Activity 1-3
Backyard BioBlitz

AT A GLANCE
Answer an ecoregional survey, then take a firsthand look at biodiversity in your community.

OBJECTIVES
Name several native Illinois plants and animals and describe your local environment. Design and carry out a biological inventory of a natural area.

SUBJECTS
English language arts, science

SKILLS
gathering (collecting, observing, researching), organizing (classifying), analyzing (discussing, questioning)

LINKS TO *ILLINOIS BIODIVERSITY BASICS* CONCEPTUAL FRAMEWORK
species diversity

VOCABULARY
ecoregion, gall, ground-truthing, migration, native species, noxious, precipitation, rapid assessment, sampling

TIME
Part I—long-term project
Part II—two class periods

MATERIALS
Part I—copies of "Ecoregional Survey" for each student and for each group; field guides; and other research materials

Part II—copies of "BioBlitz Survey" for each group; (optional: thermometers; magnifying glasses; binoculars; and field guides)

CORRELATION TO COMMON CORE STANDARDS AND NEXT GENERATION SCIENCE STANDARDS
English language arts: Writing Standards for Literacy in Science, Production and Distribution of Writing, 4
science: MS-LS2-5

You don't have to travel to the rain forests of the Amazon or the coral reefs of Australia to discover biodiversity. Just walk out the door, and you'll find an amazing diversity of life in backyards, vacant lots, streams and ponds, fields, gardens, roadsides and other natural and developed areas. In this activity, your students will have a chance to explore the diversity of life in their community. They'll also get an introduction to how scientists size up the biodiversity of an area—and why it's so hard to count the species that live there.

BEFORE YOU BEGIN! PART I

You will need to gather field guides and other resources about your area. To best prepare your students for this activity, acquire resources in advance. Suggested Illinois resources can be found in the "Resources" list with this activity (page 36). You can use the "Ecoregional Survey" as it is written, or you can adapt it more specifically to your area and situation. You'll need a copy for each student, plus one copy for each team of four to five students. You'll also want to take the survey yourself in order to generate possible answers.

WHAT TO DO! PART I

An Ecoregional Survey
In this part of the activity, your students will get a chance to complete an "ecoregional survey." It is designed to get them thinking about their local area, the plants and animals that live there, and some of the factors that may affect where and how plants and animals live in your region.

Because some of the questions can require a good amount of research, Part I can be turned into a long-term project. Student groups can be assigned a particular set of questions or the entire survey to answer. Most of the answers can be obtained by using the resources listed in the "Resources" list but encourage the students to conduct other forms of research. Local nature centers, museums, libraries and the Internet can be great resources.

1. **Take the ecoregional survey.**
   Give a copy of the "Ecoregional Survey" to each student and review any unfamiliar terms, such as native and introduced species. Then give students

about 10 minutes to complete the survey. Afterward ask the students how they think they did. (Don't share possible answers at this point.) Collect the completed sheets as a pretest of the students' knowledge.

2. **Divide the class into teams to complete the survey.** Divide your class into teams of about four students each. Give each team a clean copy of the Ecoregional Survey. Tell the students that the members of each team should work together to complete the survey as accurately as possible. Explain that the students can use whatever resources they can find to answer the questions, including the resources listed on the "Resources" list, additional resources you gathered, the library, the Internet, community elders or a local naturalist. Stress that they should find the most accurate information they can and encourage them to collect drawings or pictures of the animals and plants they list.

3. **Set a time limit on research.** Give the students at least two days to find answers to the questions. If you plan on doing the entire "BioBlitz" activity, this is a good place to stop and skip ahead to Part II. Research for the "Ecoregional Survey" should be done as homework on the days you spend on Part II, the "BioBlitz Survey." By the third day, Part II should be completed. You can go over the "Ecoregional Survey" results from their research as a wrap-up for this activity.

