

Lesson



Exploring an Ecosystem Field Activity

How well do you know the environment around your home? In lesson 1, you practiced observing a natural area with all your senses. This lesson will take you back outside, where you will be documenting your observations in a different way. If you look at the word list for the Invent-a-Word activity in lesson 2, you will see the word stems from *ecology*. Together, they mean “the study of our house or home.” More specifically, ecology is the study of how organisms interact with each other and their environment. So what is this word *ecosystem* that is in the title of this lesson? Can you guess? An ecosystem is all of the living things and their physical environment in an area. Ecologists study ecosystems!

In this lesson, you are an ecologist. You are not just walking through the area where you may have passed by for years, noting that the grass is growing, there are bees in the clover, or the prickly pear cactus is blooming. This time you will be making more detailed observations, closely observing parts of your environment, with the goal of learning more about what is actually going on there.

It doesn't matter what season it is right now. If it is winter and the ground is covered with snow or everything appears “dead,” you can still do this activity. You will be revisiting this site two more times during the course of the year, and repeating the activity during different seasons. This will introduce you to the science of *phenology* (see the definition in sidebar), which is a topic of growing interest with climate change occurring throughout the world.

In this activity, you will notice that measurements are in meters. Science uses the metric system, so you will be using it throughout this course. The metric system is used throughout the world, and it provides a universally understood language. If you live in the U.S. or a country where the metric system is not commonly used, it is time to start practicing with it! It will be an advantage to you in the future to understand this common language of measurement.

ASSIGNMENT SUMMARY

- Conduct the field activity: Exploring an Ecosystem.
- Answer analysis and extension questions.

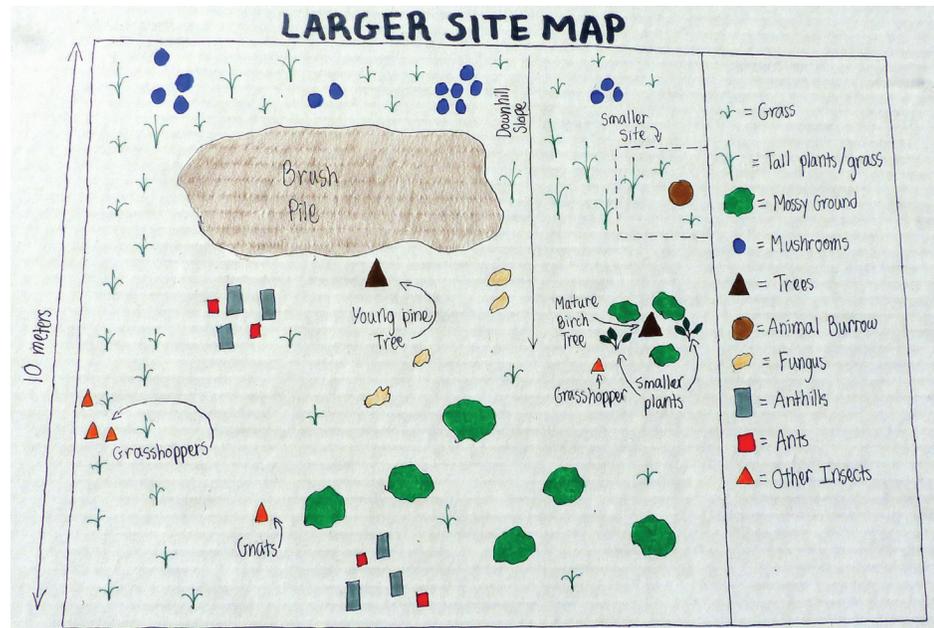
MATERIALS

- notebook for field notes
- felt pens or colored pencils of several colors
- pen or pencil
- 4–8 stakes
- string, about 50 meters
- tape measure or meter stick
- field guides to local insects and plants
- camera

Lesson 4

(continued)

e. **Maintenance:** Is the area maintained? If so, do you know how often the area is watered, fertilized, mowed, or treated with pesticides?

