

Overview

All of the Earth's habitats and species communities are essential for human survival. However, all are challenged with some form of habitat interference and at times, destruction. With public awareness and action, this potential can be greatly managed and reduced.

Through an introduction to invasive species, ***Making Waves! Protecting Ontario's Aquatic Habitats*** will familiarize Grade 4 students with the concept of healthy habitats and communities, and demonstrate how our actions, as individuals, can have a meaningful influence on maintaining the balance within them.

Making Waves! is a lesson package that revolves around the Ontario Curriculum's *Science and Technology – Understanding Life Systems* strand with integrated lessons and warm-up/wrap-up activities that reach across many other subject/strand areas:

<u>Subject</u>	<u>Strand</u>
Science & Technology	• Understanding Life Systems
Social Studies	• Canada and World Connections
Language	• Writing • Oral and Visual Communication
Health & Physical Education	• Active Participation
The Arts	• Music • Visual Arts • Drama

(See: Full Expectations Listing [page 75] for details on which Ontario Curriculum goals are met by this package.)

Kit Objectives

Making Waves! Protecting Ontario's Aquatic Habitats will:

1. Meet curriculum expectations through lessons developed with Constructivist and Experiential teaching philosophies in mind – allowing students a deeper understanding and greater ownership over the knowledge they are gaining.
2. Teach Science concepts through integrated activities, different learning styles and strategies, multiple intelligences and differentiated instruction.
3. Meet the current teaching trend of integration – combining various subject areas in one lesson so as to represent the comprehensive nature of “real life”.
4. Enable children to understand new concepts by making connections to previous experience and to the world around them.

Learning Goals

In this unit, students will gain:

KNOWLEDGE BY...

- Exploring the concept of healthy habitats and communities: plant and animal species balanced in their roles within the food chain and their relationship with their environment;
- Determining what an invasive species is and what it's main characteristics are;
- Exploring adaptations as they relate to native and non-native species; including why invasive species adaptations are harmful to Ontario aquatic communities;
- Becoming familiar with different types of invasive species;
- Determining ways humans have influenced habitats, including the many ways we have introduced invasive species to aquatic habitats;

- Determining methods of environmental stewardship as it relates to invasive species; and
- Exploring ways to involve their community in invasive species prevention behaviours.

ENDURING UNDERSTANDING BY...

- Exploring concepts related to healthy habitats and communities;
- Recognizing our role in maintaining healthy habitats and communities (stewardship); and
- Learning tools to maintain healthy habitats and communities, and protect against the spread of invasive species (action).

Curriculum Expectations – Quick Reference

The following table provides “expectations at a glance” for the Ontario Grade 4 Curriculum. This will enable you to determine how ***Making Waves!*** fits into your planning.

Subject Area/Strand

Activity	Enduring Understanding	Science	Social Studies	Language/ Writing	Physical Education	The Arts
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WARM-UP/WRAP-UP ACTIVITIES

A Change Over Time	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship 	☹				
Fridge Fiasco	<ul style="list-style-type: none"> • Healthy Habitats 	☹				
The Preventable Problem	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship • Action 	☹				
Songs for Ecosystem	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship • Action 	☹				☹

LESSONS

Know Me, Know My Habitat	<ul style="list-style-type: none"> • Healthy Habitats 	☹				
Sun Block	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship 	☹			☹	
Changing Chains	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship • Action 	☹		☹		
Aquarium Ownership is an Art	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship • Action 	☹				☹
Musical Mussels	<ul style="list-style-type: none"> • Healthy Habitats 	☹		☹	☹	
Tough Rough	<ul style="list-style-type: none"> • Healthy Habitats 	☹			☹	
Stow Aways and Crafty Ways	<ul style="list-style-type: none"> • Healthy Habitats 	☹	☹	☹		
The Ultimate Species	<ul style="list-style-type: none"> • Healthy Habitats • Stewardship 	☹		☹		

Lesson Overview - Quick Reference

WARM-UP/WRAP-UP ACTIVITIES

Title	Purpose	Time	Materials	Group Size
A Change Over Time	By comparing altered pictures of the same habitat, students will discuss how habitats can change over time and the influences for change	20 min.	BLM: <i>Habitat Transition</i>	Class / Pairs
Fridge Fiasco	By considering their own experience with food, students will engage in a discussion that introduces them to the concept of a disturbed food chain and its impacts.	15 min.	--	Class
The Preventable Problem	This comparison activity of “problems” and “preventions” encourages students to recognize that seemingly innocent actions can have great impacts on habitats and communities.	25 min.	BLM: <i>Problems and Preventions</i>	Class / Groups of 4
Songs for An Ecosystem	Students will create a song to describe how humans can protect aquatic habitats.	30 min.	Invading Species Song	Groups / Pairs

