

Alien Invaders!

Threats to Biodiversity



Description of Lesson

Students learn how invasive species reduce biodiversity in local environments - specifically the threat of common reed to coastal wetlands of the Georgian Bay - by engaging in a game based on the common "Murder Handshake" game.

Photo Above: A Common Reed. This beautiful, 3 metre tall plant represents a threat to the health of Georgian Bay's coastal wetlands.

Connect with the Georgian Bay Biosphere

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GEORGIAN BAY
BIOSPHERE
MNIDOO GAMII
Spirit of the Water

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 cards
5 balls of string

Kit available from the NND SB Resource Centre

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 photo cards
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 Loosestrife) 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 now found here on the eastern Georgian Bay.

European Common Reed is aggressive - it outcompetes native plants for water and nutrients, and releases toxins from roots into the soil to hinder growth of and kill surrounding plants.

Like another alien invader, the beautiful Purple Loosestrife, invasive *Phragmites* has often been planted as an ornamental plant. It has a large, feather-like plume that is 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;
- And lowers water levels in wetlands due to quick growth, damaging fish habitat.



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 student 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.”

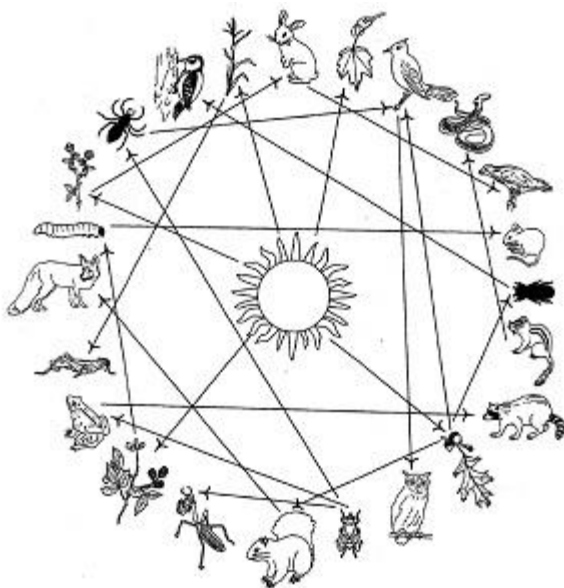
Ask students name wetland animals that need plants in order to survive. What is the name for plant eaters? (Herbivores). What is the name for animals that eat both plants and animals?

(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.



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



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 signs to each student. Each card represents a species found in coastal wetlands of the eastern Georgian Bay. 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 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 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 Cards

Plants

Arrowhead
Pickerel Weed
Cardinal Flower
Common Reed
Virginia Meadow Beauty
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
Eastern Ribbonsnake*
Leopard Frog
Mink Frog Bullfrog

* At-risk species



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 biological diversity 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, plant only native species of plants, stay on designated trails, and avoid transporting seeds on clothing 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 Georgian Bay

Invasive species are spreading quickly, and you can report their location using the Early Detection and Distribution Mapping System (or EDDMapS at www.eddmaps.org/). You can submit invasive species sightings using either a smartphone or a computer. Sightings are uploaded to EDDMapS and emailed directly to reviewers to confirm. The maps and information are freely available to everyone. Having good data on invasive species locations improves our ability to manage and respond to them.

Information from State of the Bay Magazine 2018

Making a Cultural Connection

Aanii, Boozhoo, Kina Weya:

Since time immemorial the Anishinaabe people of Wasauksing have utilized Georgian Bay, along with its many associated waterways. These waterways served as the highway for trade, and travel between the families of the area at the time.



The area spanning from Port Carling to the shores of Sandy Island down to the Moon River on Georgian Bay, would be accessed for different activities throughout the year. These activities would include agricultural work and the gathering of berries, fish, wild game, medicines, and trade. When different areas of land were accessed or resources were gathered, thanks and gratitude would be shown with traditional ceremonies.

The living connection between the people, the land, the air, and the water was respected and treated with the utmost importance. With proper respect, the abundance of resources would be sufficient to provide well into the future. The view of the Anishinaabe people is the same to this day.

The vast history of our people in the area shows Georgian Bay's importance to our communities and to our culture. It is with this knowledge that we must stay respectful, educated, and maintain the health of our water and the creatures therein. “



