

## Section IV

# Gathering Information

This section takes you through the key steps involved in beginning your Schoolyard Habitats project, including the processes behind creating a Habitat Team and developing a vision statement for your project. Also provided are activities that will assist you in engaging students in assessing the schoolyards potential for wildlife habitat, mapping and gathering other essential information.

- Create a Habitat Team
  - Habitat Team Roles
  - Team Planning Worksheet
- Develop Your Vision
  - Visioning Worksheet
  - Our Schoolyard Habitats Vision
- Conduct a Site Inventory and Choose Your Site
  - Introduction
  - Habitat Hunt (K-8)
  - Who Can Live Here? (9-12)
  - Schoolyard Biodiversity (K-8)
  - Wildlife Where You Live (9-12)
  - Basic Site Inventory (9-12)
  - Advanced Site Inventory (9-12)

# Create a Habitat Team



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No one should undertake a Schoolyard Habitats Project alone. Generally, the more people involved and informed about the project, the more sustainable the project will be over time. Of course, the greater the number of people actively engaged, the greater the numbers who will learn and reap the educational and other benefits of a schoolyard project.

A dedicated team is necessary to tackle the planning, fundraising, publicizing, building, and planting involved in the development of a Schoolyard Habitats site. The Schoolyard Habitats Team is the working committee that acts as the driving force behind the development of a Schoolyard Habitats site. The habitat team is composed of teachers, students, parents, maintenance personnel, administrators, and community volunteers. The diverse skills and support each member of the Habitat Team brings to the project are invaluable to the habitat's overall conception, construction, and maintenance. This team will have the important task of determining how to include students in the creation and implementation of the project. Members of the team will consider curriculum alignment with the goal of finding ways of using the Schoolyard Habitats project as an outdoor classroom to meet the school's curriculum objectives.

Most teams find that regular meetings, clear delegation of responsibilities, and frequent communication both between team members, and between the team and wider school community, lead to effective progress. **To ensure a solid foundation, the Schoolyard Habitats Team should include representatives from each of the following school community groups:**

## Students

Strong student involvement is key to the success of the project: students provide essential enthusiasm and creativity for these projects. The components, structure, and goals of the Schoolyard Habitats project should be defined by student input and ideas. In addition, the educational potential of Schoolyard Habitats projects can only be realized if students are involved. The more that students are involved, the more they will learn along the way; meaningful student involvement will also



create a greater sense of stewardship and engagement.

While many beautiful habitats could be created at a school without the help of students, the process of helping to create the Schoolyard Habitats site will provide students with ownership in the project, and will provide an experience to help students learn from the outside world. Students can brainstorm and discuss potential sites for the Schoolyard Habitats project, and can research habitat types, beneficial plants and the local wildlife they plan to attract.

Students can conduct school surveys to assess current use of the schoolyard, and organize preferences and ideas for the project. Almost every habitat-related activity can be directly tied in to national, state, and local standards of learning, both in the planning phases and once the habitat project nears completion. Students of all ages can be involved in all aspects of the project. High school projects are often almost entirely student-driven as students take on most leadership roles and complete rigorous assignments to move the project forward.

*“Students have been instrumental in this project from the beginning...students have studied the water quality, plant life and birds found in the salt marsh habitat. The students have collected data on water quality and post their findings on the web site they constructed. They have developed PowerPoint presentations for the School Board meeting...But most importantly they have translated their new knowledge of wetlands into action...”*

*Kimball Elementary School,  
National City, CA*



### Educators

In this process, educators may serve as mentors, facilitators, co-workers, and cheerleaders. They must strike a balance between taking the lead to push the project forward and stepping back to allow for student initiative. At the same time, teachers take the lead in maximizing the instructional potential of the site.

### Administration

Support and participation of school officials is crucial. They can offer insight into budget concerns, future building plans, liability issues, community relations, and funding opportunities. Administrators react favorably to projects that improve the school's image, offer cost savings, provide teaching opportunities across the curriculum, and incorporate student leadership and enthusiasm for the project. Also, administrators who are well informed of the project are more likely to set aside time for teachers to work with students on the Schoolyard Habitats site, and on planning the integration of the

Schoolyard Habitats site into the curriculum.

### Maintenance Staff

Maintenance staff possess valuable knowledge about the school grounds and access to the equipment needed for project construction and maintenance. Convey to maintenance staff the important role they play and critical skills they bring to the long-term success of the project.

### Parents

Parents support projects like Schoolyard Habitats that excite and stimulate their children. Many times, parents find their own lives enriched through involvement in a Schoolyard Habitats project. Their enthusiasm and resources—personal and professional—can be valuable assets to the project. The role of the parent in the establishment of a Schoolyard Habitats site is critical because it extends beyond the school into the home and the community.



### Local Businesses and Civic Organizations

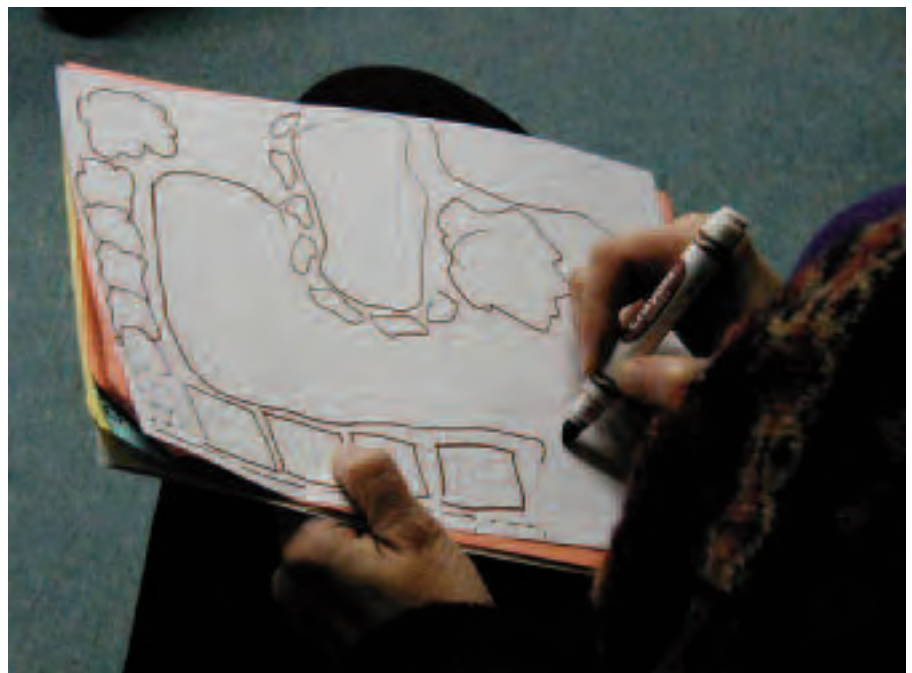
Schoolyard Habitats projects across the country have had great success engaging the support of local businesses and community organizations. Community partners can offer technical support, material contributions, small grants, volunteers, and other in-kind donations. Always acknowledge contributions to a Schoolyard Habitats project publicly and with letters of appreciation: this recognition helps these groups gain positive recognition in the community, and often inspires them to continue to provide assistance in the future.

### Resource Professionals

Resource professionals can offer valuable knowledge and experience to a Schoolyard Habitats project. Their expertise can assist in the planning of the site and in the construction and installation of specific habitat components. These individuals from your local community may also serve as positive role models and mentors: through workshops and school assemblies, their involvement with the project may also open students' eyes to new career possibilities.

#### Resource for Professionals to Consider:

- Forester
- Cooperative Extension agent
- Entomologist
- Park naturalist
- Waste water engineer
- Wildlife biologist
- Land-use planner
- Soil Conservationist
- Horticulturist
- Landscape architect
- Local historian



# Habitat Team Roles



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The following list provides examples of roles that schools should consider when creating the Habitat Team. The number of people involved and the roles of each member will vary by school. At the high school level, students can fill or share all roles except the Curriculum Coordinator. Add or modify these roles as necessary to meet project needs.

Using the suggestions on the previous page, use the worksheet on p. x to develop your team and delegate responsibilities. Some schools choose to obtain the signature from their principal or program director after the team has been formed to help ensure that the administration is informed and supportive of their project goals.

**High School Teachers:** Have your students brainstorm and volunteer for positions on the Habitat Team. It may become so competitive that you'll need to hold elections!

TEAM ROLE	IDEAL QUALITIES	RESPONSIBILITIES
Habitat Team Leader	Effective organizer; able to delegate responsibilities and communicate effectively.	Oversee development of the habitat plan and coordinate other team members.
Budget Coordinator	Well organized; comfortable using the internet	Maintain receipts, keep records of purchases, donations, etc. Research possible grants and sources of funding and donations.
*Curriculum Coordinators	Member of staff or administration; prior education experience. Leadership skills. Ideally should include one teacher from every grade.	Assist faculty to make effective use of the Schoolyard Habitats site to meet academic standards. Compile resources and activities for staff use.
Historian	Creativity and research skills.	Help with student research into historical uses of the school grounds. Document project progress with photos, scrapbook, etc.
Maintenance	Responsible, organized.	Coordinate on-going maintenance of site. Oversee delegation of tasks.
Parent/Volunteer Coordinator	Good communication skills.	Promote volunteer involvement with the project. Match volunteers to tasks, coordinate workdays, and send thank-you notes to those who contribute.
Publicity	Writing skills.	Coordinate publicity and updates to local media and NWF. Create a newsletter or write articles for school newsletter, updating community on project progress.
Student Liaison	Leadership. Positive Energy.	Ensure ongoing involvement of all students in ongoing project work.

\* Some schools choose to create a separate Curriculum Team; others include those focusing on curriculum within the larger Habitat Team.