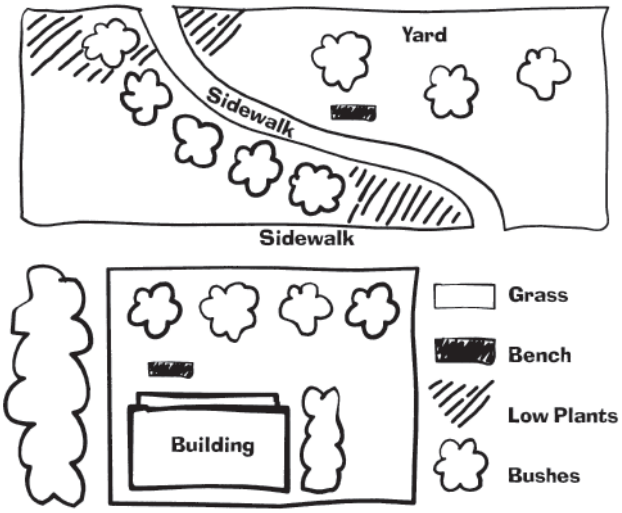
4. **Go over the survey results.** Once the students have finished the survey, have them share the information they found and compare their answers to the pretest. Did students find different answers to some of the questions? (For example, how extensive was the group's list of native plants?) What sources proved to be the most helpful? Were they surprised by any of the information they found?

The survey discussion can also be used as the wrap-up to Part II and as a way to discuss things the students observed during the "blitz."

BEFORE YOU BEGIN! PART II

You will need to find a nearby natural area where the students can conduct their "BioBlitz Survey." School grounds, a nearby park or the grounds around a neighborhood nature center can all work. Just be sure that your area is safe for your students (no broken glass or other hazards) and that you have the permission of the owners, if needed. For example, if you're using your own school grounds, you probably don't need permission, but if you're using a nearby city park, you should check with the city parks department first. You will also need to sketch a quick "site map" for the students. This map should show the boundaries of the study area and a rough delineation of different plant types. For example, areas with shrubs would look different from grassy areas (see sample below).

Be sure to have a copy of the "BioBlitz Survey" for each student (optional: thermometers; magnifying glasses; binoculars; and field guides).



WHAT TO DO! PART II

A Look at Biodiversity

In this part of the activity, your students will have a chance to go outside and take a firsthand look at biodiver-

Getting to Know Biodiversity

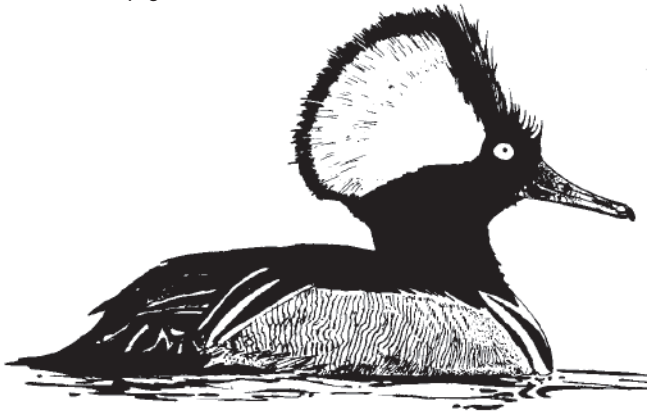
When scientists want to know what lives in a particular area or region, they rely on a number of tools and techniques. Here's a quick look at some of them.

Bird's-Eye View

Aerial photographs and satellite images can give conservation biologists, wildlife managers and others a lot of information about a region. For example, different cover types such as coniferous forests, deciduous forests or grassy areas show up in these pictures as different colors or patterns. Scientists can use the photographs to delineate features on the ground before they ever visit an area. Knowing what grows on the ground can be useful for predicting where animals might be, whether areas could sustain certain animal populations, and for planning strategies to manage these populations. Scientists can also compare pictures taken at different times to look for changes in such things as forest cover and land-use patterns.

See It for Themselves

No matter how much aerial photographs or satellite images tell us about a study area, scientists like to visit the area to see for themselves if the information they gleaned from the photos is accurate. The process of going to an area to verify information is called ground-truthing. Ground-truthing gives scientists a firsthand look at the areas they're interested in and can help guide further studies.



Sampling

Scientists rarely have the time to identify every single plant and animal that lives in a particular area. And even if they did have the time, it would be extremely expensive for them to do so. For these reasons, scientists rely on statistics to get an idea of species diversity. The scientists look closely at only small portions—or samples—of the total area they're interested in. Then they use mathematics to extrapolate their findings to the larger whole. Scientists frequently use aerial photographs or satellite images to decide where to do their sampling. If an area they want to study is covered by both woodlands and grasslands, for example, scientists will take samples in both.

