

Ecosystem Field Study

Ecosystems are characterized by a particular set of abiotic and biotic factors. In this field study, you will be part of a group that visits a local terrestrial ecosystem and document its abiotic and biotic features.

SKILLS MENU

- | | |
|-------------------------|-----------------|
| ● Questioning | ● Performing |
| ● Hypothesizing | ● Observing |
| ● Predicting | ● Analyzing |
| ● Planning | ● Evaluating |
| ● Controlling Variables | ● Communicating |


Purpose

To visit a natural or artificial ecosystem and collect data on the biotic and abiotic features.

Equipment and Materials

Note that you may not use all of the equipment listed below. Your teacher will tell you which pieces of equipment you will be using and demonstrate their proper use.

- compass and whistle
- map of field study site
- clipboard
- data recording sheets and field notebook
- anemometer (for measuring wind speed)
- thermometer
- soil thermometer
- sling psychrometer or hygrometer (to measure relative humidity)
- field guides to local flora and fauna
- digital camera
- binoculars
- sweep nets
- forceps
- magnifying glass or bug box
- gloves

 Take precautions if you have any particular allergies or reactions, such as to bee stings. Avoid poison ivy (Figure 1).

Take a whistle with you in case you become disoriented.

Never taste anything you find while in the field.



Figure 1 Poison ivy. Beware!

Procedure



Part A: Field Work—Abiotic Features

1. Spend 5 or 10 min walking through your ecosystem to familiarize yourself with its features.
2. If you do not have a map, make a rough outline sketch of your ecosystem indicating major features such as large trees, pathways, roads, and buildings.
3. Choose a location that seems representative of your ecosystem. Mark its location on your map or sketch.
4. Make and record measurements of each of the following abiotic features: ¹⁷¹
 - wind speed
 - temperature at ground level and at 1.5 m above the ground

- soil temperature
- relative humidity using a sling psychrometer or hygrometer
- percent canopy cover estimate as 0 %, 25 %, 50 %, 75 %, or 100 % (for use in comparing relative light availability)

Part B: Field Work—Biotic Features

5. Spend the remainder of your allotted time observing and documenting what species live in your area. Use field guides to try to identify each species. If you cannot identify some species, just record them as “unknown #1, unknown #2,” and so on. Write a brief description of each species in your field notebook. The purpose of this activity is to document and compare the variety of organisms present, not their names or abundance. While you are encouraged to learn the names of these species, their function in the ecosystem does not depend on people knowing their names. If available, use a digital camera to document as many species as you can. **C**

The following techniques should be used to find and observe life forms: **T/I**

- (i) Use binoculars to observe as many bird and mammal species as you can.
- (ii) Identify and record as many plant species as you can. Be careful not to overlook small plants. Take note of any fungi you see.
- (iii) Closely observe the surfaces of leaves, bark, and the ground for invertebrates. If available, use sweep nets to capture insects on vegetation and in the air. Use forceps and a magnifying glass or a bug box to have a closer view.
- (iv) Carefully look under logs or other objects on the ground in search of salamanders and other organisms. Be sure to return any moved object to where you found it. Handle all animals with gloves. Use great care because they are very easily injured. Return all organisms to where you found them.
- (v) If a small stream or pond is present, look along the water’s edge for additional plants and animals.

Part C: Back at School—Ecosystem Show and Tell

6. Working with your group, prepare a “show and tell” audiovisual presentation of your experiences in the ecosystem. Your presentation should portray the diversity of living things. Provide evidence of the abiotic characteristics at that location. Your presentation will be assessed for
 - thoroughness in highlighting both the abiotic and the biotic features of the ecosystem
 - creativity and originality
 - evidence of effective group work and cooperation **T/I** **C**

Analyze and Evaluate

- (a) How did the variety and size of producers compare with the variety and size of consumers in your ecosystem? **T/I**
- (b) How does your understanding of energy and food pyramids support and explain this observation? **T/I**
- (c) What kinds of producers seemed to dominate your ecosystem? **T/I**
- (d) Make a food web of the organisms in your ecosystem. **C**
- (e) Describe evidence of human influence or intervention in your ecosystem. **A**
- (f) If you were able to compare data from two ecosystems, write two summary paragraphs comparing their abiotic and biotic features. **T/I** **C**

Apply and Extend

- (g) Is there evidence that this ecosystem has remained unchanged for the last 10 years or 100 years? Explain your answer. **T/I**
- (h) Would you expect this ecosystem to look the same in 10 years? Why or why not? What about in 100 years? **T/I**