### In Working as a Habitat Team, Remember

#### That Strong Teams:

- *Communicate Effectively*
- *Support Each Other*
- *Share Responsibilities*
- *Make Major Decisions as a Team*
- *Run Meetings Effectively*
- *Cooperate*
- *Include Diverse Members*
- *Celebrate Accomplishments*
- *Work to Merge Individual and Group Goals*

### Gaining Support from All Staff

Though the Habitat Team will be the driving organizational force behind the project, it is very important to share information and gain the support of as many school staff and administrators as possible. Many projects are initiated by one or two inspired individuals; however, to ensure the progress and sustainability of the project, most if not all of the community should be “on board.” Building support usually begins with effectively communicating the reasons that the Schoolyard Habitats project will benefit the entire school community.

Some teachers or administrators may choose not to be involved in planning and planting the Schoolyard Habitats site. One hundred percent participation in this process may be unrealistic. However, if the administration does not understand all of the ways that this project will benefit the school community, they may not, for example, be especially supportive of fundraising on its behalf. Or if other teachers don't understand all of the opportunities for improving student learning that the habitat provides, they may never take advantage of this wonderful living laboratory outside their doors.

One way to ensure that all of the staff is well informed is to participate in a relevant staff training together. Many schools send one or two people off-site for training, but often those one or two people remain the holders of information and tend to work in relative isolation. Encourage the professional development coordinator to offer a Schoolyard Habitats workshop during a regular inservice day, which will help get the project off the ground. Many schools have also written grants for money to pay teachers to participate in trainings on non-inservice days. Funding these trainings is often key to a high-rate of consistent participation. Having all staff informed and convinced of the value of the project will not only benefit this year's students but will ensure the sustainability of the project for many years to come.

From early on, take small steps and publicize each success—this will help build attention and support. Consider sharing newspaper or magazine articles (such as those provided in this manual), that provide research to back up the value of schoolyard projects and highlight other schools' successes, with the school administration. Highlight the ways in which hands-on learning will improve academic achievement and build community.

Many teachers find that project interest and support grow after they receive their first grant, or after the appearance of the first article in a local newspaper.

Other schools with active teacher participation in committees have had success with creating an official Schoolyard Committee. Becoming an official committee within a pre-set, administrator-sanctioned system gives this group voice and legitimacy as well as an instant structure with a consistent meeting schedule.

Often, providing visuals can help spark understanding and inspire your community. The National Wildlife Federation has a Schoolyard Habitats slideshow and video which can be used to help bring project goals to life. A Schoolyard Habitats presentation at a staff meeting can be an easy way to bring all staff up to date on project plans and progress. Some schools have chosen to organize staff bus tours of other local schools with thriving schoolyard projects and gardens to provide inspiration.





# Creating a Vision Statement

The first task of the Habitat Team is to define and set clear and attainable project goals. The construction of a Schoolyard Habitats site may seem daunting, but it won't be overwhelming if it's developed in phases. First, establish long-term goals; next, identify readily accomplished short-term goals to help move towards the larger vision. Fundraising, solicitation of materials, curriculum integration, etc. are all ongoing projects. With each phase of habitat development, important lessons are learned.

The overall long-term goal can be written as a vision statement. What does the school envision as their ideal schoolgrounds? Take the time to develop this vision with as many different groups of people as possible, including students, teachers, administrators, parents, and community volunteers, etc. This process will build support, enthusiasm, and ownership for the project. Keep in mind that the vision is not set in stone; it will probably need to be updated as the project progresses. Use the following worksheets to think about the vision and sketch out both short and long-term goals as well as an overall vision statement.

The Schoolyard Habitats Visioning Worksheet (p. x) can be completed by older students and the Habitat Team. Younger students' thoughts and desires regarding the schoolyard can be captured through brainstorming, discussion and drawings.

## Examples of Vision statements

- *Our vision for our Schoolyard Habitats site is a free flowing area filled with plants, trees, birds, flowers, insects, and a variety of animals. This space will involve all parts of the community for curricular studies, meditation, and the planting and caring of the environment.*
- *Our vision for our Schoolyard Habitats project is to provide a natural area that is aesthetically pleasing where wildlife can be observed and appreciated. This site will provide students with hands-on experiences that enhance all areas of the curriculum.*



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# Visioning Worksheet

## HABITAT TEAM/9-12 WORKSHEET

Name: \_\_\_\_\_

Role in the project: \_\_\_\_\_

On your own, write a brief response to each question.

1. Describe how your schoolyard currently looks. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. How is the schoolyard currently used? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. If you could change your schoolyard in one way, what would that be? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

4. Describe your ideal schoolyard—what would it look like? Sound like? How would it be used? \_\_\_\_\_

\_\_\_\_\_

In working towards creating a wildlife habitat area on the schoolyard, consider these questions.

5. Where on the school grounds will the habitat be located? \_\_\_\_\_

\_\_\_\_\_

6. What should the size, shape, and type of the habitat site be? \_\_\_\_\_

\_\_\_\_\_

7. What will it provide habitat for (e.g., birds, butterflies, reptiles, etc.)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

8. What type of ecosystem are you restoring or recreating? \_\_\_\_\_

\_\_\_\_\_

9. What will the source of water be in your habitat (e.g., pond, wetland, birdbath)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

continued

10. How will students be involved in the design and development of the habitat site?



Visioning Worksheet *continued*

HABITAT TEAM/9-12  
WORKSHEET

- 
11. How will classes use the completed site? What special features will the site need to accommodate these uses? \_\_\_\_\_  
\_\_\_\_\_
  12. Which community members, businesses, and organizations might be of assistance with your project? \_\_\_\_\_  
\_\_\_\_\_
  13. What will your habitat site look like next year? The year after? How will it need to be maintained? Who will be responsible for maintenance during the school year? During the summer? \_\_\_\_\_  
\_\_\_\_\_
  14. What is the process for making final decisions for the project? \_\_\_\_\_  
\_\_\_\_\_
  15. Use the above ideas to form a vision statement for your Schoolyard Habitats site. This statement should include:
    - Location and reason for selecting that area: \_\_\_\_\_  
\_\_\_\_\_
    - Size of the habitat project: \_\_\_\_\_  
\_\_\_\_\_
    - Wildlife for which it will provide habitat: \_\_\_\_\_  
\_\_\_\_\_
    - General description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Conduct a Site Inventory and Choosing Your Site

A site inventory is an important educational step in the development of a Schoolyard Habitats site.

In this first phase of the project, team members and students go outdoors to familiarize themselves with the schoolyard. The subsequent mapping activities will help students create a “big picture” of all the observations and data collected during the site inventory. These activities will be helpful in creating a connection between students and the site and will also provide invaluable information for use in the planning process.

Conducting a thorough site analysis requires spending a good deal of time out on the site.

## Site Inventory Elements

Elements of the site inventory include but are not limited to:

### *Traffic Patterns*

- Study foot, auto and bicycle traffic on your site.
- Make note of all existing pathways (formal and informal). Check for signs of wildlife trails.

### *Water Flow / Topography*

- Observe contours and slopes of the site. Note where water flows during times of rain and of areas where water drains or settles.

### *Existing Vegetation*

- Make note of existing vegetation such as deciduous trees, evergreen trees, shrubs, long vs. short grass, natural vs. landscaped areas. Depending on ages of students, this step may include identification of specific species of plants.

### *Permanent Structures*

- Take note of buildings (take into consideration location of doors and windows. Can you situate your habitat site so that it can be seen from classrooms? Is the site easily accessible for all students?)
- Record the location of sidewalks, driveways, parking lots and loading areas.
- Look for other human influences (i.e., playing fields, utility lines and towers).
- Make note of underground utilities or power lines.
- Make note of water sources (both natural and municipal).

### *Signs of Wildlife*

- Observe wildlife visiting your schoolyard, include actual sightings, tracks, scat and other signs of wildlife activity.

### *Soil Types*

- Take soil samples from different areas of your site and compare color, texture and moisture content. Hint: Recruit a garden shop representative or an employee of the local soil and water conservation district to help with this part of the activity if no one in the group is familiar with soil pH and composition.

### *Sun and Shade*

- Study which areas of the site receive the most sun and the most shade. How much does air temperature change throughout a day? Throughout the year?

### *Adjacent and Historical Land Use*

- Consider how nearby neighbors utilize their land. Make note of any existing green spaces or large paved areas, for example.
- Investigate past land use and site history.

### *Summarizing the Inventory Data*

After the site inventory is complete, let participants know that the information gathered in the inventory will be referred to throughout the planning and design process. To be most useful, the information should be gathered and summarized. This should include the base map overlays, tables, charts, graphs and narrative summaries.

### *Defining the Site*

Once all the data is summarized, Habitat Team members can evaluate which area of the schoolyard is the best suited for a habitat site. Examine the summarized data and determine if the schoolyard has the essential habitat elements. While you are doing this, you should be able to determine where the Schoolyard Habitats site should be located. In some cases, a certain site may have already been designated. In other cases, students might have found that some areas of the schoolyard might already be frequented by wildlife. These areas may naturally provide some or all of the essential habitat elements.

### *Evaluating the Site*

During the site inventory, students identified existing wildlife habitat components on the schoolyard. In this step, students focus on the chosen site

and determine which habitat elements must be enhanced or developed to attract wildlife. What was found? What needs to be added or changed?

When analyzing the new habitat site, keep in mind the four essential elements of a habitat – *food, water, cover and places to raise young.*

## **Assembling the Elements**

### *Schoolyard Habitats Design*

At this stage, students should create a list of “essential” components they will need to add to the chosen site. For example, if during the site inventory students found no water source for wildlife on the site, water would be one of the essentials, even though the group has yet to decide how water will be provided or where it will be located. Before beginning this next stage, have the class brainstorm about other essentials to add to the list.