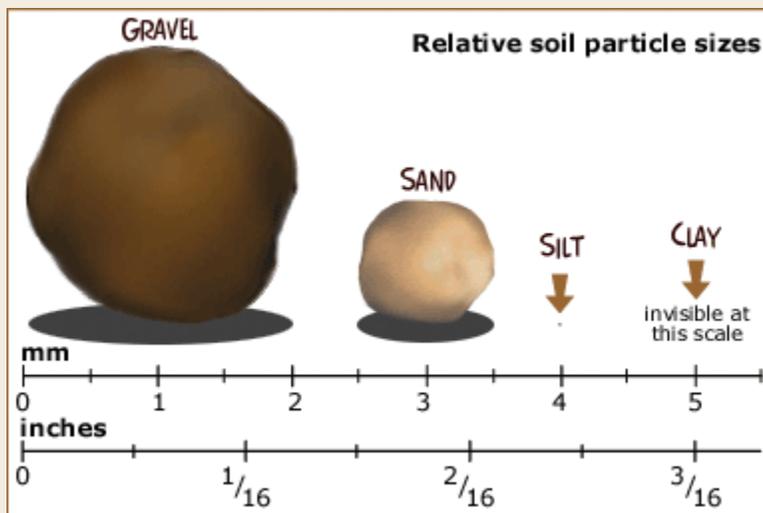


Credit: Jamie Masthay, Oak Meadow student, 2014

8. Now find a 2m x 2m area within your larger site that you would like to study in more detail. Stake out this area, and mark the boundaries of it with string. Draw the location of this smaller site on your larger site map.
9. Trying not to disturb the site, get right down on the ground and use your hand lens to inspect the area. Record the types of insects, plants, or other features that you see when looking close up.
10. Carefully collect a small sample of soil, and observe it with your hand lens. Describe the soil and any organisms you see living in it. Is the soil mostly sand, silt, clay, or is it loam? Is there organic matter in the soil?
11. *Extra credit (optional):* Prepare another, more detailed site map of your smaller site. Include a key specifically for this site.

Soil Types

Don't know the difference between sand, silt, and clay? It has to do with particle size. Sand is the most coarse, and feels gritty. Clay is extremely fine, doesn't drain well, and is harder to dig into. Silt is between these extremes. Many soils are a mixture of these, which is called *loam*. Loam is the best type of soil for plant growth. You may see organic matter (bits of decomposing plant or animal matter) in your soil. This is called *humus*. This image shows you the difference between the particle sizes of soil.



Credit: DiscoveryEducation.com

Lesson 4

(continued)

12. Take photos of your site, including close-ups of insects or plants that you can use to help you with identification later. These photos will also give you a comparison for when you revisit this field activity later in the course.
13. Look around at the area around your site. From a general visual survey, are there differences in the physical features or plant/animal life in the surrounding area compared to your site? Or is the entire area fairly uniform? Take brief notes on your observations; you will be answering this more fully in the analysis below.

Lesson 4 Analysis

(continued)

1. Using your field guides, identify as many of the plants or animals as you can.
2. Using your notes and your site map, prepare a written description of your 10m x 10m site. Write one paragraph.
3. Now describe the 2m x 2m site that you studied. Is this site characteristic of the rest of the large site?
4. Write a paragraph describing how your site compares to the area around it, as per the observations you noted in #13 above.

Extension

1. As the seasons change, the types of organisms that live in an area are likely to change as well. Predict how your area would change in a different season of the year. You will be exploring this later to see how accurate you are.
2. Describe at least two interactions between organisms on your site, or between an organism and its environment, based on your observations.
3. Based on your detailed observations and what you have learned about your site, think of a question that you could use for further investigation about your site. For example, you may want to consider the influence of humans (for instance, traffic or maintenance) on the site; study how two species interact (perhaps a predator/prey relationship); explore the effects of physical features, such as water or sunlight, on organisms; investigate larger animal traffic through the site; or explore a specific aspect of the site through the seasons. These are just a few of many possible examples! You may want to go “micro” and explore the fine details of a rotting log on the site.

Using the tools for scientific investigation that you learned in lesson 3, write a description of how you would investigate this topic. Please give specific details! Examples of details would be your times of observation, duration, frequency, etc. Remember, your investigation must be replicable. Since you are not required

Lesson 4

(continued)

research. Any time you raise your awareness of your surroundings, you become more “tuned in” to the world around you. Becoming a “noticer,” in the micro and the macro sense, can only help you as you go through life.

Why is phenology important? People who depend directly on the land to survive (as opposed to indirectly, which includes all of us), have seen changes in seasonal events in recent years because of climate change. In the tundra, people depend on the increased mobility that the frozen ground of winter provides to travel and hunt. What happens if winter comes late and leaves early? Different species of animals depend on the cycles of other animals for their survival. What if these cycles become out of sync because the timing of the seasons is different? The more baseline data we can gather about phenology, the more we can notice change when it happens, and predict the effects of future changes.

FOR ENROLLED STUDENTS

At the end of this lesson, please send your work from lessons 3 and 4 to your Oak Meadow teacher. Make sure your submission is organized and well-labeled.

Please submit all parts of this lesson to your teacher. You can either scan your handwritten notes, or type them into your Google course doc. Include your responses to all procedure, analysis, and extension questions, a photo or scan of your site map, and any photos that you have taken of your site. If you completed the extra credit assignment (a detailed site map of your 2m x 2m site), please include it with your submission as well.

Activity created by Julia West, Oak Meadow High School Faculty
oakmeadow.com