YORK/SENECA INSTITUTE FOR SCIENCE, TECHNOLOGY AND EDUCATION

YSISTE

ASSESSMENT OF SCIENCE AND TECHNOLOGY ACHIEVEMENT PROJECT (ASAP)

Science and Technology Exemplars

Grade 7: Life Systems – Interactions within Ecosystems

Exemplar Task (7LS/PT02/Dec 2000)

Creature Feature

EDUCATION

Preface

This task is one of a series developed by the Assessment of Science and Technology Achievement Project (ASAP) which is being used for the ASAP Science and Technology Exemplars Project.

This task is organised in three parts:

A. Task Overview
B. Student task sheet – designed to be photocopied for the students
C. Teacher Information – providing essential information relating specifically to this task

For further information, contact the ASAP office at 416-736-5269 or email: asap@edu.yorku.ca

Task Overview

Description of the Task

In this task, students are asked to consider the relocation of a species in order to repopulate a pond. They must consider all of the interactions and factors that affect the balance among the components of the pond ecosystem.

Suggested Timeline

- 2 x 60 minutes

Suggested Grouping

- individual

This task assesses the following **specific expectations**:

Understanding Basic Concepts

- identify living (biotic) and non-living (abiotic) elements in an ecosystem
- identify populations of organisms within an ecosystem and the factors that contribute to their survival in that ecosystem
- identify and explain the roles of producer, consumers and decomposers in food chains and their effects on the environment
- explain the importance of micro-organisms in recycling organic matter
- interpret food webs that show the transfer of energy among several food chains, and evaluate the effects of the elimination or weakening of any part of the food web
- investigate ways in which natural communities within ecosystems can change, and explain how such changes can affect animal and plant populations

Developing Skills of Inquiry, Design and Communication

- formulate questions about and identify the needs of various living things in an ecosystem and explore possible answers to these questions and ways of meeting these needs
- use appropriate vocabulary, including correct science and technology terminology to communicate ideas, procedures and results
- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, written notes and descriptions, charts, graphs, drawings and oral presentation

Relating Science and Technology to the World Outside the School

- identify and explain economic, environmental and social factors that should be considered in the management and preservation of habitats

Materials & Equipment Needed

As required by the students.

Prior knowledge and skills

Students should have been taught the background knowledge required for this task (see Appendix 1).

Students should also be familiar with:

- problem solving
- presenting their ideas in a variety of formats

Introductory activities

Brainstorm with the whole class to allow them to explore possible species to relocate to the pond.
Allow the students to respond with ideas.
Review the background knowledge required for this task.
Read the scenario to the whole class, this may have to be repeated with individual students.

Discuss the assessment criteria with the students

Assign the student work sheets.

Clarify how each student will be presenting his/her work (see Collecting the Evidence).

Collecting the Evidence

Teachers will need to collect evidence to submit for the exemplars project. In this task students should produce **one** of the following:

- a video or audio tape of an oral presentation (A-V arrangements will be required)
- a written report
- a web page
- a set of posters (5 x letter size paper)