In the design process, take into consideration any features that will make the site more accessible as a learning environment. Many schools include some type of seating area (which can range from a circle of tree stumps cut from a fallen tree to picnic tables) or an open area where a class could gather. Consider pathways that allow access to many parts of the habitat (winding paths sometimes lend more access to plantings than do single straight ones).

If your school has limited space, consider a container garden or rooftop habitat.

## **Ensuring Continued Success**

### *Maintenance*

Creating a habitat-based learning site at school lessens the need for traditional maintenance of the area. Most programs, once started, find plenty of

willing supporters interested in volunteering time for maintenance. Usually, students do most maintenance throughout the school year. If sharing the responsibilities with other classes, make a work schedule for each semester.

However, you still need to plan for the watering, weeding and general upkeep of the habitat site over the summer months and other holidays when fewer students are at the school. Contact summer school teachers to see if they are interested in incorporating the habitat site into the summer program. Their students can enjoy and maintain the site during the summer months. Alternatively, different teams of students and parents or neighbors can sign up to take care of the habitat for a specific week of the summer.

### *Schoolyard Habitats® Certification*

Applications will be reviewed by Schoolyard Habitats staff to see that basic criteria have been met.

When your habitat is certified, you will be sent a Certificate of Achievement from the National Wildlife Federation. Your habitat will be assigned its own unique number and it will be entered in our computer-based National Registry of Schoolyard Habitats Sites.

### **Additional Downloadable Resources**

These additional reference material about Schoolyard Habitat® are available at [www.nwf.org/volunteer](http://www.nwf.org/volunteer).

Downloadable on the web

- Natural Standards of Learning—They Grow Together

## Habitat Hunt

### Summary

*Students assess the schoolyard (or nearby park) as a habitat for local wildlife.*

### Grade Level:

K-4, 5-8

### Time:

2 class periods (60 minutes)

### Subjects:

Science, Geography

### Skills:

Observation, description, analysis, research

### Learning Objectives:

Participants will be able to:

- Locate habitat elements on the schoolyard
- Assess the schoolyard's potential as a suitable habitat for a specific animal
- Identify an area of the schoolyard that would include the most habitat elements for a specific animal

### Materials:

- Pictures of local wildlife
- Construction paper or flagging tape (4 colors)
- String (and/or masking tape)
- Single-hole punch
- 4 colors of chalk or dry-erase markers
- Scissors
- Journal
- Pencil

- Tools for observing wildlife: field guides, binoculars, hand lenses (optional)
- Habitat Hunt worksheet (p. x)
- Field Guides

### Background

In order for an animal to survive as a species, it must be able to find adequate habitat that provides food, water, cover, and a safe place to raise its young. The amount and quality of these needs vary a great deal from species to species. It may be that your schoolyard already has adequate habitat for some animals—students may have seen squirrels romping around in nearby trees, or have heard songbirds in the spring. This activity may answer questions as to what these animals are finding in your schoolyard, and what they and other species may lack.

Identifying and locating the elements already present on school grounds represents the first step in restoring wildlife habitat. From there, you will better understand ways to attract and help support a wider variety of local wildlife.

### Preparation

Cut construction paper into “flags” (a rectangular quarter of a page) and punch a single hole in the top, or set out materials for students to do this during class time. Alternatively, provide 4 colors of flagging tape. Each student, should have 4 flags, one of each color. Designate one color for food, one for water, one for cover, and one for places to raise young.

If necessary, have students label each of the flags.



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### Procedure

1. Review the four basic elements of habitat and the importance of each for animal survival.
2. Pass out the Habitat Hunt worksheet on p. x. Tell students they will complete these during an exploration of the school grounds. (If the area to explore will be limited to certain sections of the school grounds, state the boundaries of the area.) They will look at the school grounds as if they were a local animal species in search of habitat.
3. Have students choose a local animal species common to the area. Using field guides or storybooks (K-3), identify the types of food, water cover and places to raise young that their animal requires.
4. Pass out construction paper flags so each student has one flag of each color. Tell students they will use the flags to tag the area where a habitat element for their animal is located on the school grounds. One color represents food, one represents water, one cover and the other places to raise young. Have the student write the name of their species on each flag so they will be able to tell them apart from those of other students. Have them cut string and punch a hole in each flag (if not already done) so they can tie flags outside.
5. While students are outside, they will need to think about the following:

- In order to survive, all animals need food, water, cover and a safe place to raise their young.
  - When outside, take a look around you. Do you see the necessary habitat elements for the animal you have chosen to survive here? Spend some time exploring this area. Look for all the characteristics of habitat that meet your specific needs. Based on what you find, you will decide to stay and call this area “home” or continue to look for a new place to call home.
  - Describe the four elements of habitat you found that meet your needs:
    - Food
    - Water
    - Cover
    - Places to Raise Young
  - Note where you found each element. Are they spaced close together or spread out over the school grounds?
  - Decide whether you (as the animal) would stay and set up home here. Why or why not? What other habitat elements would need to be added for you to stay here?
6. Before going outside, review any safety rules with the class. If the area is too large, consider setting up boundaries for the activity. Depending on the age range, have students stay together as a group, or allow them to investigate the school grounds on their own. They are searching for a new habitat for their

animal, but first they must identify which of the four basic habitat elements are on school grounds. As they explore the schoolyard in the role of the animal, students will use the different colored flags to identify as many habitat elements as they can find for their animal. These may vary for different animals and not all the students are likely to locate all four elements for their animals.

7. After they place each flag, participants will use the Habitat Hunt worksheets and/or student journals to record what and where they found all or some of what they need to survive. While outside, be sure to help students if they feel unable to identify the elements.
8. Once all students are finished, tour the schoolyard together and collect the flags. Discuss the habitat elements each flag signals. After the exploration, have the class assess its findings. If possible, use chalkboard (a dry-erase board or overhead and transparency will work as well) to draw a simple map of the area explored during the activity. Have each child come

to the board and add the location of the elements they flagged to the map. Each element should be represented by a different color of chalk (or marker). As a class, discuss the map. Which areas on the schoolyard have the most habitat elements? How many different species might each section support? Ask each student to decide if the schoolyard would be part or all of their animal’s habitat. What habitat elements may need to be added to enhance or create adequate wildlife habitat?

### Modifications for Older Students

Have participants put the information they discover directly onto maps, rather than using flags.

### Extensions

Challenge students to think about how the availability of certain habitat elements may change through the seasons. Would water be more difficult to get for wildlife in summer or winter? Are small streams, ponds and puddles they may have seen available for wildlife all the time? What about food?

### Assessment

Have students write a short essay describing their findings in the schoolyard and how the area meets and does not meet their animal’s needs. How would the schoolyard need to change to become a better habitat? You may want to instruct younger students (K-3) to draw pictures of their animals’ habitat needs.





**K-8**  
**WORKSHEET**

You are a \_\_\_\_\_ In order to survive you need Food, Water, Cover, and Places to Raise Your Young. Explore the schoolyard. Describe the habitat elements you find and where you find them. Then, decide whether or not you could stay and make your home here.

Food Source: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Water Source \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Cover: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Places to Raise Young: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Questions:**

1. Will you stay and make your home here? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. Why or why not? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. What other habitat elements would you like to see here? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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# Who Can Live Here?

## Summary:

*Students assess the fitness of a habitat for a specific species.*

## Grade Level:

9–12

## Time:

2–3 class periods (120 minutes)

## Subjects:

Biology, Environmental Science/Studies, Geography

## Skills:

Observation, Investigation, Data Processing, Critical Thinking

## Learning Objectives

Students will be able to:

- Locate habitat elements on a specific site
- Assess site's potential as a suitable habitat for a specific species
- Identify an area of the site that would include the most habitat elements for a specific species

## Materials:

- Tools for observing wildlife: field guides, binoculars, hand lenses (optional)
- Habitat Evaluation worksheets (pgs. ?—?)

## Background

See Gardening for Wildlife (p. 25-53)

## Preparation

Identify a suitable study site for students, either on or near school grounds. (A current or future Schoolyard Habitats location makes an excellent study site). Study sites should potentially provide habitat for at least 4 to 7 different species.

## Procedure

1. To evaluate the fitness of a habitat for a specific species, the students will first need to:
  - Research the needs of animals native to the area. Assign each student (or allow students to choose) a different animal that is found or could be found at the study site. Assign animals from a variety of phyla. Identify the specific habitat needs of the animal—food, water, cover, and places to raise young.
  - Describe the habitat type at the site and evaluate it for each of the habitat components and the impact



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of humans. Rate the habitat in terms of each component on a scale of 1 to 10, with 1=poor and 10=excellent.

- Analyze the findings to evaluate the quality of the site for this animal. A guide to assist the students in this task is included at the end of this activity.
2. After the students have analyzed their individual species, the class should compile their findings to assess the overall wildlife habitat quality of the site.
    - Record all of the data on a chart displayed in the classroom on the board, overhead projects or computer screen:
    - Discuss the answers to the following questions:
      - Which animals had the highest total score? Lowest?
      - Which components had the highest score? Lowest?
      - For which animals would the habitat be the easiest to improve? Most difficult?
      - Which habitat component is the easiest to improve? Hardest?
      - Do different animals need different site enhancements?
    - Discuss different enhancement possibilities that might improve the habitat quality rating. Have the students break into groups according to the animals or components on which they would most like to focus. For example, a group may wish to focus on one component, such as

## Habitat Components

SPECIES	FOOD	WATER	COVER	PLACES TO RAISE YOUNG	HUMAN COMPATIBILITY	TOTALS
Species A						
Species B						
Species C						
Species D						
Species E						
Etc.						

water, or on one species for which one or more components were not appropriate. Have them draw up simple plans to improve the quality of the habitat and present them orally to the class.