Fast Fact-Finding

In the race to save the world's biodiversity, scientists have developed methods to find out as much information about a particular habitat as quickly as they can. In such rapid assessments, teams of scientists work together. Each member of the team has a specialty, such as botany (plants), entomology (insects) or ornithology (birds). The team members travel to the study area together, collect as much information as they can in the short time allowed, including carefully collecting specimens of individual organisms, and then return to their laboratories or offices to sort out and identify what they found. Rapid assessments can be particularly effective in assessing the biodiversity of remote areas where it would be too expensive to employ researchers for more extended periods of time. However, rapid assessments provide only snapshots of what's found in particular areas and usually can't cover extensive geographic areas.

sity in their own local environment. Observation is very important in science. This activity is a great opportunity for students to develop their observation skills. Be sure that they use objective observations: facts only; no personal feelings; no value judgements; no assumptions; no bias; measure instead of guessing.

1. **Set the stage.**
   Ask your students to imagine that the school board is planning to add a greenhouse to your school. One factor that's important in the board's decision to build is how biodiversity might be affected by the development. The board is planning to meet in just two days to decide whether or not they should add the greenhouse to the school grounds, and it has asked the students for a list, or inventory, of all the species found on the site. (Rapid assessments are usually conducted because a decision about land use must be made quickly, and the species living on the land in question are being factored into the decision. If you're in a nonformal setting or if you can't use your schoolyard for the "BioBlitz," adjust the school board scenario accordingly.)

   What kinds of things would your students need to consider as they inventory the biodiversity of this area? List their ideas on the board or overhead. If the students don't suggest anything along these lines, ask them if there might be differences depending on the time of year. Would they expect to find the same species in areas covered by grass as in areas where trees grow? Do they think the relative numbers of individuals, or the population sizes, of each species might be important? Stress that knowing what lives in an area, knowing where different things live within the area and having an idea of the size of the populations of different living things are all important pieces of information that wildlife managers and conservation biologists try to find out when they investigate the biodiversity of different land areas. Save all the questions the students generate for the wrap-up (step 7).

   Ask your students how they think scientists find out answers to questions like the ones they've generated. *(Scientists may use aerial photographs, satellite photos and special maps; they may interview knowledgeable people and consult historical records; and they usually go to the areas of interest and look at the plants and animals firsthand.)*

2. **Explain the task.**
   Explain to the students where their study site is located and pass out copies of the "site map" you sketched earlier. Also distribute copies of the "BioBlitz Survey." Explain each of the different biodiversity categories listed on the survey sheet and give some examples of each.

   Divide the group into teams of four or five students and explain that the team members must work together to design a way to fill out their sheets as completely as possible in a relatively short time. Where are they going to look? What are they going to look for? How will they record what they find? Are they going to draw sketches of different species or take very detailed notes? How are they going to divide up the work?

   Tell them they will have only 30 minutes to work at the site and let them know that they are not to bring samples back. (Remind the groups that correct identification of different species is not a necessary goal of this activity. "Green needle tree" and "shiny red bug" are as correct as "white pine" and "ladybird beetle." However, depending on your group and the time you have available, you can teach your students to use field guides and incorporate accurate species identification into the survey.)

   Review the range of animal signs the students should look for ("Animal Signs to Look For"). Also review the "Do's and Don'ts of Field Work," adding any additional points needed for your particular area.

   Now give the students time to work in their teams to come up with their inventory plans: including roles; responsibilities (data recorder, observers, etc.); equipment needs and distribution among team members; and time allotment.

3. **Review the inventory plans.**
Once the students have designed their inventory plans, meet with each group independently and have the group explain its design. Make sure that each group has evenly divided the amount of work to be done among the group members, will be getting to all areas of the study site and has accounted for inventorying the full range of species types listed on its survey sheet.

4. **Conduct the "BioBlitz."**
Take the students to the study area and give them approximately 30 minutes to conduct their survey. Although identification is not the ultimate goal of this activity, you might want to have field guides available for students to use to help identify what they are seeing. Remind students of safety precautions and of the "Do's and Don'ts of Field Work." Have the students draw sketches or take photos of items that are hard to describe or identify. Students should not collect any materials.

5. **Finalize findings.**
Give the teams time to review their results and consolidate information. Have them make notes on the sketch of the area to indicate where certain things were found or where animals or plants were concentrated.