DRAFT RUBRIC FOR GRADE 7: CREATURE FEATURE

Knowledge/Skills	Level 1 The student:	Level 2 The student:	Level3 The student:	Level 4 The student:
Understanding basic concepts	• identifies with many errors the biotic and abiotic elements in a pond • identifies with many errors the populations of organisms in a pond • identifies and explains with many errors the roles of producers, consumers and decomposers • explains with many errors the importance of micro-organisms • draws and interprets with many errors food webs of the pond • investigates with much assistance the way natural communities in the pond can change and how this affects the ecosystem	• identifies with some errors the biotic and abiotic elements in a pond • identifies with some errors the populations of organisms in a pond • identifies and explains with some errors the roles of producers, consumers and decomposers • explains with some errors the importance of micro-organisms • draws and interprets with some errors food webs of the pond • investigates and explains with some assistance the way natural communities in the pond can change and how this affects the ecosystem	• identifies with few errors the biotic and abiotic elements in a pond • identifies with few errors the populations of organisms in a pond • identifies and explains with few errors the roles of producers, consumers and decomposers • explains with few errors the importance of micro-organisms • draws and interprets with few errors food webs of the pond • investigates and explains with little assistance the way natural communities in the pond can change and how this affects the ecosystem	• identifies with no errors the biotic and abiotic elements in a pond • identifies with no errors the populations of organisms in a pond • identifies and explains with no errors the roles of producers, consumers and decomposers • explains with no errors the importance of micro-organisms • draws and interprets with no errors food webs of the pond • investigates and explains with no assistance the way natural communities in the pond can change and how this affects the ecosystem
Inquiry skills	• with much assistance identifies the needs of various living things in the pond and explores ways of meeting these needs	• with some assistance identifies the needs of various living things in the pond and explores ways of meeting these needs	• with little assistance identifies the needs of various living things in the pond and explores ways of meeting these needs	• with no assistance identifies the needs of various living things in the pond and explores ways of meeting these needs
Design skills				
Communication of required knowledge	• communicates with limited clarity and precision • rarely uses science and technology terminology	• communicates with some clarity and precision • sometimes uses science and technology terminology	• communicates clearly and precisely through most of the task • often uses science and technology terminology	• communicates clearly and precisely through all of the task • always uses science and technology terminology
Relating Science and Technology to the world outside the school	• identifies and explains with many errors economic, environmental and social factors that should be considered in the management and preservation of habitats	• identifies and explains with some errors economic, environmental and social factors that should be considered in the management and preservation of habitats	• identifies and explains with few errors economic, environmental and social factors that should be considered in the management and preservation of habitats	• identifies and explains with no errors economic, environmental and social factors that should be considered in the management and preservation of habitats

Appendix 1
Background knowledge – Creature Feature

Students should be aware of the abiotic (non-living) and biotic (living) elements in a pond ecosystem.

Students should be able to identify the populations of organisms in a pond and identify the factors that contribute to their survival.
Examples are:

- fish
- frogs
- pond weed
- water fleas

Students should have been taught about:

- producers, organisms that can make their own food
- consumers, organisms that rely on plants for food
- decomposers, organisms that break down matter

Students should be aware of the importance of microorganisms as organisms that break down organic matter in order that it can be recycled.

Students should be able to understand and interpret food webs and food chains. They should be aware that food webs transfer energy through the ecosystem. They should be aware of these as they relate to a pond.

Students should be aware of the ways that natural communities within ecosystems can change and be able to discuss how these changes can affect animal and plant life within the ecosystem.

Students should have had opportunities to discuss and explain the environmental and social factors that should be considered in the management and preservation of a pond habitat.

Glossary
Biome – an area with a characteristic geographic and climactic pattern that supports characteristic animal and plant populations
Biosphere – the portion of the planet that supports life and the living organisms within in
Community – a group of all the interdependent plant and animal species found in a habitat
Ecosystem – a group of living organisms that, along with their abiotic environment form a self-regulating system through which energy and materials are transferred
Food chain – a sequence of feeding relationships between organisms in an ecosystem
Food web – a network of feeding relationships in an ecosystem
Habitat – the area in which a species lives
Population – all the members of a one species found in a particular area at a particular time

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Science and Technology Exemplars Project

Grade 7: Life Systems – Interactions within Ecosystems

Creature Feature

Student Task Sheets

Creature Feature

It is the year 2020 and the majority of Canada's ecosystems have lost an important component due to habitat disruption. The Canadian government has decided to repopulate areas of Canada with species from other parts of Canada. As an environmental scientist you have been assigned a pond ecosystem that has lost an important species of frog through extinction. Your task is to prepare a presentation that will convince the Canadian government to fund the relocation of frogs to rebalance the pond ecosystem.

Your presentation may be oral, written, a set of posters or a web-site.

You should identify a potentially successful species of frog to relocate and defend your choice

Use this checklist to ensure you consider all the important components of the pond ecosystem in your presentation:

The abiotic and biotic elements of the pond	
The populations of organisms in the pond	
The producers, consumers and decomposers in the pond	
The microorganisms in the pond	
The food webs for the pond	
The natural communities in the pond	
The needs of the living things in the pond	
Scientific vocabulary	
The economic, environmental and social factors to be considered in the management of the pond habitat	