Lessons in a Backpack

United Nations Educational, Scientific and Cultural Organization

LONG POINT BIOSPHERE REGION

Alien Invaders!

Threats to Biodiversity

Description of Lesson

Students learn how invasive species reduce biodiversity in local environments - specifically the threat of Common Reed (*Phragmites)* to coastal wetlands of the Long Point Inner Bay and Marshes of Big Creek National Wildlife Reserve - by engaging in a game based on the common “Murder Handshake” game.

Photo Above: A Common Reed. This beautiful, 3 metres tall plant represents a threat to the health of Long Points’s coastal wetlands.

Connect with the Long Point Biosphere

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LONG POINT BIOSPHERE REGION

At a Glance

Grade Level: 6

Learning Environment: Indoor Classroom and any playing field— indoors or outdoors

Prep Time: 15 minutes

Length of Lesson: 45 minutes

Key Vocabulary: Biodiversity, biodiversity threats, invasive species

Staffing: 1 educator

Materials:
30 wetland species photos
5 balls of string

Groupings: Whole class

Teaching/Learning Strategies: Game

Lesson Outline

TIME	ACTIVITY	LOCATION	MATERIALS
15 min.	Web of the Wetland	Field	5 balls of string
15 min.	Alien Invader	Field	Wetland species photos
15 min.	Web of the Wetland (Damaged)	Field	5 balls of string

Curriculum Expectations Grade 6 Science Curriculum

Understanding Life Systems: Biodiversity

Overall Expectations:

1. Assess human impacts on biodiversity, and identify ways of preserving biodiversity;

Specific Expectations

3.4 Describe ways in which biodiversity within and among communities is important for maintaining the resilience of these communities (e.g., having a variety of species of wheat allows for some part of the crop to survive adverse conditions);

3.7 Explain how invasive species (e.g., Zebra Mussel, Asian Longhorned Beetle, Purple Loose-strife) reduce biodiversity in local environments.

Background

Invasive *Phragmites australis*, also known as European Common Reed, is an alien invader in our wetlands. It is believed to have come to North America in the ballast water of ships in the 1800's and since has spread throughout the continent. It is found here in the eastern Ontario area.

European Common Reed is aggressive - it outcompetes native plants for water and nutrients, and releases toxins from roots into the soil hindering growth or killing surrounding plants.

Like another alien invader, the beautiful Purple Loosestrife, Phragmites has often been planted in gardens as an ornamental plant. It has a large, feather-like plume 15-30cm long and the plant grows up to 5 metres in height.

A single plant can produce over 2000 seeds, but is most often spread through the rhizomes of a parent plant creating dense interwoven roots.

The plant is so successful at reproducing itself that it poses a threat to biodiversity in the following ways:

- Crowds out native vegetation, resulting in less plant biodiversity;
- Destroys natural habitat and food sources of local species of wildlife, including several species at risk;
- Lowers water levels in wetlands due to quick growth, damaging fish habitat.
- Increases fire hazard - dead stalks within a dense stand are highly combustible during the dormant season when conditions are dry.

Part A. Web of the Wetland

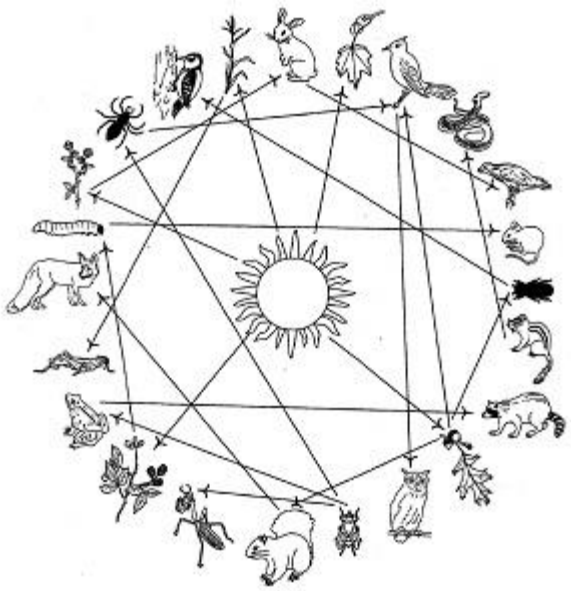
(Adapted from Southern Alberta CPAWS)

Discuss the four things needed for all things to survive: food, water, shelter and space.
Have students stand in a circle. Tell students that you are playing the role of the sun, the source of life for all things. Ask which things need the sun to create their own food (plants). Ask the students to name plants that they would find in a wetland. Pass one ball of string to each of the plants, and say, for example "I am passing the ball to the pickerelweed, because it needs me to survive. I provide energy to the pickerelweed to grow its own food."

