditions
Water	Acceptable temperatures
Air (oxygen)	No poisons or dangerous chemicals
Food/nutrients (energy)	Limited Diseases
	Limited predators
	Nest site

Which resources and/or conditions can WE try to eliminate to KEEP RATS AWAY????

WATER _____

FOOD _____

NEST SITE

Module 2 – Lesson 5**Rat Prevention Tips:**

A rat needs the three basics of life: food, water and shelter. If you prevent the access of these 3 things, your community will do well to prevent an infestation.

- Contain your garbage in a can with a tight-fitting lid.
- Never leave pet food out all day or all night. As soon as your dog is finished with the food, take the bowl inside. Rats just love dog food!
- Eliminate leaks from your hose bib.
- Eliminate any and all standing water from buckets, bird feeders, tables, etc.
- Cut your grass and remove all high weeds.
- Remove ivy and trim your shrubs.
- Get rid of that old, dilapidated shed you have not used in a while.
- Eliminate all bulk trash items from your yard. If everyone in your community can follow these few simple steps, your community will be on its way to being rodent-free.