- The class should discuss each plan: *How likely is it that the plan will improve the quality of this habitat? How feasible (in terms of time, cost, legal issues, etc.) is the plan? What community resources might be needed to implement the plan? What other information would they need to carry out their plan? Does the plan of one group affect the plan of another? Can any of the plans work in tandem?*

### Assessment

1. Describe another location in the community familiar to the students. Provide photographs, maps, or diagrams if needed. Ask them what they would include in a survey of that site.
2. Give students the results of another survey (perhaps completed by another class for another site), and ask them to suggest a plan to improve habitat quality at that site.
3. Using inventory information, students write a site description and speculate about wildlife species that may have lived there once but are no longer seen there.

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Science and Civics: Sustaining Wildlife Council for Environmental Education  
 5555 Morningside Dr., Suite 212  
 Houston, TX 77005-3216  
 Phone: 713-520-1936  
 Fax: 713-520-8008



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# Who Can Live Here?

## 9-12 WORKSHEET

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Site: \_\_\_\_\_ Location: \_\_\_\_\_

### Part 1: Natural History

Wildlife Species: \_\_\_\_\_

Description of animal: \_\_\_\_\_

#### Specific Needs of Animal

Food: \_\_\_\_\_

Water: \_\_\_\_\_

Cover (all types: nesting, wintering, storage, resting, and protection): \_\_\_\_\_

Places to Raise Young: \_\_\_\_\_

### Part 2: Habitat Characteristics

*Habitat Type: (check all applicable)*

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Mixed Forest                 | <input type="checkbox"/> Wetland                           | <input type="checkbox"/> Buildings, scattering of trees, little or no lawn |
| <input type="checkbox"/> Lake                         | <input type="checkbox"/> Shrub                             | <input type="checkbox"/> Business Area                                     |
| <input type="checkbox"/> Forest                       | <input type="checkbox"/> Park                              | <input type="checkbox"/> Other _____                                       |
| <input type="checkbox"/> River                        | <input type="checkbox"/> Shrub with some trees             | _____  |
| <input type="checkbox"/> Agricultural Field           | <input type="checkbox"/> Houses, many trees, mowed lawn    | _____  |
| <input type="checkbox"/> Pond                         | <input type="checkbox"/> Schoolyard                        |  |
| <input type="checkbox"/> Mixed field/shrub            | <input type="checkbox"/> Houses, few trees and little lawn |  |
| <input type="checkbox"/> Stream                       | <input type="checkbox"/> Neighborhood                      |  |
| <input type="checkbox"/> Mixed field/shrub/some trees |  |  |



## 9-12 WORKSHEET

Briefly describe the habitat at the site you're investigating, including major vegetation and wildlife known to be on site: \_\_\_\_\_

### Part 3: Habitat Component Rating

#### A. Food

1. Does this site provide food for this animal?  Yes  No

2. If yes, list foods found on this site: \_\_\_\_\_

3. Are foods limited to one or more seasons?  Yes  No

4. If yes, which seasons?  Winter  Spring  Summer  Fall

Rate "Food" from 1 to 10: \_\_\_\_\_ ("10" is excellent quality; "1" is poor quality.)

#### B. Water

1. Does this site provide water for this animal?  Yes  No

2. If yes, list water sources found on this site: \_\_\_\_\_

Rate "Water" from 1 to 10: \_\_\_\_\_ ("10" is excellent quality; "1" is poor quality.)

#### C. Cover

Animals require different types of cover. Place "yes" next to those cover types that your animal requires, then decide if this site meets the needs for the animal. If yes, list possible places where the animal may find cover on your site.

COVER TYPE	NEEDED BY ANIMAL?	FOUND ON SITE?	LOCATIONS (BE SPECIFIC)
Breeding/Nesting			
Nursery			
Roosting/Resting			
Hibernating			
Protection			
Other			

Rate "Cover" from 1 to 10: \_\_\_\_\_ ("10" is excellent quality; "1" is poor quality.)



## 9-12 WORKSHEET

### E. Places to Raise Young

1. Does the site provide adequate places to raise young? Please explain.

---

---

---

---

Rate "Places to Raise Young" from 1 to 10: \_\_\_\_\_ ("10" is excellent quality; "1" is poor quality.)

### Part 4. Human Compatibility

Are there human activities on this site?  Yes  No

If so, list: \_\_\_\_\_  
\_\_\_\_\_

Are these activities compatible with this animal inhabiting this site? Explain. \_\_\_\_\_  
\_\_\_\_\_

Rate "Human Compatibility" from 1 to 10: \_\_\_\_\_ ("10" is excellent quality; "1" is poor quality.)

### Part 5: Management

What is the total rating for this animal at this site? \_\_\_\_\_

Based on this total habitat evaluation, could this animal live on this site? \_\_\_\_\_

Why or why not? \_\_\_\_\_  
\_\_\_\_\_

Does the animal live on this site to your knowledge?  Yes  No

If not, why not? \_\_\_\_\_  
\_\_\_\_\_

Can this site be easily improved for this animal?  Yes  No

If yes, how? \_\_\_\_\_  
\_\_\_\_\_

## Schoolyard Biodiversity

### SUMMARY:

*Students will estimate the biodiversity of the schoolyard (or other site) and gain an understanding of the relationship between species biodiversity and the fitness of a habitat for wildlife.*

### Grade Levels:

K-8

### Time:

60-90 minutes

### Subjects:

Science, Math

### Skills:

Research, classification, synthesis, observation, analysis

### Learning Objectives:

Students will be able to:

- Define biodiversity and species diversity
- Calculate species richness and relative abundance
- Describe how different habitats support various species
- Explain how species diversity is an indicator of habitat health
- State two reasons for preserving biodiversity
- Discuss strategies for preserving biodiversity

### Materials:

- **Part 1:** Ziplock plastic bags, assorted shapes and sizes of pasta, legumes, rice, other seeds, dark colored marker, string, tape measure or meter sticks
- **Part 2:** string and popsicle sticks or stakes (or hula hoops), paper, pencils, clipboards

### Preparation

#### Part I

1. Prepare an “ecosystem bag” for each group of 3-5 students. Each bag will represent a different type of ecosystem. Place objects representing specific plants and animals (i.e. different types of dried pasta for grasses, colored paperclips for wildflowers, small seeds for insects, rice for decomposers, dried beans for mammals, etc.) in the bags. The number of items included in each bag should roughly correspond to the ecosystem being represented.

Ecosystems might include (in order of species richness) a nature preserve, butterfly garden, vacant lot, sidewalk, ball field, and resi-dential lawn. For example, a residential lawn bag might simply include linguni (representing a single type of grass) and a few seeds (insects).

Label each bag with a different number. Create a key for the species included in the ecosystem bags and for the ecosystem types represented by the bags. Post the species key

and a listing of the ecosystem types in an area visible to all.

#### Part II

1. Locate a section of the schoolyard (or a nearby park or natural area) that the class will investigate for biodiversity.
2. Prepare a quadrat string for each group of three to five students. Cut string to the size of the quadrat’s perimeter (for a 1m square quadrat the perimeter is 4 m). Add about 10 extra inches to the string for tying and wrapping around stakes. Alternatively, use a hula hoop to define an area.

### Procedure

#### Part I

1. Introduce the concepts of species diversity and sampling and discuss the importance of each.
2. One way of sampling species biodiversity is to count all the species in a small patch of land and then estimate the number in a similar larger area. Scientists use a quadrat, a device that clearly marks the edges of the area you are studying study (plot). Discuss what size quadrats students will use (1m<sup>2</sup>)



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3. Tell students that they will be investigating the biodiversity of several ecosystems. Organize students into groups of three to five “conservation biologists.” Have each group measure and mark off a  $1\text{m}^2$  area with string on the floor or a table. Give each group an ecosystem bag and have the groups scatter the organisms from the bag throughout their quadrats. Review the types of ecosystems that the bags represent, but don’t tell them which ecosystem their bags represent.
4. Have each group count the different types of grasses, insects, etc. that they found in their ecosystem (ex. 3 types of grasses, 4 types of wildflowers) and record this data. *How many different species are in each ecosystem bag?* This is **species richness**. Compare the species richness for each ecosystem. *Which has the greatest number of different species? The least? Why? Why is this important?*
5. Determine the total number of all organisms found. Divide the number of each kind of organism (ex. grasses) by the total number of organisms found. Multiply by 100 to get the percentage (%) **relative abundance**.

**Example:**

30 ants/120 individuals of all species in the plot =  $.25 \times 100 = 25\%$  relative abundance of ants

6. Compare the relative abundance of species for each ecosystem. *Which has the greatest relative abundance of grasses? of insects? Why? If the relative abundance of an area has a high percentage of weedy plants, what type of ecosystem might this area be? What if the area has a high relative abundance of grass and a very low relative abundance of insects? Why?*

## Part II

1. Go to the outdoor area selected for this activity. Assign, or have each group select, an area of the schoolyard for sampling. To focus on variation in species diversity, select different areas of the schoolyard for each group (i.e. a lawn, the edge of an asphalt playground, a garden, the edge of a forest, and pond). Numbers obtained from pre-selected areas should not be used to estimate the species diversity for the entire schoolyard. *To determine a species diversity estimate for a large area, quadrat or plot areas should be randomly selected (groups might toss a ball and sample the areas where the ball lands).* Tell students that during this activity, they will be determining the species diversity for different areas on their schoolyard. Divide the class into groups of 3-5 students.
2. Give each group one of the pre-prepared string quadrats. Have each group mark off  $1\text{m}^2$  with the string. When everyone has an area to investigate, have students measure the length of each side of the quadrat with tape measures and place popsicle sticks or stakes in each corner. You may want to check these measurements. Tie one end of the string to one stake.



