

Summary

This lesson focuses on exotic and invasive species and their presence in Canada. The activity involves developing a Futures Wheel, a tool you can use to explore the environmental, social, cultural and economic impacts of introducing an exotic pest or invasive species.

Note: A Futures Wheel is a graphic description of the interrelationships and impacts of a single decision or event.

Activity Info



Level: Grade 7

Subject: Life Science, Interaction within Ecosystems, Sustainability of Ecosystems

Estimated Duration: 120 minutes

Materials: pencil, paper (for large Futures Wheel diagram)

Learning Outcomes

- Students will identify beneficial and harmful effects of a wide variety of organisms in their world.
- Students will learn to work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results.
- Students will evaluate relationships that affect the biodiversity and sustainability within the biosphere.

Teacher Background

Invasive species can be defined as those species that are not naturally found in an area. They have either been introduced by some means or they invaded on their own.

Canada has been invaded by many of these species over the years. Some well known

examples are purple loosestrife, forest tent caterpillar, starling, zebra mussel, brown spruce long horn beetle and the Asian long horn beetle.

Purple loosestrife came to Canada over 100 years ago. It may have been carried in the wool of sheep being shipped across the sea, or perhaps an well-intentioned gardener brought this lovely purple plant to Canada.

It is the type of plant that grows prolifically in moist areas, where it chokes out the native vegetation. The end result is reduced biodiversity and a serious loss of habitat for native species.

The brown spruce long horn beetle is a recent example of an invasive species that has arrived in Canada. It has been found in Halifax, Nova Scotia, most likely imported into a nearby port in wood packing material. It is a wood-boring species that attacks dead and dying trees. The beetle was found in Point Pleasant Park in Halifax attacking living, healthy red spruce and other spruce species. There were many opinions about how to deal with the infestation, but the Canadian Food Inspection Agency decided to remove and burn the infested spruce trees to stop the pest from spreading beyond the park boundaries.

Procedure

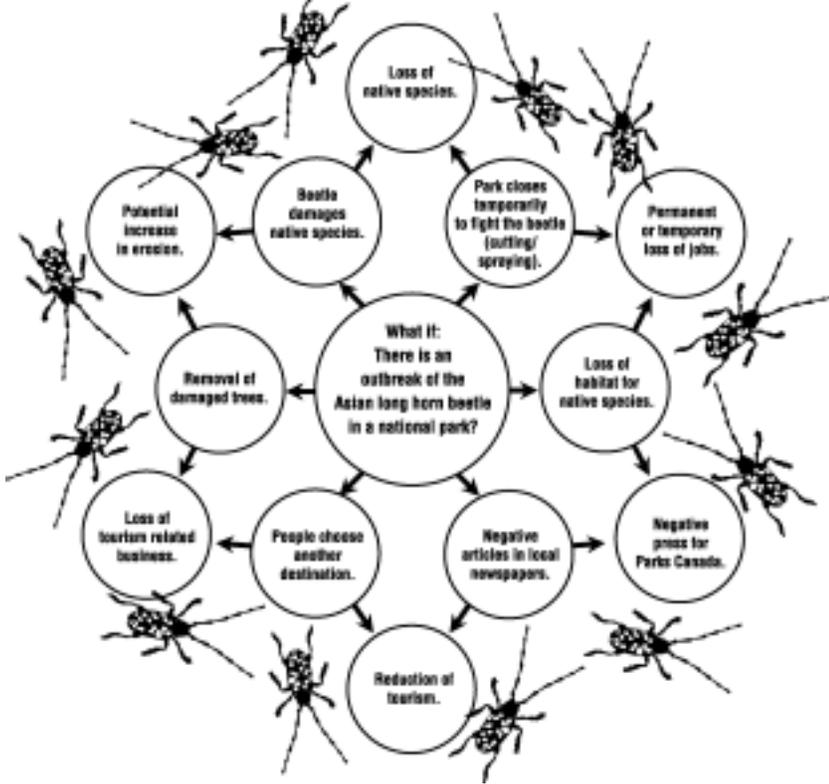
Step 1

Discuss with your students the idea that introducing change to an ecosystem can cause unexpected results. You may be able to demonstrate this using examples of possible changes in their world (the closing of a local ice rink or the building of a large new shopping mall at the end of their street). Draw those causes and effects on a blackboard or flip chart in the form of a Futures Wheel.

Step 2

Ask your students if they are familiar with any invasive species in Canada or worldwide. Have they heard of purple loosestrife, zebra mussels and the Asian long horn beetle? Can

What Happens If? Futures Wheel



- What if the beetle killed all of the trees within the park?
- What might happen if the park was permanently closed because of the beetle infestation?

Step 4

Divide the class into four working teams. Ask each team to carry out research on the brown spruce long horn beetle and create an Invasive Species File. This file must include some basic factual information they can collect from the Internet. Include the following file headings: name, preferred habitat, where it originated, length of time in Canada, and how it is being managed.

Canadian Forest Service
<http://www.nrcan-rncan.gc.ca>

Step 5

The Invasive Species File will also include their version of a Futures Wheel. Each working team will

choose one of the what-if questions or create their own. Make sure each group addresses a different question.

Step 6

Each team must list at least four first level implications of their issue (four circles outside the initial question), and project out at least three levels of implications. Have each team create a poster sized illustration of their Futures Wheel for a presentation to the rest of the class.

Step 7

Have each team present their completed Invasive Species File and Futures Wheel to the class. The teams should be prepared to add to, question or complement those findings with their own.

they explain how invasive species can damage a fragile ecosystem?

Step 3

Work with your students to develop a series of what-if questions on the impacts of the brown spruce long horn beetle. Put their questions on the board.

The following are some examples you may wish to use to get them started:

- What might happen if only the affected trees were cut?
- What might happen if no trees were cut?
- What would be some of the impacts if the beetle spread throughout the province of Nova Scotia?



Extensions

- Have your students go to the Canadian Forest Service Web site and research another Canadian unwelcome guest. You may ask them to prepare a five to 10 minute report.

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• National Forest Week Poster

This lesson extension allows students to work with the National Forest Week poster provided with this teaching kit. Take a few minutes with your students to review the forest pest species on the back of the poster before starting the activity.

Students can work individually or in teams of two.

Step 1

Have each student or team select a forest pest species from the poster.

Step 2

Have each student or team research their forest pest. They can start with the Canadian Forest Service Web sites that will assist them in their research.

<http://www.nrcan-rncan.gc.ca>

Have the students consider:

- insect's life cycle (pupae, larva, adult)
- habitat, including their preferred host(s)
- population outbreaks
- concrete evidence of its presence (defoliation, wood boring, bark damage, etc.)

- the impacts (ecological, economic, social, etc.) of population outbreaks

Step 3

Ask your students to predict what would happen to a local forest ecosystem if an outbreak of the insect occurred.

Step 4

In a presentation, have each student or team describe in detail the short and long term changes they will expect to find in the forest environment after the outbreak.

Step 5

Provide time for the student or team to create their own poster with the following:

- an illustration of their pest species
- a description of its effects on the individual trees (defoliation, bark damage, etc.)
- its impacts on the local forest ecosystem

