

# CURIOSITY AT HOME

## ECOSYSTEM SURVEYS



*An ecosystem includes all the living and non-living things in a geographic community. Practice observing an ecosystem near you at a park, schoolyard, or in your own backyard by conducting a survey of a small study area. What might that sample teach us about the ecosystem as a whole?*



### MATERIALS

- approximately 3 m (10 ft.) of rope (substitute: hula hoop, wire, string, or square frame)
- clipboard or other hard writing surface
- science notebook or paper
- something to write with

### PROCEDURE

- Find an area in nature that interests you and lay out your rope in a circle. This circle defines the small area you will study, called a quadrat.
- Make careful observations of what you find in the quadrat using some of the following options, or your own way of observing:
  - ◇ Journal about what you see, hear, smell or touch in the quadrat.
  - ◇ Make a table listing each type of plant and animal you find in the quadrat and tally how many of each you find in the study area.
  - ◇ Make a drawing of what you find in the quadrat. Use the “ABCDs” of scientific drawing when you make your sketches: Accurate, Big, Clearly labeled, and Detailed.
- Do you think there are any clues in your quadrat observations that might tell you something about the ecosystem as a whole? How many more quadrats would you want to study to get a better idea of what the whole ecosystem is like?



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### EXPLORE MORE

Biodiversity means all the different kinds of living things in an area. One way to measure biodiversity is by counting how many types of living things are in an area. How many different kinds of plants did you find in the quadrat? How about different kinds of animals?

- Print out or copy the chart below and color in all the bars up to the number of types of living things you found.
- Remember, with this method we are measuring the types of living things, not the number of living things. So, if you found five dandelions, an ivy plant and ten clovers in the quadrat, that would be three types of plants.
- Try using an app such as Seek or an identification booklet such as the Audubon Field Guide to help you identify and tell apart different plants and animals in the quadrat.

10			
9			
8			
7			
6			
5			
4			
3			
2			
1			
	Types of Plants	Types of Animals	Types of Fungi



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### WHAT'S HAPPENING?

It can be difficult to get detailed information about a large area like an entire ecosystem all at once. A survey is a tool many types of scientists use to collect information from a smaller sample of the whole study area, then use that information to make a good estimate, or guess, about what the larger area is like. Scientists who study ecosystems, called ecologists, can use quadrats to survey a region and learn more about the number, distribution and relationships of the organisms that live there. To get a good sample of the ecosystem, ecologists collect data from many different quadrats spread all over the area of study. To get a better sample of your chosen ecosystem, try collecting data on three or more quadrat areas. What similarities and differences did you find?



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### K-2 GRADE EXPLORATION

- Cut 1-2 pieces of paper into about 8 pieces each. Write down or draw a picture of each type of plant, animal, fungi and non-living thing (like rocks, water or dirt) found in the quadrat on each piece of paper. What are some ways you could sort these items into different categories? Try organizing them into groups, or ordering them in a row. What observable properties can you use to classify them (color, size, shape, etc.)?
- What kinds of animals would be able to live in the quadrat area? Does it have everything an animal would need to survive? Why or why not? Draw a picture of an animal surviving inside the quadrat area.
- Natural areas change over time. Draw pictures of what you think the quadrat area would look like in each season: spring, summer, fall and winter.



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### 3–5 GRADE EXPLORATION

- Choose a location for a second quadrat and compare the two quadrats by making observations. What similarities and differences do you notice between the two? Do you think putting the quadrats near each other, or far away makes a difference?
- What else do you want to know about the quadrat study area(s)? Maybe you are wondering if there are more ants or spiders present, or if there are more large leaves or small leaves in the quadrat? Perhaps you want to know which quadrat has more mushrooms?
  - ◇ Choose a research question you are curious about and see if you can answer it by making more observations of your quadrat(s). To make your research question measurable, try starting it with the following prompts:
    - » “How many...”
    - » “Are there more/less...”
    - » “Which quadrat...”
    - » Avoid questions that start with “Why...” or “How does...” You may be able to find the answers to these questions using other sources, but they will be difficult to answer using direct observations.
  - ◇ Record your results in your science notebook. Consider making a chart, graph or picture to easily share your results with others.



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### 6–8 GRADE EXPLORATION

- To get a more accurate and representative sample, scientists have to carefully consider how to choose the locations for their quadrat. How did you choose a spot? Was it an area that was easiest to get to? A spot that looked interesting? How do you think your method for choosing a spot might influence what you found in the quadrat?
- Practice using one of the suggested methods below for choosing quadrat locations, or come up with your own method to get a more representative sample:
  - ◇ Use a random number generator to give you a number between one and ten. Take that many steps forward and place your quadrat there.
  - ◇ Use a measuring device such as a yard stick and place each quadrat the same distance apart from each other.
  - ◇ Alternate placing the quadrat to your left, then to your right, repeatedly alternating left and right for each quadrat placement.
- Changes to a natural area can cause the biodiversity to increase or decrease. Find two locations for a quadrat, one with more human disturbance (for example next to a sidewalk or in your yard) and one with less human disturbance (perhaps in a park away from roads and trails). Measure the biodiversity for each quadrat location, as described above.
- In which location did you find higher biodiversity, or more different types of living things? Why might that be?
- What would you change or add to this experiment to make it more reliable?



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