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3. Instruct students to observe their plot and determine the total number of different types of species in their quadrat (species richness). Students don’t need to identify each species, but they should write a brief description (i.e., trees with diameter smaller than 3 cm, stiff grass, clover-shaped weed, ant, etc.) and sketch each kind of organism they find. Encourage them to observe carefully, examining the soil, in between grasses and other plants—but not to pull out or remove anything.
4. After they have recorded the species types they find, instruct each group to count all the organisms of each type inside the quadrat. Have students record their findings in a chart.
5. Have students calculate the species richness and relative species abundance for each species found. Share results. Create a class chart on a board or flipchart, showing where the quadrats were located and the “species biodiversity” for each quadrat.
6. Ask students the following questions: *What did you discover? Why do some study areas have more species than others? Which study area had the greatest species richness? Greatest relative abundance? Why? What could change the types of species living in each area? What would happen if one of the species disappeared? What would happen if that species was a major food source for an endangered species? For any species? How could the species diversity be increased?*
7. If your class is interested in determining the species diversity

for a large area, as a group have students measure the length of the sides of the larger site under investigation. Calculate the area (in square m) of the site by multiplying the average of the length and the average of the width. How many of the quadrats would fit into this larger area? Divide site area by the area of a single quadrat to find the quotient. To determine an estimate of the biodiversity of the entire site, multiply the number of all species found in a single quadrat and the number of quadrats that would fit into the entire site. Express the species biodiversity as the number of species per total site area.

8. Compare each student's or group's species biodiversity estimates. Ask students the following questions: *Were everyone's estimates the same? Why or why not? Was there a problem with the sampling technique? With the uneven distribution of the organisms? Did groups with quadrats in different areas of the schoolyard get different results? Why or why not? What are benefits of using this method? What are drawbacks? Do you have any suggestions for making the sampling technique more accurate?*



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## Modifications for Younger Students (K-2)

Take the students outside with a hula hoop, identify or have them identify several spots to sample, and conduct the investigation as one large group. Have students select plants and animals they see and draw them if possible. When you return to the classroom, count the species found together and help the students understand that this is just a sample of the entire area. What kinds of differences do they observe between the two areas?

## Modifications for Younger Students (3-4)

Have students use a hula hoop instead of string for their quadrats. Create species richness and relative abundance graphs as a class.

## Modifications for Older Students (5-8)

- Have groups calculate the total area of the schoolyard (or the section used in this activity). Calculate the area by multiplying the length and the width of the section being

studied. Determine an estimate of relative species abundance by multiplying the number of all species found in a single quadrat and the number of quadrats that would fit into the entire area. Express the result as number of species per total site area. Compare each group's estimates. Were they the same? Why or why not? Is there a better way to determine an estimate (calculate the average relative species abundance first)? What are the benefits of this process? Drawbacks?

- Compare the relative species abundance of native and introduced species found on the schoolyard. Monitor and record changes in species diversity over time.

## Assessment

Discuss (or write a school newsletter article on) the species and ecosystem diversity of the schoolyard. Compare the species diversity of the schoolyard to other ecosystems.

*Portions of this activity adapted with permission from the Botanical Research Institute of Texas.*

# Site Inventory Overview

After the Habitat Team has been formed, and a vision for the Schoolyard Habitats project has been developed, it's time to engage students in a study of the schoolyard in its present state. This assessment of the schoolyard is called a "site inventory" because it includes taking an inventory of various components of the schoolyard.

The purpose of the site inventory, and analysis of the information collected, is to discover the opportunities and constraints of your site. Analysis of this information and other relevant site conditions help the Habitat Team make decisions about the design and use of the habitat.

Before you decide on a location for your habitat project, you will need to investigate your school grounds thoroughly to decide where the best location will be. The inventory and analysis process will make you aware of many schoolyard features which may not be readily apparent.

## BASE MAP

Try to obtain a site plan of your school. This plan will show most existing features such as all buildings, fence lines and property lines, sidewalks, driveways, parking lots, bus circle, playing fields, utility easements etc. This will reduce the amount of drawing you will have to do, and once you have determined the best site for your habitat, it may also reduce the amount of measuring (or provide accurate numbers against which to compare student-made measurements).

If you are unable to find a copy of the site plan, you will need to create a rough base map from scratch by sketching the school grounds and recording on the map all of the information described above (i.e. sidewalks, playing fields, etc.).



Once a base map has been created, all students and adults involved in completing the site inventory will use copies of the same base map to record their inventory findings. In this way, everyone will have an identical frame of reference when noting new information.

The process of creating a base map, and taking an inventory of sun and shade, soil, topography, human use, and vegetation of the site, can be completed with grades K-12 and adults. Teachers of grades K-8 should look to Basic Site Inventory (p.86) and teachers of grades 9-12 should look to Advanced Site Inventory (p.97) for guidance. See Appendix E, p. 174, for strategies your Habitat Team can use to develop a base map.

# Basic Site Inventory

## Summary

*Students create a base map of the schoolyard, then conduct a site inventory of the grounds, mapping the physical and human elements. Students then assess the schoolyard for its habitat potential and identify a site for a Schoolyard Habitats project.*

## Grade level:

5-8; K-4

## Time:

3-7 class periods (depending on size of class, team structure, and size of area to be mapped)

## Subjects Science:

Math, Geography, Art, Science

## Skills:

Research, analysis, observation, description

## Learning Objectives:

Students will be able to:

- Identify existing natural and artificial characteristics of available land
- Create a basic map of the area
- Select an appropriate site for the creation of a habitat area within the land available

## Materials:

- Field guides
- Paper and pencils

- Clipboards (if available)
- Compasses
- A large poster or interactive creation to show different parts of compass
- Sample site maps or drawings
- Worksheets, p 27-33
- Overhead projector and transparencies—or—graph paper, poster board or butcher paper (see note at end of activity if a projector is not available)
- Different colored overhead transparency markers,—or—crayons, and/or colored pencils
- Rulers and markers
- Journals
- Thermometers

## For younger participants:

(see note at end of activity)

- Field guides with large color pictures
- Butcher paper or cardboard
- Colored clay, construction paper, and/or building blocks
- Odds and ends to represent different parts of site
- Scissors, glue

## Procedure

1. Go out on the school grounds or site at various times during the day. Have students consider the following questions and make notes in their journals. If they do not yet have journals, they should create simple ones.
  - *How do you feel when you are at the site?*  
*Comfortable? Exposed?*
  - *Where is your favorite place?*  
*Why?*
  - *Where is your least favorite place?* *Why?*
  - *Where are the best views?*
  - *Where is the quietest spot?*  
*The noisiest spot?*
2. Tell participants that they will all help to create a base map of their school grounds or site. This map will include many different features of the site. Explain the following process: Students will begin by creating a very simple map together, and will learn how to orient themselves using this map and a compass. The next part can be done in a number of different ways. Depending on the size and level of your group, and time available, you may wish to have all your students do each activity, perhaps one each class period. Alternatively, you may wish to divide your students into small teams, each charged with investigating and mapping a different feature. When all groups have finished conducting their research, they will assemble everything together to create one very detailed map. Show sample maps or drawings to illustrate each feature that a team will map.

# K-8 ACTIVITY

3. Construct an outline map of the site as a group. The students can help create this map, but you should make sure that it accurately reflects what the site looks like. The outline map should be a fairly simple sketch of the area (see samples). Identify an appropriate scale. The map should include all borders, such as property lines, sidewalks, roads, etc., and any large permanent features such as buildings (showing exits and entrances), fences, power lines, and ball fields. The outline map can be drawn on a transparency and shown on an overhead projector (if an overhead projector is not available, or if the majority of students are 4th grade or below, see notes at end of this activity).

4. If the outline map is on a transparency, create one copy per group on white or solid colored paper and place them each on a separate clipboard. Put an overhead transparency on top of the outline map. Students will map directly on the overhead transparency and not on the base map itself.

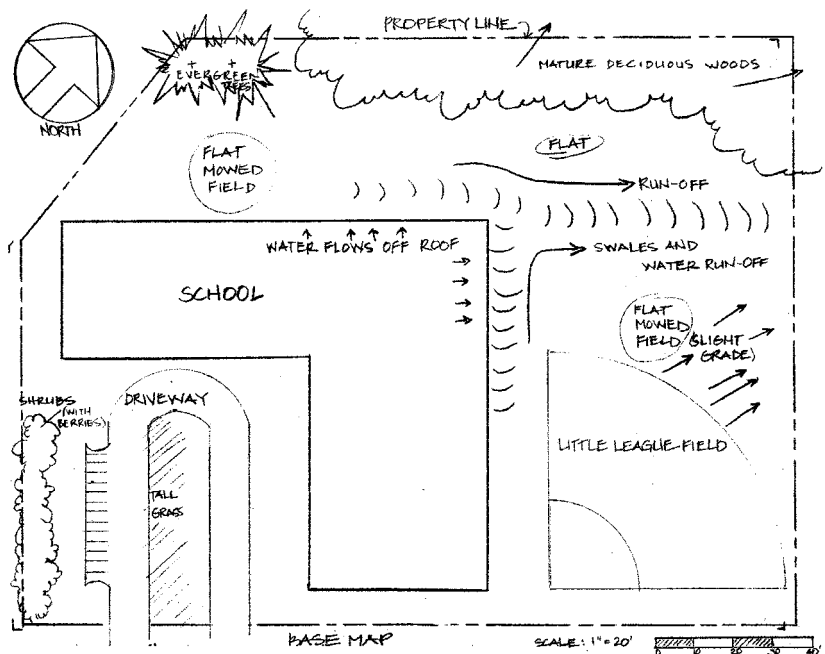
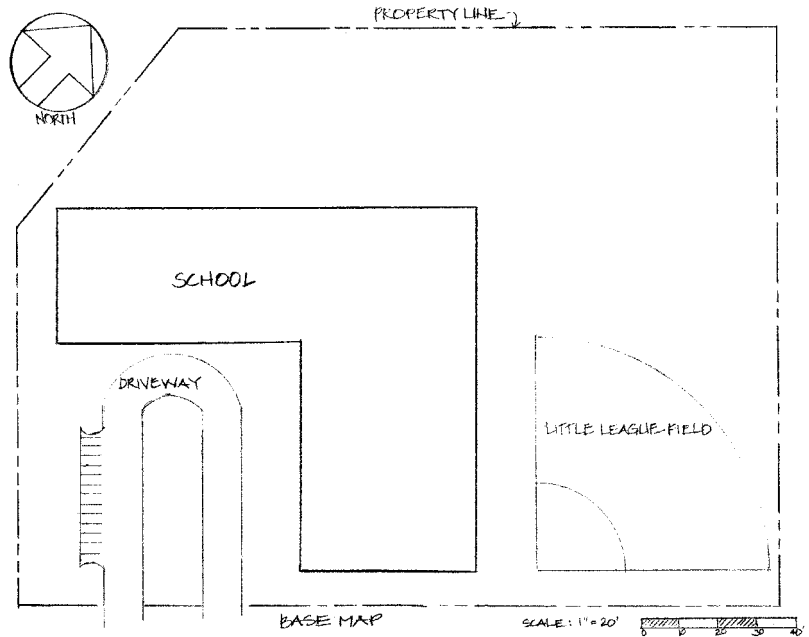
5. If you are using teams, divide students into small groups. If possible, assign a volunteer or older student to assist each group. Explain to students that each team will be responsible for mapping different features of the site. You will need the following teams:

- Traffic Patterns Team: to study foot, auto and bicycle traffic on your site
- Water Flow/Topography Team: to observe contours and slopes of the site
- Existing Vegetation Team
- Soil Team
- Sun/Shade Team

- Adjacent Land Use Team
  - History Team
- Consider encouraging each team to come up with a name for itself, relating to what it will do.

6. Show the outline map to students and explain what they see in detail. Students should be able to identify several landmarks on the map.

7. Give each group the appropriate inventory sheet to assist in the investigation. Go through each sheet and explain what each item is and why it may be important. For example, traffic patterns are important because you do not want your habitat site in the middle of a high traffic area. Give each team a different colored overhead



# K-8 ACTIVITY

marker to map its assigned feature. Each type of site feature should be drawn in a different color to avoid confusion. Encourage all group members to help draw the site feature on the transparency.

- Hand out clipboards and a compass to each group. Make sure at least one leader or volunteer is familiar with using

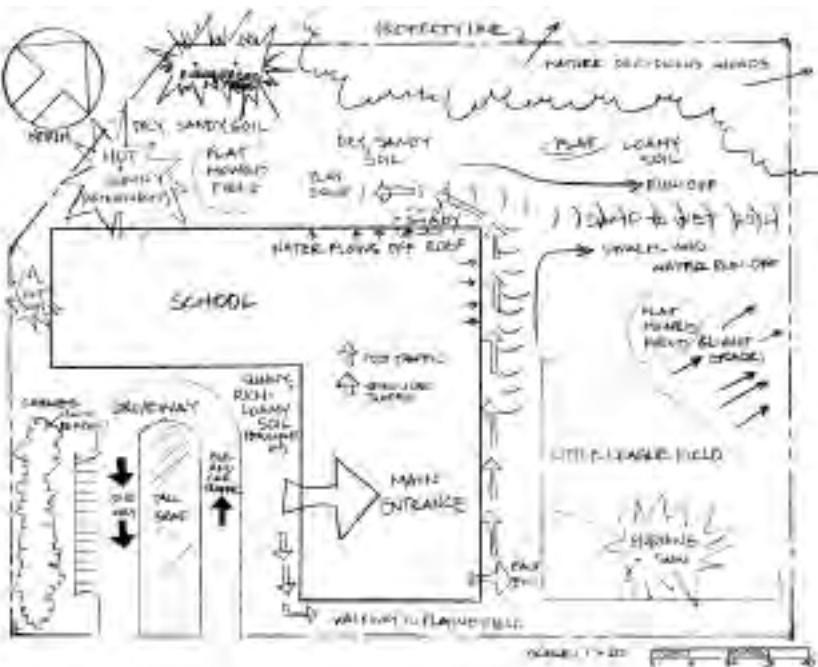
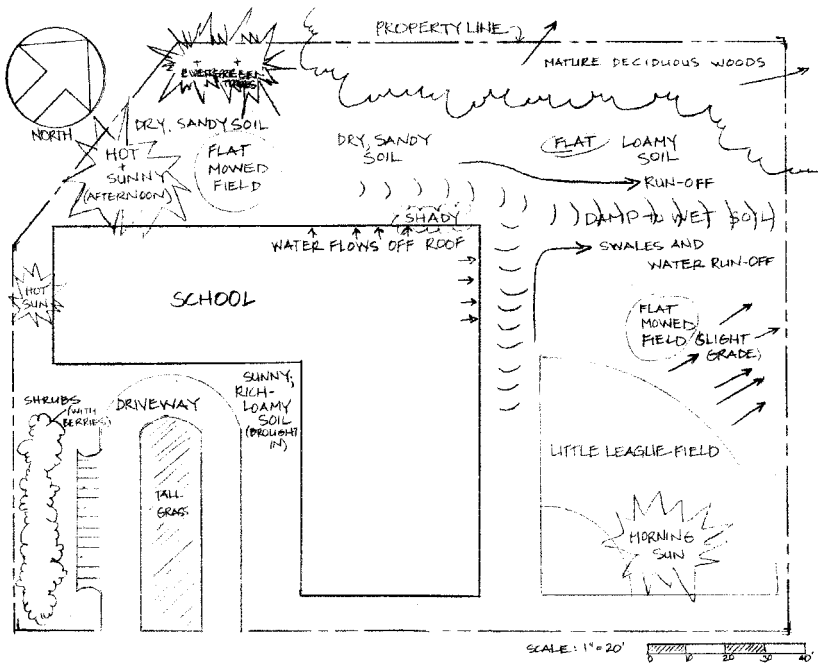
a compass before beginning this exercise. Explain to participants that once they are outside, they should try to locate north with the compass, and then find it on the map. If anyone does not know how to use a compass, be sure to explain clearly how it works. Depending on the level of your students, you may want to do a separate compass activity

prior to beginning this activity.

- Once outside, show participants how to use the compasses, and let them try to figure out which part of the map points to the north. Tell them to find a corner of the map, draw a small arrow on it so that the arrow is pointing north, and label the arrow with the letter "N". Check and make sure that the arrows are all pointing the same way, and that each group can name a few of the features on the map before going to the next step. Participants need to know where they are in relation to things on the map so that they draw their feature maps in the same direction.

- Once groups have finished with their site feature maps, bring them back inside and place the base map on the projector. Put each feature map (i.e., traffic pattern, soil) on the projector one by one. Have groups explain what their maps show. If participants are working from a piece of graph paper, have them share and discuss maps with class. Ask students to think about how their findings might affect their habitat decisions.

- After discussing each transparency individually, place all the transparencies on the projector one at a time until they make one very detailed map. Ask students if all the maps together show them a good location for their project. Wrap up by reinforcing the importance of the site map. Ask the participants if they learned anything about the site that they did not notice earlier. What can they do with this information? Explain that they are now ready to move on in selecting and planning a site.



*Note: If an overhead projector is not available, create the base map on a large piece of poster or butcher paper. Make small copies of the base map on pieces of graph paper and have these serve as the site feature maps for participants. Another option is to put tracing paper over the graph paper so that the base map can be reused. When everyone gathers together after they have investigated their site features, have them explain their investigations and methods, present their findings and conclusions they have drawn from their work, and draw their part on the large map.*

## Adaptations for Younger Students (K-4)

Students in grades K-4 may have trouble understanding the abstract qualities of a two-dimensional map. For this age group, consider making one large three-dimensional model of the school building, out of blocks or other materials. Take students outside to assess the various inventory components. Then use symbols (i.e., blue construction paper for water) to represent what they found. Have students place these symbols around their model to show the results of the class inventory. When everything has been incorporated, ask students what they learned about their site. Wrap up by having students look for patterns in their model that might point to a good place to put their wildlife habitat site.





# Traffic Pattern Team

## K-8 WORKSHEET

Team Name: \_\_\_\_\_

### Look for:

1. Use of the site by people on foot: (i.e., Where do people gather, walk, etc.?) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. Bicycle use: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. Auto use: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

4. Any pathways or wildlife trails: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Did you notice any traffic patterns? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

How might these traffic patterns affect the location of a potential habitat site?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Were any questions raised by your investigation? How might you try to answer your questions? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Topography Team

## K-8 WORKSHEET

Team Name: \_\_\_\_\_

1. Do you observe any hills, valleys or slopes? \_\_\_\_\_

\_\_\_\_\_

2. Where does water flow when it rains? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Are there areas that usually hold puddles? \_\_\_\_\_

\_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. On your map, make note of any pipes, storm drains, and sewers.

5. How often does it rain in your area: \_\_\_\_\_

\_\_\_\_\_

6. How much rain does your area get per month? \_\_\_\_\_

\_\_\_\_\_

7. What questions do you have about the shape of your area and how it will affect your choice of site? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How will you answer these questions? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Vegetation Team

## K-8 WORKSHEET

Team Name: \_\_\_\_\_

**Do a survey of the vegetation at your site. Note each observation on your base map. Do you see:**

- 1. Deciduous trees (those that lose their leaves in fall)?  Yes  No
- 2. Evergreen trees (those that keep their leaves or needles, all year)?  Yes  No
- 3. Shrubs?  Yes  No
- 4. Long or short grass?  Yes  No
- 5. Natural areas?  Yes  No
- 6. Landscaped areas?  Yes  No
- 7. List different species of vegetation you see. Are they native to your area? (specific species) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

- 8. Are there more of one species than another? Why do you think that might be?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 9. What do you want to know about the vegetation that you've found here? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





Soil Team

K-8 WORKSHEET

Team Name: \_\_\_\_\_

Instructions: Gather at least 5 soil samples from different areas of your schoolyard on a day at least 3 days after the last rain. Pick areas that have different kinds of vegetation growing, or different topography—such as a hill, by a stream, under a tree, on the open ground, etc. Compare the color, texture, and moisture content of each sample. The pH measures how acidic the soil is; this determines what kind of plants can grow there. If possible, obtain pH-testing materials for gathering this information.