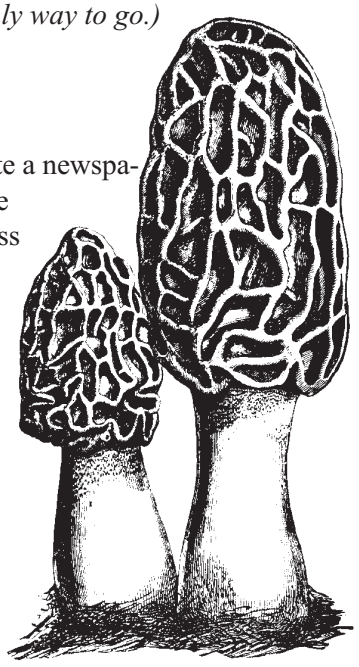
6. **Share results.**
Have the groups report on their findings and discuss the processes they used. How many different living things did they find? Where did they find different things? Did they find any native species? Nonnative species? Were species evenly distributed across the site or did the students find greater variety in particular areas? If there were distribution differences, where did they find the greatest diversity? Do they think that as a group they found everything out there? What factors might have affected the number of species they found? For example, would they have expected to find the same number and types of species if they'd done their "BioBlitz" at a different time of year? Or with magnifying glasses? Did one team have a way to complete the investigation that worked particularly well? What was the hardest thing about conducting their "BioBlitz?" Were they surprised by anything they found or didn't find?

7. **Discussion.**
Have the students look back at the questions they generated in step 1 of Part II. Based on their recent field experience, is there any other information they need to know about the land in order to make a complete inventory of its biodiversity? What kinds of organisms have they probably missed? Do they think these kinds of rapid inventories are useful? *(It's often difficult to find all the species in an area in a short amount of time. Because animals tend to come and go from different areas, they can be missed if the amount of time spent looking for them is too short. Very small or microscopic organisms can be hard to find and identify. Also, there are often seasonal changes in the organisms in an area, so an inventory conducted at one time of year might be very different from an inventory of the same area at a different time of year. But despite their problems, rapid inventories are often very useful because they are a way to quickly get a good idea of the diversity of species in an area. When time is short, a BioBlitz may be the only way to go.)*

WRAPPING IT UP

Assessment

1. Have each student write a newspaper article reporting the "BioBlitz" that the class



conducted. The article should identify which members of the teams played what roles in the blitz, logistics of their inventory plans and biodiversity results of their "BioBlitz."

2. Have your students write an article explaining the process they used to collect their data, including any conclusions they may have drawn during the activity. (Use the list of questions they generated in step 1 of Part II.)

3. Have student groups determine where the greenhouse should be located in the school area. This decision should be based upon the results of the "BioBlitz" and should be explained in a written report. The written report should explore the following areas: the specific location of the greenhouse; the biodiversity that would be affected by the proposed greenhouse location; impact upon biodiversity living in the entire study area; and suggested methods of recovering biodiversity lost from habitat removal.

Portfolio
The "Ecoregional Survey" and "BioBlitz" survey could be added to a portfolio.

Extension
If you use a natural area for this activity, you can have students keep track of changes in it from season to season and year to year by comparing their data with that collected by other groups in the past. You can also do an urban blitz to identify the plants and animals that live in a city block.

"One result of formal education is that students graduate without knowing how to think in whole systems, how to find connections, how to ask big questions, and how to separate the trivial from the important. Now more than ever—we need people who think broadly and who understand systems, connections, patterns, and root causes."

—David Orr, writer, professor

Resources

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Hogan, K. 1994. *Eco-Inquiry: a guide to ecological learning experiences for the upper elementary/middle grades.* Kendall/Hunt Publishing Company, Dubuque, Iowa. 400 pp.

