

Monitoring Ecosystems

Real World Ecosystems
Activity
Grade Level: 5-8



Main Objectives

This activity provides two important activity modes, the first being a background reading, the second, an exercise in summarizing and analyzing environmental data. The backgrounder provides essential foundational knowledge about the main topic (environmental monitoring). The activity that follows tests learners' comprehension of the ideas in the backgrounder and allows them to apply this understanding using a realistic example.

Learning Outcomes

By the end of this activity, learners will:

- Define and give examples of environmental monitoring
- Describe the purpose of environmental monitoring
- Define the term "environmental indicator" and give examples
- Analyze environmental monitoring data to propose explanations and make predictions about the ecological health of a typical central Alberta Lake

Length of Activity

3 hours

Materials List

Monitoring Ecosystems Backgrounder
Monitoring Ecosystems Learner Worksheet
Monitoring Ecosystems Learner Worksheet Answer Key

Procedure

Step 1: Backgrounder

- a. Provide the learners with copies of the Monitoring Ecosystems Backgrounder. Allow the class to read the backgrounder individually or in groups.
- b. As learners are finishing up their reading, be sure to remind them to discuss amongst themselves the "Think About" questions at the end of the backgrounder.
- c. Provide the learners with the worksheet and have them answer the questions in Part A.

Step 2: Worksheet

- a. The second part of the worksheet provides data about the growth of algae in an unnamed lake in central Alberta. The data are not authentic, but do represent the kinds of results that can be expected in some lakes.
- b. Have the learners read and find trends in this information. The easiest way to spot the trends is to construct a graph.
- c. Learners may do this by downloading the data and manipulating it using a spreadsheet, or more simply plotting it on graph paper.
- d. After graphing the information, have learners answer the questions that follow. These questions are designed to encourage careful analysis of the graphical information.
- e. Answers to the worksheet questions can be found in the answer key.

Other Possible Investigations

- Collect and measure the rainwater. Record the pH levels (pH level: A measurement to indicate the acidity or alkalinity of water or soil) of the rainwater.
- Discover the air quality. Use index cards smeared with Vaseline to collect and record the amount of particulate matter in the air. How might this information be useful?
- Search for evidence of animal species. This evidence could include leaf holes, anthills, spider webs, worm castings, bones, scat etc. Record what you find.
- Find and record the amounts of types of litter. How biodegradable (A substance which is susceptible to breakdown by bacteria or enzymatic action) is the litter? What might the significance of this information be?
- Record and chart surface temperatures. Study the differences according to the type of surface. Discuss some of the practical uses such information might have.
- Gather samples of soil. Identify the types of soil using a soil chart.

Tips and Extensions

Environmental monitoring can encompass any kind of regular measurements made of environmental parameters, including simple weather measurements. You may be able to set up your own environmental monitoring program right at your school. Here are a few ideas:

- Start a semi-annual local bird count. Do a survey of local birds visible in the schoolyard or a nearby park both in the early fall and in the spring. Keep this list from year to year, and have your learners compare the results as the information accumulates.
- Set up a weather monitoring station at your school. Collect the data and have your learners prepare graphs showing seasonal and year-to-year changes.
- Set up a program to monitor the health and growth of trees in the schoolyard or its neighbourhood. Trees provide many benefits

including shade, air purification, and wildlife habitat. Your learners can gather information about their rate of growth (height and diameter), rates of insect infestation, incidents of damage, signs of moisture stress, and other indicators.

- Contact your local municipal public works department and invite one of their technicians to speak to your class about environmental monitoring. Have your guest speaker bring along some of the equipment they use and ask them to address the question of how the community benefits from environmental monitoring, and what a career in this field is like.

Comprehension

You may wish to test learners' comprehension with the following prompts and questions:

- How is the science of environmental monitoring different from other kinds of science?
Environmental monitoring is aimed at "keeping an eye on" the health of the environment through on-going measurements. Other kinds of research may ask a question, propose an experiment or study, and then stops when the answer is found.
- Do you know examples of environmental monitoring programs in your community? *Most communities have several environmental monitoring programs going. These may include monitoring the quality of the municipal water supply, local air quality monitoring, ground water near a local sanitary landfill, and other associated with the municipality itself. There may also be a local provincial government office or other departments and services responsible for some aspect of environmental management.*
- How would things change if we had absolutely no environmental monitoring on any of our national or provincial parks, provincial forests, rural or urban areas? *Without on-going monitoring of the environment, incidents of pollution would go unreported, and there could be serious damage to the environment. Human health problems could occur as happened in Walkerton, where bacteria that went undetected in drinking water caused the deaths of several people and made more than 1000 sick.*