Miigwetch, Chief Warren Tabobondung
From: stateofthebay.ca

Arrowhead



Photo Credit: Mike Ryon

Pickereelweed



Photo Credit: D. Gordon E. Robertson

Cardinal Flower



Photo Credit: Wikimedia Commons

Common Reed



Virginia Meadow Beauty



Photo Credit: Wikimedia Commons

Duckweed



Mink

MINK



J.F.GARDNER-2008

Photo Credit: Jim Gardner

Beaver



Photo Credit: Public Domain

Raccoon



Photo Credit: Public Domain

Moose



J.F.GARDNER-2008

Muskrat



Largemouth Bass

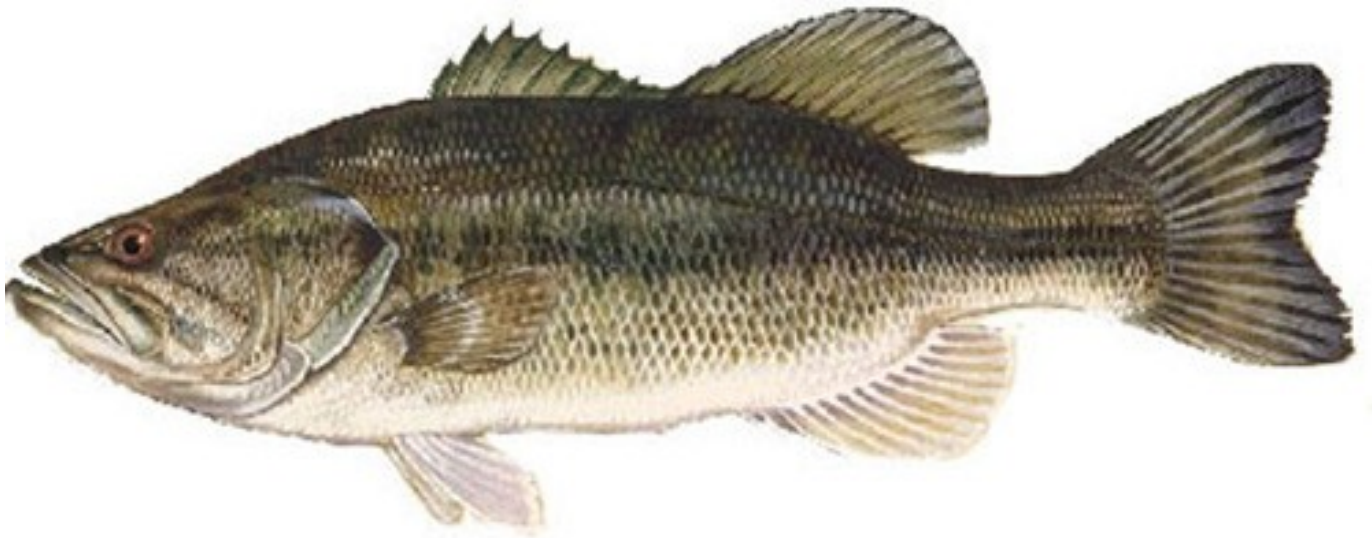


Photo Credit: Public Domain

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

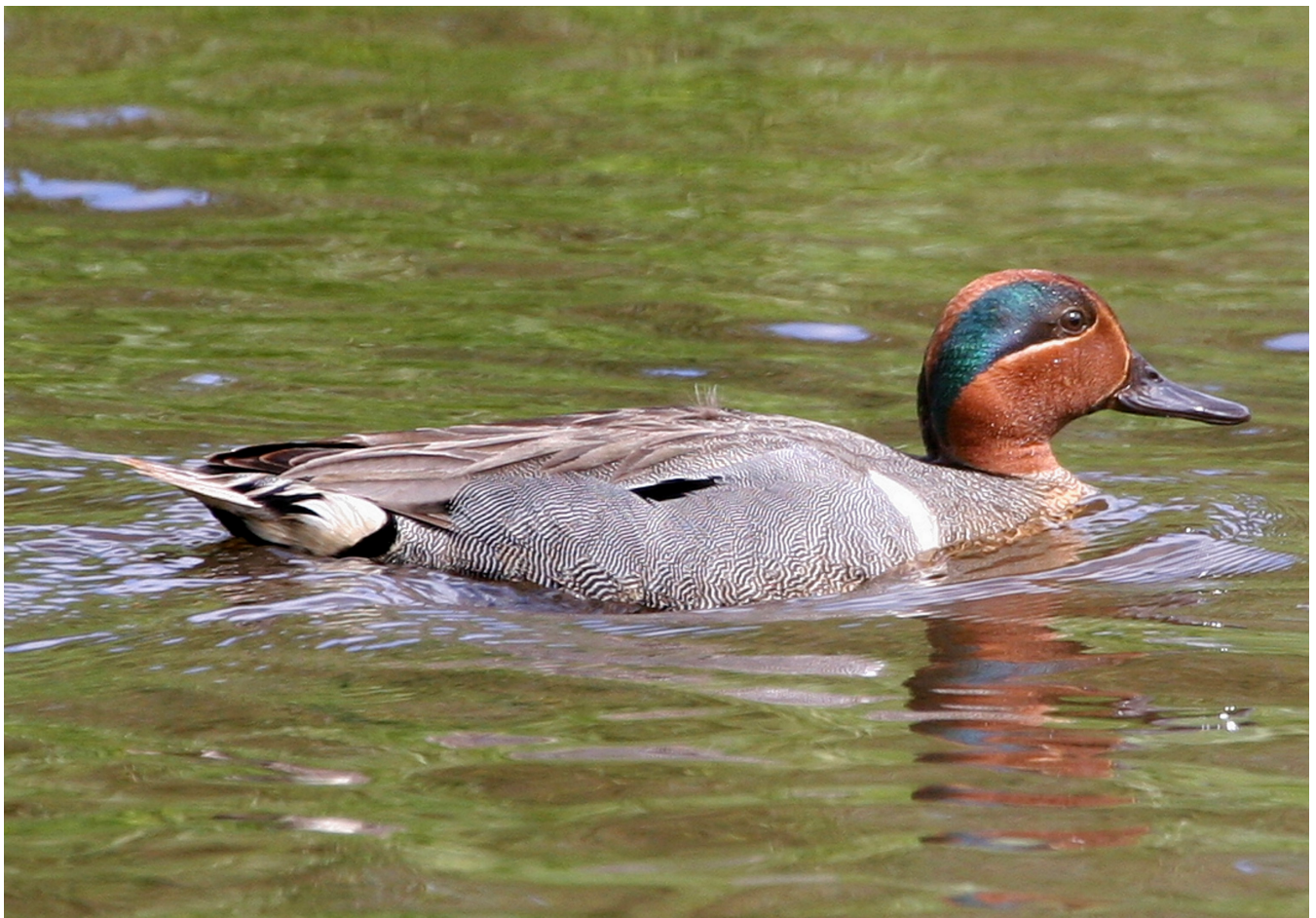


Photo Credit: Public Domain

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

Mink Frog



Photo Credit: Denis Doucet

Bullfrog



Photo Credit: Carl D. Howe/
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Eastern Ribbon Snake



Photo Credit: Scott Gillingwater