

Unit 1 Projects

Inquiry Project

Pollutants and Aquatic Ecosystems

Many substances can dissolve in water. This does not mean that they disappear, however. It means that they are reduced to small particles. These particles can move with the water as it travels through the ground or from one ecosystem to another, such as from a stream to a river to a lake. As you have learned, some substances that are produced by humans pollute the aquatic ecosystems of the biosphere.

Inquiry Question

How do common substances affect the sustainability of aquatic ecosystems?

Initiate and Plan

1. Design at least two aquatic ecosystems, or *ecojars*. Use simple containers, such as large jars, modified 2 L soft-drink bottles, or small aquariums.
2. Plan what you will put in your ecojars by making a list of possible abiotic and biotic components.
3. Decide what substance(s) to investigate. Remember to use one of your ecojars as a control.
4. List the materials you will need, the steps in your procedure, and any safety precautions you should take.
5. Decide how you will measure the effects of each substance on the ecosystem.
6. Select an appropriate format, such as a table, to organize and record your data.
7. Formulate predictions about what will happen to the water and to the plants when you add each substance to the ecosystem.
8. Have your teacher approve the design of your investigation.

Perform and Record

9. Set up your ecojars, and conduct your investigation. Record your results.

Analyze and Interpret

1. Describe any patterns or trends you observed in the data you collected.
2. Did the trends in the data you collected match the predictions you made? Provide some possible explanations for any differences you observed.
3. Evaluate the design of your investigation. Were you able to control and identify the effects of variables? Was your measure of the effects of the substances accurate? What changes would you make to your design for future investigations on this topic?

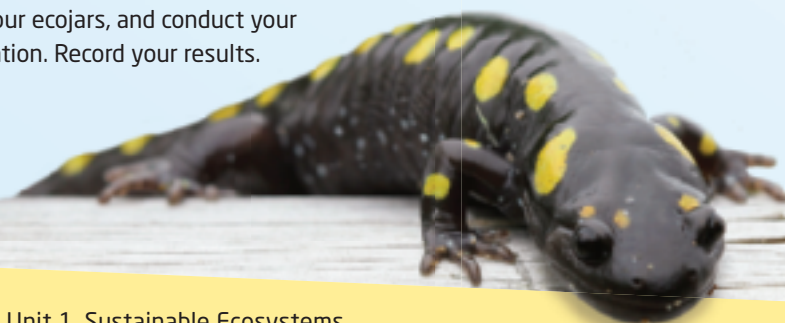
Communicate Your Findings

4. Present your results using both a visual component and a written component, taking into consideration both the purpose and the audience.

Assessment Criteria

Once you complete your project, ask yourself these questions. Did you...

- **K/U** provide an accurate description of the abiotic and biotic characteristics of the ecosystem?
- **T/I** formulate appropriate predictions for the impact of the investigated substance(s)?
- **T/I** control appropriate variables and use equipment and materials safely, accurately, and effectively?
- **T/I** analyze and interpret qualitative and quantitative data to determine whether the evidence supports or contradicts your initial predictions?
- **T/I** identify sources of error that may have influenced the outcome, and suggest improvements to the original design?
- **C** organize and record data appropriately?
- **C** take the purpose and audience into account?



An Issue to Analyze

Protecting Ecosystems

The Oak Ridges Moraine is a valuable ecosystem in Ontario. Diverse natural habitats, such as ancient forests and complex wetlands, provide living space for all kinds of organisms. Much of the water supply for the Greater Toronto Area begins in the ground-water system of the moraine's glacial soils.

To preserve this 1900 km² ecosystem from excessive development, a law was passed that placed strict controls on development. The Oak Ridges Moraine is only one of many special ecosystems in Ontario needing protection.

Issue

What can be done to protect a valuable ecosystem in your area?

Initiate and Plan

1. Choose an ecosystem that needs protection (either a large ecosystem or a small green space near your home).
2. Research and describe the human factors that threaten or could threaten the ecosystem you have chosen. Think of some questions to help you focus your research. To do this, consider what issues are involved and what groups may have a stake in these issues. Consider researching some or all of the following questions:
 - Are there threats from erosion, deforestation, pollution, recreational overuse, wetland drainage, or housing developments?
 - Which threats to the ecosystem will you address?
 - Who will your audience be? Will you communicate directly with those who are posing the threats? Will you communicate with a government (municipal, provincial, or federal)? Will you seek the attention of the public through a newspaper, a media broadcaster, or a widely read blog?
3. Decide how you will conduct and record your research. What sources will you use?

Perform and Record

4. Conduct your research to answer your questions.



Analyze and Interpret

1. Based on your research, identify the threats to the ecosystem and explain the issues involved.
2. Explain the perspective of the people who are posing the threats. How do they justify their activities?
3. Propose one or more practical strategies that people, including you, could take to reduce or eliminate the threats.

Communicate Your Findings

4. Choose an appropriate form of communication for your audience (for example, a newspaper article, a protest sign, or a podcast).

Assessment Criteria

Once you complete your project, ask yourself these questions. Did you...

- **K/U** describe human factors that impact the ecosystem?
- **C** collect information from a variety of sources?
- **C** organize your information appropriately for your intended audience?
- **C** use appropriate scientific vocabulary?
- **A** analyze your information for bias and accuracy?
- **A** analyze your information to identify both the protection strategies and the obstacles?
- **A** propose alternative courses of action that could be taken to improve the status of the ecosystem?