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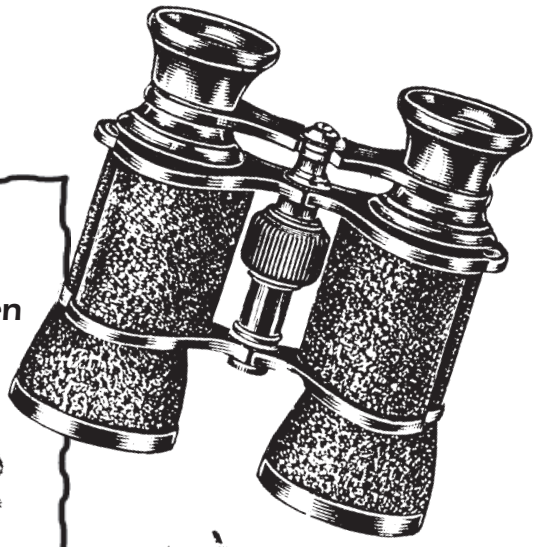

Animal Signs to Look For

In addition to looking for animals, keep your eyes open for animal signs. These signs include the following:

- burrows
- digging and scratching marks
- bones
- insect galls
- spider webs
- droppings
- runways and trails
- nests
- tracks
- feathers
- cocoons
- nibbled leaves and branches
- feeding holes in dead trees and logs.

Also, don't forget to look everywhere, including:

- on the ground
- in tree branches
- on plant stems and leaves
- under rocks
- on tree trunks
- in leaf litter
- under and around logs.

Do's and Don'ts of Field Work

Do's

- ✔ Do be sure that you have all the materials you need before you head to the study site.
- ✔ Do be a careful observer.
- ✔ Do take careful notes about what you find, including information about the locations and characteristics of plants and animals.
- ✔ Do handle animals with care—and handle them as little as possible.
- ✔ Do return animals you find to the places where you found them.
- ✔ Do replace logs and rocks to the position you found them.
- ✔ Do stay within the boundaries of your study area.
- ✔ Do try to identify unknown species while you're in the field.
- ✔ Do look for animal signs as well as actual animals.
- ✔ Do wash your hands carefully as soon as you return to the classroom.

Don'ts

- ✘ Don't damage trees or other plants by digging them up, ripping off leaves or tearing at the bark.
- ✘ Don't put anything you find—such as berries, leaves, mushrooms and bark—in your mouth. Also, don't put your fingers in your mouth until after you have returned to the classroom and washed your hands thoroughly.
- ✘ Don't chase after, yell at or throw things at animals you see.
- ✘ Don't touch animal droppings, dead animals, mushrooms or human refuse such as bandages, broken glass, rusty cans or needles.
- ✘ Don't reach under logs or rocks, crevices or other spaces if you can't see into them.

Student Page

Ecoregional Survey

How much do you know about where you live?

1. What major habitat type do you live in? (temperate forest, temperate rain forest, grassland, shrubland, taiga, tundra, desert and so on)

2. Name three native trees that live in your area.

3. Name five native edible plants that grow in your region and list in which season(s) each is available.

4. Name one poisonous plant that lives in your area.

5. Name 10 native animals that live in your region.

6. Name three native animals that you can see in your area at any time of the year.

7. Name three migratory animals that visit or live in your area and list in which season(s) you're able to see them.

8. Do white-tailed deer live in your area? If so, when during the year do they give birth?

9. How much average rainfall does your community get each year?

10. When (during what season or month) does your community normally get the most precipitation?

(—continued)

Student Page

Ecoregional Survey *(continued)*

11. *How long is the growing season in your community?*

12. *What is the average temperature in July? In December?*

13. *What are some natural signs in your community that show that the seasons are changing?*

14. *What body of water—lake, pond, stream or river—is closest to your school?*

15. *How has your area changed in the past 25 years? (Ask your parents or neighbors.)*

16. *What types of plants and animals lived in your area 10,000 years ago? What was the climate like then?*

17. *What species in your area—if any—are threatened or endangered?*

18. *What natural events or processes influence the land around your community? How have they affected the land? (For example, have there ever been glaciers, earthquakes or volcanic eruptions in your area? Do frequent fires, high winds or flooding shape where and how things grow?)*

19. *Are there any threatened ecological areas in your community? (Are any wetlands, rivers or forests, for example, in trouble?)*

20. *Name a nonnative species that has created problems in your community.*

BIOBLITZ SURVEY

Site _____ Date _____

_____ Weather _____

City _____ Temperature _____

State _____ Team Members _____

_____

Description (what the area looks like in general) _____

_____

SITE MAP

Student Page

Backyard BioBlitz (continued)

Plants

Insects

Mammals

Other Invertebrates

Birds

Reptiles and Amphibians

Other / Animal Signs