Pickerelweed. Native to Lake Erie wetlands, the brilliant purple flowers of the pickerelweed brighten up the shoreline and provide food and habitat for many species of wildlife.

Ask students to name wetland animals that need plants in order to survive. What is the name for plant eaters? (Herbivores). What is the name for animals that eat both plants and animals? (Omnivores). In an orderly fashion, tell students with the balls of string (plants) to pass the balls to one of those students with their hands up and say "I am passing the string to the _____ because it needs me in order to survive." Make sure all students understand why the ball is being passed.

Ask students to put their hands up if they are meat eaters (carnivores or omnivores). In an orderly fashion, tell students with the balls of twine, to pass the balls to one of those students with their hands up and say "I am passing the ball to the _____ because it needs me in order to survive." Make sure all students understand why the ball is being passed.



www.amnh.org/ology/features/stufftodo_bio/weboflife.php

Challenge students to name enough wetland species, so that no students are left out, remembering the four things needed for survival: food, water, shelter, space. (Besides providing food, plants can provide shelter. Decaying plant and animal matter can provide nutrients to the soil for plant growth.)
When all students are connected, ask students to pull gently to take in slack.

Debrief: Examine the pattern made and tell them that this pattern represents the very complex pattern of interconnections between species in a coastal wetland—known as the web of life.

Part B. Alien Invader

Game is based on the well-known game Hand Shake Murder.

Objective: To uncover the alien invader, the threat to the biodiversity of the coastal wetland.

Hand out Wetland Species photos to each student. Each photo represents a species found in coastal wetlands of the Long Point Biosphere. Note that some of species are Species at Risk, meaning that the coastal wetland habitat is critical to their survival.

Announce: “There is an alien in our midst that is a threat to our biodiversity. To maintain the health of our wetland community, the alien invader must be uncovered so that it can be eradicated.”

Have everyone in the circle close their eyes. The leader walks around the circle and taps the student with the Common Reed card on the shoulder – this indicates to the student that he/she is the ALIEN INVADER.

Once the alien invader is secretly identified, students get up and start shaking hands. When they shake hands they show each other their card, say “Hi, I am a" (whatever species is on the card), and shake hands.

The only difference between the ALIEN INVADER and the rest of the wetland species is in the student’s handshake. When the ALIEN INVADER shakes hands, the student slips in one finger and tickles the palm of the other student.

After being “tickled” by the ALIEN INVADER, the student must shake hands with four more students before dramatically dropping to the floor in an exciting fake death, representing a loss of that species from the wetland.

After each loss of species, the game stops, and the first student with hands up has a chance to guess who the ALIEN INVADER is by pointing. The student being pointed to indicates whether or not she is the ALIEN INVADER.

List of Wetland Species photos

Plants

- Arrowhead
- Pickerel Weed
- Marsh Marigold
- European Common Reed **
- Michigan Lily
- Duckweed

Mammals

- Mink
- Beaver
- Raccoon
- Moose
- Muskrat

Fish

- Largemouth Bass
- Rock Bass
- Pumpkinseed
- Northern Pike
- Muskellunge

Birds

- Least Bittern*
- Green-winged Teal

Insects

- Dragonfly Species

Reptiles and Amphibians

- Spotted Turtle*
- Blanding’s Turtle*
- Blue Spotted Salamander
- Yellow-spotted Salamander
- Common Garter Snake
- Leopard Frog
- Gray Tree Frog

* At-risk species
**The Common Reed is native to the Ontario; the European Common Reed (Phragmites australis) is invasive.

If the guesser is wrong, then the guesser too drops to the floor in a dramatic death. None of the students that have already been tickled may guess, as they already know who the identity of ALIEN INVADER. Game continues until ALIEN INVADER has been identified or everyone else is dead.

Have all students that were killed during the game turn their species cards over, so that the blank side is showing.

Debrief: What species was the ALIEN INVADER? (Common Reed) What happens to native species when an ALIEN INVADER enters a habitat, like a wetland? What is the best chance that native species have for survival in the event of an ALIEN INVADER in their habitat? (Hint – early detection).

Part C. Web of the Wetland (Damaged)

Have all students gather in circle once again.

Create another web which only includes the "survivors" from the previous game. The web should be considerably less complex.

Debrief: What does biodiversity mean? How does an ALIEN invader impact ecosystem biodiversity? (Destroys wetlands by outcompeting native vegetation, destroys wildlife habitat, lowers water levels and destroys fish habitat). What can be done to protect coastal wetlands from invasion of Invasive Common Reed? (Learn to identify, do not plant non native species, plant only native species of plants, stay on designated trails, and avoid transporting seeds on clothing, shoes/boots or equipment.)

