

Monitoring Ecosystems

Real World Ecosystems
Learner Worksheet Answer Key
Grade Level: 5-8



Name:

After reading the Monitoring Ecosystems Backgrounder, answer the following questions.

1. What is the main purpose of environmental monitoring?

The purpose of environmental monitoring is to help people spot possible problems in the environment, allowing them to take corrective action if necessary.

2. What is an environmental indicator?

An environmental indicator is some aspect of the environment that can be accurately measured that can tell us how clean air, soil, or water are, or can tell us if there are problems with forests, oceans, or other natural ecosystems.

3. Provide three examples of environmental indicators:

Answers may vary widely. Look for examples that represent quantifiable values, such as the number of organisms in a population, the mass or volume of some pollutant in a given volume of air, water, or soil, etc.

4. Describe an environmental indicator that could help you monitor the health of trees in a local park:

Again, answers may vary widely. Look for quantifiable variables that pertain to tree growth and health, such as the annual rate of growth, the number of insect pests per leaf, etc.

5. What is the purpose of a test well?

The purpose of a test well is to allow a sample of groundwater to be taken for testing.

6. Describe the environmental indicators that could tell a biologist about the health of a river:

Answers may vary widely, but look for indicators that refer to the amount of a pollutant in a specific volume of water, the number of bacteria or other organisms in a unit of volume, etc.

7. Provide an example of an international environmental monitoring program. Describe what elements of the global environment it monitors, and what it does with the information.

Three of four examples were provided in the backgrounder. The best description was that of the IPCC, the Intergovernmental Panel on Climate Change. The IPCC monitors greenhouse gas emissions and climate all around the world, analyzes the information, and provides advice to governments on how to deal with climate change.

Part B Questions:

1. In what season do the algae reach their greatest numbers?

In all years, summer had the greatest algal growth. August was typically the worst month.

2. In what season do the algae reach their lowest numbers?

The winter season (November to February) had the lowest algal cell counts.

3. How would you explain the seasonal differences in algae?

There are several possible explanations: One is seasonal temperature differences. Algae will reproduce more quickly in warmer water. Ice cover is also a factor. With ice covering the lake, there is much less access to sunlight, and the algae cannot grow and reproduce as quickly. A third explanation is that there are seasonal inflows of nutrients such as nitrogen and phosphorus into the lake. Usually, a combination of water temperature and “nutrient loading” produces the algal bloom.

4. Based on your graph, what trends do you notice regarding the algal population in the lake from year to year?

The population of algae is generally increasing from year to year in the summer, and the period of time during which algae are present in large numbers is greater (their growing season appears to be lengthening as the years progress).

5. What do you think might cause the trend you see in the population of algae from year to year?

Several answers are possible: It could be that the lake is attracting more and more people which are adding to the pollution problem and therefore the algae problem. It is also possible that the lake is getting warmer as the years progress. This could happen if the water levels in the lake are declining, or because of regional climate warming.

6. Based on the numbers and trends for algae in the lake water, what human activities could be happening near this lake?

Human activities contributing to algal growth in the lake could include dumping of sewage from cottages, or increasing agricultural runoff from fields, feed lots, or pastures.

7. What do you predict for maximum and minimum populations for the year 2004?

Based on the trend, it is possible that the algae could increase to between 4000 and 5000 cells per mL in 2005.