LESSONS

Title	Description	Time	Materials	Assessment Opportunities	Group Size
Know Me, Know My Adaptations	By playing a “Who Am I?” type game, students will learn to identify plant and animal adaptations and explore how these may relate to specific habitats and communities.	50 min.	BLM: <i>Cottage Country’s Most Unwanted</i> , BLM: <i>My Adaptations Checklist</i> , BLM: <i>Predator, Plant and Prey</i> , tape, chart paper, markers	Using a checklist, teachers can evaluate student understanding of adaptation and habitat by observing group work and individual student response during the discussion.	Class
Sun Block	In this active game, students will emulate the transfer of food energy in a lake habitat. They will gain an understanding of how both non-living factors and living creatures affect an animal’s ability to survive. Students will predict outcomes, and compare scenario’s between a healthy habitat and one disrupted by an invasive plant species.	50 min.	Pinnies, pylons, craft sticks, hula-hoops, whistle, clipboard, pencil, poster paper	Students can design a storyboard illustrating and explaining what happens in a lake when an invasive species is introduced.	Class

Title	Description	Time	Materials	Assessment Opportunities	Group Size
Changing Chains	Students will create food chains from familiar animal and plant species and examine the impacts on these food chains when environmental problems and invasive species disrupt them.	2 x 50 min.	Cue cards, chart paper, markers, tape group work.	Teachers can evaluate group work while students are working together on their food chains and tables. Further language evaluation can be done on student articles .	Groups of 4 – 6
Aquarium Ownership is an Art	Students will learn that when they release aquatic pets and plants into local waterways there can be subsequent impacts on habitats and communities . Students will take action by creating educational posters to put in pet shops and city aquariums that remind the public of their responsibilities as pet owners. As an art activity, this project will be used to explore tint, shade and texture.	50 min.	BLM: Pet Shop Poster Messages, cardboard, paper, paint, paintbrushes, sand, water, scrap paper, example posters	Posters can be evaluated for art concepts (tint, shade and texture). Presentations will indicate whether students recognize the need for human action to protect against the impact of invasive species.	Class to groups
Musical Mussels	In this version of Musical Chairs, students will role-play aquatic animals to discover adaptations and factors that enable invasive species (zebra mussels) to spread throughout the Great Lakes and Ontario's inland waters.	50-70 min.	10 chairs, BLM: Musical Mussel Cards, mailing labels, music	Students can be evaluated on their written statement of the game's objectives , including their understanding of: community, habitat, basic needs, the struggle for survival, native species and invasive species.	Class
Tough Ruffe	In this active simulation , students will demonstrate the struggle for survival as experienced by perch in a lake habitat. Students will predict outcomes, and compare scenarios between a healthy habitat and one disrupted by an invasive species, the Eurasian ruffe.	45 min.	Hula-hoops, watch, pinnies, whistle, BLM: Tough Ruffe Game Cards	Evaluations can be done on student written responses to the questions outlined in the Checks for Understanding section.	Varies
Stow-Aways and Crafty Ways	Students will learn how the Great Lakes and other waterways are linked. Using an atlas to identify various locations where the invasive species, round goby, have been, sighted, students will both extrapolate the possible routes members of these species have used to get to their present location, and predict future spread.	70 min.	BLM: Map of Ontario, atlases, Canada and World Map, pencil crayons, paper, pop bottle, basin, duct tape, water BLM: Round Goby Investigation Background, 4 x \$2 coins	Teachers can evaluate student knowledge of Ontario waters, mapping vocabulary (province, latitude, longitude, etc.), cardinal and intermediate directions, non-pictorial symbols and the use of colour in legends on the invasive species spread map . Additional assessment can be performed on prediction and communication skills as displayed in the investigative report .	Class
Ultimate Species	In this culminating activity, students will demonstrate their understanding of habitats and adaptations of species by creating their own ultimate invasive species.	2 x 40 min.	BLM: <i>Cottage Country's Most Unwanted</i> , drawing utensils, chart paper	Using the Rubric provided , teachers can evaluate legal-sized paper, student Ultimate Species creature descriptions for Science, Language and Art requirements.	Class