Lesson Conclusion: Diverse habitats can support a greater number of species. Alien invasion – the introduction of a species that is not native and spreads rapidly – can threaten the amount of biodiversity by out-competing native species, thereby destroying important habitat for many species of plants and animals.

Help Protect the Wetlands of Lake Erie

The biological pollution caused by invasive species is extremely challenging, because even if we never import another non-native species, the ones already invading our native ecosystems will continue to grow and spread. Mapping invasive species is the first step towards their control or eradication.

Become a citizen scientist and report your observations. Users simply enter their observations either in the online form or through one of the invasive species reporting smartphone applications.

eddmaps.org

Information from EDDMaps

Arrowhead

Photo Credit: Mike Ryon

Pickerelweed

Photo Credit: D. Gordon E. Robertson

Marsh Marigold

Photo Credit: Cynthia Brink

European Common Reed

Michigan Lily

Photo Credit: Cynthia Brink

Duckweed

Mink

Photo Credit: Jim Gardner

Beaver

Photo Credit: Public Domain

Raccoon

Photo Credit: Public Domain

Moose

Muskrat

Largemouth Bass

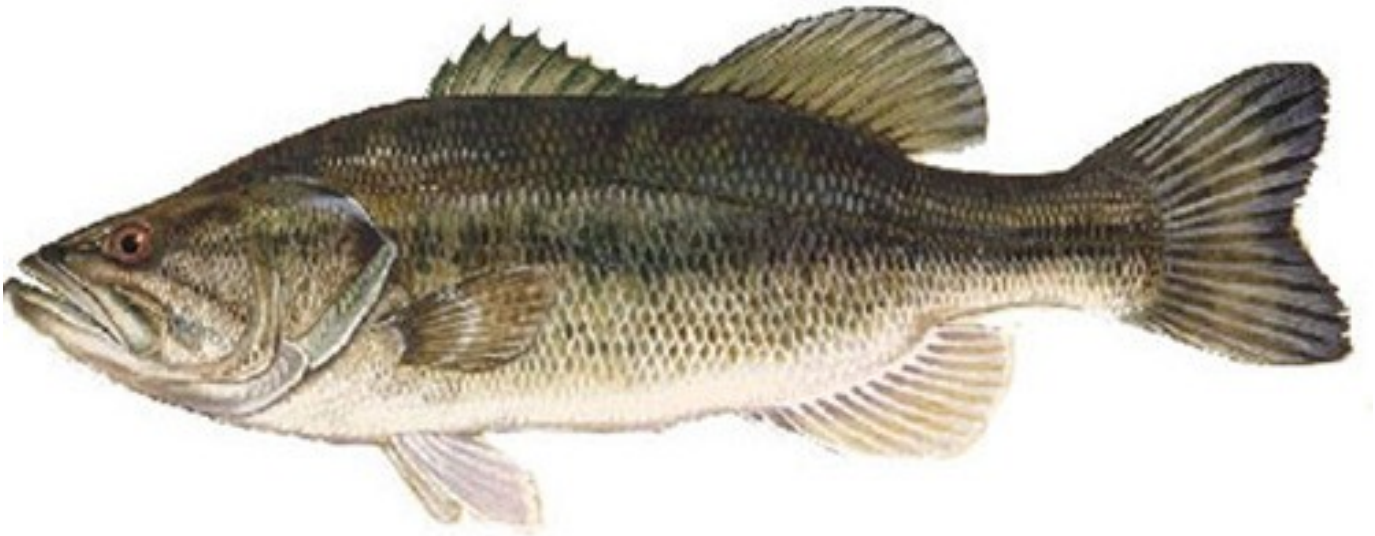


Photo Credit: Public Domain

Rock Bass

Photo Credit: Public Domain

Pumpkinseed

Photo Credit: Public Domain

Northern Pike

Photo Credit: Public Domain

Muskellunge

Least Bittern

Photo Credit: Public Domain

Greenwinged Teal

Photo Credit: Public Domain

Dragonfly

Photo Credit: D. Gordon E. Robertson

Spotted Turtle

Photo Credit: Scott Gillingwater

Blanding's Turtle

Photo Credit: Scott Gillingwater

Blue Spotted Salamander

Photo credit: IronChris/Wikimedia Commons/
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Yellow Spotted Salamander

Photo Credit: Brian Gratwicke/Wikimedia Commons/CC-BY-SA 2.0

Leopard Frog

Photo Credit: David Cappaert, Michigan State University, Bugwood.org

Gray Tree Frog

Photo Credit: Leanne Gautier-Helmer

Bullfrog

Photo Credit: Leanne Gautier-Helmer

Common Garter Snake

Photo Credit: Leanne Gautier-Helmer

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GEORGIAN BAY BIOSPHERE
MNIDOO GAMII
Spirit of the Water