SAMPLE #	COLOR	TEXTURE (SAND, SILT, CLAY)	MOISTURE	pH

What questions do you have about the soils you found at your site? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How might you start to answer them? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_







## History/Local People Survey Team

## K-8 WORKSHEET

Team Name \_\_\_\_\_

### Instructions:

In your group, generate a list of questions about your site and a list of people you think might be able to help you answer them, or whose opinions you would like to consider. Before the interview, make up an interview sheet, with all your questions written out, and with room for answers. Conduct an interview with each person (at least 3 different people), recording their answers carefully. Be prepared to present your findings to the whole group. Some ideas are below, but add your own—these are only to get you started!

### People to interview:

- |   |   |
|---|---|
| <input type="checkbox"/> Long-time town resident                        | <input type="checkbox"/> Local business people        |
| <input type="checkbox"/> Principal                                      | <input type="checkbox"/> Local nature center director |
| <input type="checkbox"/> Parent who attended your school many years ago | <input type="checkbox"/> Urban forester               |
| <input type="checkbox"/> Local farmer                                   | <input type="checkbox"/> Long-time teacher            |

### Sample questions:

How long has this site been here?

What was here before?

What species of wildlife did you see here many years ago?

What do you think of creating a wildlife habitat here now?

Do you think it would help or hurt the local community?

Do you have any concerns about a habitat site here? What are they?

Can you recommend any resources that might help us with this project?

# Advanced Site Inventory Activity

## Summary:

*Students investigate various elements of their Schoolyard Habitats site, including climate, land use, and human impact.*

## Grade Level:

9–12

## Time:

2–3 class periods

## Subjects:

Biology, Environmental Science/Studies, Geography

## Skills:

Observation, Investigation, Data Processing, Critical Thinking

## Learning Objectives

Students will be able to:

- Examine factors influencing suitability of a potential Schoolyard Habitats site
- Observe various physical and environmental characteristics of the site
- Record and critically examine data

## Materials:

- Schoolyard Habitats Site Inventory worksheets (p. x)
- Testing kits for pH
- Thermometers

## Background

Potential Schoolyard Habitats sites are affected by many factors: climate, topography, land use, and even the site's history. Before deciding which native plants you will use to attract wildlife to your Schoolyard Habitats, conduct the following site inventory, a comprehensive survey of all the factors, both physical and environmental, that will affect the project. Factors to investigate include the site's topography, soil, existing vegetation, sun and shade, as well as historical and current land use.

## Procedure

Divide the class into small groups. The class can focus on a small section of the schoolyard, with each group completing each part of the inventory; or each group can be responsible for a different component. Each group's findings should be added to the base map created in Part I to generate a total picture of the current uses and

features of your Schoolyard Habitats site. Findings can be written directly on the base map or on transparencies that can be placed directly over the base map. If each student group is responsible for a different inventory component, make sure that all groups first complete Part I: Topography together to ensure that everyone begins with a base map of the same scale. (See Appendix E for information on base mapping strategies.)





## Advanced Site Inventory

## 9-12 WORKSHEET

### Part I: Topography

1. Measure the dimensions of your Schoolyard Habitats site. \_\_\_\_\_
2. Describe the size and location of any hills, valleys, or slopes on the site. \_\_\_\_\_  
\_\_\_\_\_
3. Determine run off paths for rainfall. Note any areas that usually hold puddles. \_\_\_\_\_  
\_\_\_\_\_
4. How often does the site get rainfall (approximately)? \_\_\_\_\_
5. How much rain does the site get per month? \_\_\_\_\_ per year? \_\_\_\_\_
6. How will the shape of the site affect your potential habitat plans? \_\_\_\_\_  
\_\_\_\_\_
7. When you have finished this section, create a base map of the site, using the contour and water runoff information above. Include any pipes, storm drains, and sewers on your map.

### Part II: Soil

Gather at least 5 soil samples from different areas of your schoolyard on a day at least 3 days after the last rain. Pick areas that have different kinds of vegetation growing, or different topography—such as a hill, by a stream, under a tree, on the open ground, etc. Compare the color, texture, and moisture content of each sample. Use pH-testing kits to determine the acidity of the soil in each location; soil acidity determines which kinds of plants can grow in a location.

SAMPLE #	LOCATION	COLOR	TEXTURE	MOISTURE	pH
1					
2					
3					
4					

1. Check native plant guides to determine which plants will grow best in your soil type. Make a list. \_\_\_\_\_  
\_\_\_\_\_
2. What other questions do you have about the soils found at your site? \_\_\_\_\_  
\_\_\_\_\_











# 9-12 WORKSHEET

## Part V: Site History

Knowing your site’s history is an important part of planning the site’s future. For example, if the site is located near an industrial center, soils may contain residues of chemicals generated by the adjacent industry. Generate a list of questions about your site and a list of people who you think might be able to help you answer them. Some suggestions are listed below.

Questions about your Schoolyard Habitats site:

1. How long has the site been here? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
2. What type of ecosystem was here before the school was built? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
3. Were any industrial centers near the site in the past? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

*Who Can Help:*

- Long-time town residents
- Principal
- Local farmer
- Local Businesspeople
- Long-time teacher
- County Planning Office
- Conservation District





## 9-12 WORKSHEET

### Part VI: Land Use

1. How is the potential Schoolyard Habitats site currently used? \_\_\_\_\_  
\_\_\_\_\_
2. How do your site's current neighbors use their land? \_\_\_\_\_  
\_\_\_\_\_
3. How might current uses, either on or near the site, affect your Schoolyard Habitats plans? \_\_\_\_\_  
\_\_\_\_\_

Note any buildings, bodies of water, forests, etc. near your potential site. Record findings in the chart below, as well as on your site map.

DIRECTION FROM SITE	LAND USE	POSSIBLE EFFECTS ON SYH SITE
<b>Example: N, S, E, W</b>	<b>Road</b>	<b>May generate fumes, noise</b>

### Part VII: Traffic Patterns

Observe your site on different days and at different times of day to collect the following information.

1. How do pedestrians use the site? (i.e., Where do people gather, walk, etc.?) \_\_\_\_\_  
\_\_\_\_\_
2. How do bicyclists use the site? \_\_\_\_\_  
\_\_\_\_\_
3. Describe any vehicle traffic on or near the site. \_\_\_\_\_  
\_\_\_\_\_
4. Describe any existing pathways or wildlife trails. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Describe any potential conflicts with this area for a Schoolyard Habitats project.  
\_\_\_\_\_  
\_\_\_\_\_

# Wildlife Where You Live

## Summary:

*Students conduct a habitat evaluation for creating a Schoolyard Habitats project.*

## Grade Level:

9—12

## Time:

variable

## Subjects:

Biology, Environmental Science/Studies, Geography

## Skills:

Observation, Classification, Data Collection, Data Analysis

## Learning Objectives:

Students will be able to:

- Observe animals and plants in the schoolyard
- Conduct a plot study on the school grounds
- Conduct a population study in a plot on the school grounds
- Compare the plant and animal life found in different plots on the school grounds
- Assess the quality of the school grounds as a wildlife habitat
- Alter the vegetation, soil, and water on the plots to study their effects on wildlife

## Materials:

- thermometers
- field identification guides
- soup cans
- stop watches

## Background

In this investigation, students will be spending most of their time outside and may need an orientation to field work and observation techniques. Spring and fall may be the most convenient times to conduct this investigation, but this can be done year-round. Remember that when you are outside, your students' attention will be drawn to whatever is happening around them. Take advantage of the "natural happenings" that attract their attention. See Site Inventory, p. x.

Plots or quadrats are widely used to sample habitat characteristics, to count animal numbers, and to count animal signs. Used in this way, plots represent small geographic areas (circular, square, or rectangular) that are the elements of the geographically defined population. The population size is the number of the geographic areas (plots) that would cover the entire study area. Usually sufficient time, money, and personnel to study the entire area are not available, so a subset of plots is used with the assumption that it is representative of the area. Any of the survey designs—i.e. simple random, systematic, stratified random, and cluster—can be applied (see Glossary, p. \_\_\_). For this activity, you are using the simple plot method. Feel free to use line transect and other plot methods.

## Procedure

### Part I

1. Divide your class into groups and have each group measure a one-meter square plot in different parts of the school grounds.
2. Give each group field guides to aid in identification of insects and plants they find in their plots. Students who find species they can't identify with the guides should describe or draw them for their records.
3. Each group will record information about its plot on the worksheet on p. 121. They will be counting the number of each species of plant and animal they find on the ground. In addition to recording information about plants and animals in the plot, students will record data about soil and weather conditions and how long each day the plot is shaded. It is important that they record all of this information accurately. The information they record will help them make other observations in Procedures 7, 8, and 9.
4. Have each group test the degree of soil compaction in its plot by pouring water through a can and timing the rate at which the water is absorbed. Provide each group with a soup can open at both ends. Each group should push the can into the soil about one inch, just far enough to reach below the surface. As a student pours one quart (or one liter) of water slowly into the can, allowing the soil to absorb it without spilling any over the can's rim, another student will

record the time needed for the entire quart (or liter) to be absorbed. By comparing the different rates of absorption at each plot, students will be able to get a crude, relative measure of soil percolation conditions at the school.



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5. While most students are working on their plots, assign two students to measure the area of the entire school grounds in square meters. They can do this by measuring the length of their stride and then pacing off the paved and unpaved areas of the school grounds. It would also be helpful for them to make a map of the grounds.
6. Once students have gathered their information, compare the plots.
  - Which plot had the greatest number of plants on it? Which had the fewest?
  - Which plot had the greatest number of animals in it? Which had the fewest?
  - In which plot was the greatest variety of animals found?
  - When and for how long each day was each plot shaded?
  - What, if any, similarities are there among the plots where no organisms were found? (Are they more exposed to the elements than other plots? Did they absorb water slowly? Do they have the same soil types?)

- *What are the similarities between the plots in which the most organisms were found?*
  - *What were the major differences between the plots with the greatest number of organisms and those with the fewest organisms?*
  - *Why might there be more of one organism in one plot than another?*
  - *Based on this information, which plot seems to be the best wildlife habitat?*
7. Choose one kind of animal or plant found in abundance on the school grounds for a population estimate. Earthworms or other small organisms, such as sowbugs, dandelions, slugs, or crickets are good selections for this population study. Have students follow this procedure:
    - Total the number of organisms found in each plot and divide it by the number of plots (this will give you the average population on a one-meter plot).



- Multiply this average by the number of square meters on the school grounds (this will give you the total estimated population of that organism on the school grounds).
  - Ask your students what other populations can be estimated using this method.
8. Discuss differences in the plots and try to come up with reasons why one might be a better wildlife habitat than another. *What could students do to other plots to make them better habitats? How do you judge whether one habitat is better than another?*
  9. Students should now manipulate variables they have observed by making changes (such as planting more grass or watering some plots regularly) that they think might improve the plots as habitat for the insects and other animals that live there. Make sure the plots are isolated in some way from disturbances by other students. Ask students to observe the plots over the next several weeks and compare them with their original observations. *How has improving the habitat for one species affected its quality for other species?* (To improve habitat for earthworms, for example, students could add mulch, water, and leaf cover to one of their plots.)
  10. Make sure the students keep accurate temperature and climatic records (wind, rainfall, cloudiness) during this period in order to analyze the effect of weather on the plots.

**Part II**

1. Let your students pick a common animal to study on a “scouting” trip outside.

Squirrels, robins, insects, starlings, rabbits, and chipmunks are

among the many common animals found in most areas. You may wish to assign at least two students to each animal, to increase the depth of the information collected.

2. Your students may want to use a field notebook to keep records of field observations (see p. x) about the animals they have chosen to study. Give them copies of the worksheet on the last page of this investigation to introduce them to a field notebook format.

3. Students should develop their own methods of recording the information they gather. Hold a brainstorming conversation for students to suggest the type of questions they would like to answer about their animal. Questions can include, but do not need to be limited to:

- How far does the animal roam from its home?
- Where does it live or build its nest?
- Where does it look for food?
- What does the animal do when it is frightened?
- What other animals or things is the animal afraid of?
- During what time of day is it most active?
- How does it react to people?

- Is the animal eaten by other animals?
- How does the animal react when another animal of its kind is close?
- How does the animal react when another animal gets near its home?
- How does the animal hide from enemies?

4. Allow plenty of time for observation and, if possible, send students out at different times of day. Some of this information may be difficult to gather through field observations, so allow them plenty of time for library research as well.
5. Compare information in class when the observation period is over. If some students studied the same animal, identify the differences and similarities in behavior that they observed. Refer back to relevant information on your plot survey. *How does the information from the plot survey affect their animals?*

Your class is now ready to conduct a survey of the school grounds to locate plants and animals that serve as food sources for the animals your students have studied, then find ways to improve the school grounds as a wildlife habitat by planting more of the trees, plants, or shrubs that the animals require.



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**Assessment**

The development of your students’ observation skills is more important than the information they gather during this exercise. The questions below will help you assess their development of those skills, and can provide a route to new experimentation. The suggestions that appear in parentheses after each question can help.

1. *What does your animal do when it starts to rain?* (If possible, have your students read the daily weather report and conduct their animal observations on a rainy day. They should be outside before a rainstorm is expected).
2. *During what part of the day does the animal eat? Sleep?* (Realistically, finding the answers to these questions can only be done over a weekend, when students have longer periods of time for observation).
3. *As you observed your animal, what did you notice it left behind in the way of tracks or objects that will help you recognize its presence when you cannot see the animal itself?* (Mammals are usually very shy of people and are not commonly seen. Biologists, however, recognize their presence in an area by looking for their feces, their tracks, and other signs. Your students may want to look in field guides to identify the tracks of their own animals if they have not already noted them in their field observations).





# Analyzing the Site Inventory

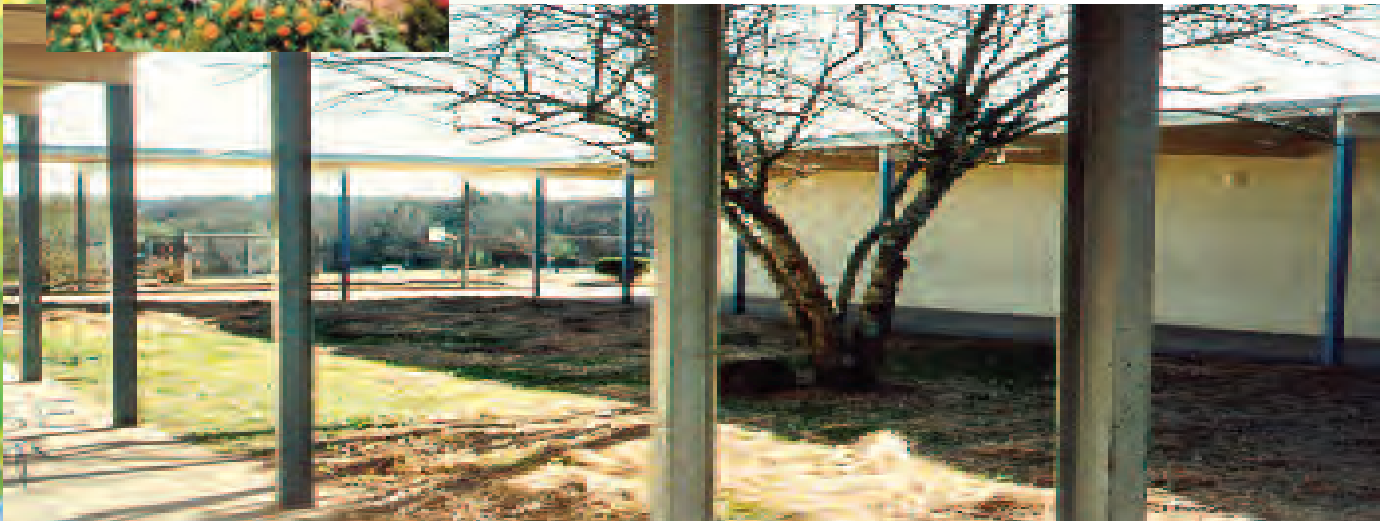
After completing the site inventory, it is time to assess your findings. This information will be helpful in choosing the actual area of the schoolyard in which to locate your Schoolyard Habitats project, and in creating the final site design.

All students are capable of some level of analysis of the information; the depth and format for this assessment will vary by age. Grades K-2 can participate in a teacher-led discussion, in which they consider the effects of some of their findings on their future habitat design decisions. For instance, if they find that the entire schoolyard receives full sun all day, they can discuss that this will mean that they won't be able to choose plants which require shade when selecting plants.

Older students will be able to go farther in considering their more detailed data, and in making subsequent decisions regarding project design and choice of site.

## For instance:

- Their drainage analysis might say that water runs from the southeast corner of the main school building and collects in a low spot along the fence line in the southeast corner of the schoolyard. This may lead to their conclusion that this area will be suitable only for plants that can tolerate periodic flooding.
- A slope analysis might say that 70% of the site has slopes of 5% or less and is easy walking terrain. However, approximately 30% of the site to the north of the school building has steep slopes greater than 12%. Students may then decide that due to steep slopes to the north, the habitat should be situated south of the school building.
- A vegetation analysis might find that 90% of the vegetation on site is Bermuda grass, while a small pocket to the east of the building is dominated by native oak and elm species. Students may suggest that in order to increase and diversify habitat, more diverse plantings should be added and the amount of lawn decreased.





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therefore include information on wildlife species currently using the site, habitat elements currently being provided (food, water, cover and places to raise young), as well as findings regarding soil, sun/shade, vegetation, and current human use of the site.

Next, the specific site should be selected based on these summaries. Also consider the accessibility of the site (see *Accessibility Guidelines*, p. \_\_ ) and the vision and educational goals you seek to meet through your Schoolyard Habitats project.

- A historical land-use analysis might reveal that the area to the west of the parking lot was, in the past, used as a land-fill. Students may recommend avoiding the area for safety reasons, or bringing in an outside resource person to assist with soil testing before that area is considered for use in the habitat project.

## SITE SELECTION

At this point, students and/or adults should write and/or draw a summary of their findings, both about local wildlife (for K-8, from *Habitat Hunt* p. 74 or for 9-12, from *Who Can Live Here?* p.77 ) as well as the site inventory. These summaries will

### Example:

Perhaps your site inventory identified only a small area of vegetation beyond turf grass. This small area of bushes at a corner of the schoolyard may be an excellent place to start. Your students have observed local and migratory birds feeding on the fruits of these native shrubs. These also provide a source of cover from potential predators. The clump of shrubs could immediately be augmented by a few young trees, hummingbird-attracting flowers, ground cover and a water source. The paved, flat sidewalk already in place to this area would give instant access to all students. In this case, it may well be better to start here than in a middle of an otherwise barren stretch of grass in the middle of the schoolyard.