Activity: Plants of the Melting Pot

As adapted from Invaders of the forest

Time Frame: 50 minutes

Grade: 9

Class size: 20-30

Courses:	**Applied**	**Academic**	**Alternate (main stream/ life skills, etc.)**

Setting:
-Classroom

Objectives:
-Students will compare immigration statistics with the arrival of invasive species to begin to understand how and why invasive plants came to Ontario

Materials:
-World map for colouring of origin of invasive species and immigration travel route
-Access to the internet or copies of invasive species fact cards and information brochures
-*A travelling we will go!* Class read aloud
-Plants and species cards (laminated)

Curriculum Links

Overall Expectations

Grade 9 Academic Biology: Sustainable Ecosystems

B2: investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems.

Grade 9 Applied Biology: Sustainable Ecosystems and Human Activity

B2. Investigate some factors related to human activity that affect terrestrial or aquatic ecosystems, and describe the consequences that these factors have for the sustainability of these ecosystems.

Grade 9 Academic Canadian and World Studies: Interactions In The Physical Environment

B1: The Physical environment and human activities: analyse various interactions between physical processes, phenomena, and events and human activities in Canada

Grade 9 Academic Canadian and World Studies: Managing Canada's Resources and Industries

C2. The development of resources: analyse issues related to the distribution, availability, and development of natural resources in Canada from a geographic perspective

Grade 9 Applied Canadian and World Studies: Interactions in the Physical Environment

B1. Natural processes and human activity: analyse some interactions between physical processes, events, phenomena and human activities in Canada

Grade 9 Applied Canadian and World Studies: Liveable Communities

E1. Sustainable communities: identify factors that affect the sustainability of communities, and describe strategies for improving their sustainability

Specific Expectations

Grade 9 Academic Biology: Sustainable Ecosystems

B 1.1 assess, on the basis of research, the impact of a factor related to human activity *(e.g., urban sprawl, introduction of invasive species, overhunting/overfishing*) the threatens the sustainability of a terrestrial or aquatic ecosystem

B 1.2 evaluate the effectiveness of government initiatives in Canada (*federal, provincial, municipal)*, and/or the efforts of societal groups or non-governmental organizations, such as Aboriginal communities, environmental groups, or student organizations, with respect to an environmental issue that affects the sustainability of terrestrial or aquatic ecosystems (*e.g., wetland restoration, recycling programs, Canada-Ontario Environmental Plans, stewardship of national and provincial parks)*

B 2.5 analyse the effect of human activity on the populations of terrestrial and aquatic ecosystems by interpreting data and generating graphs (*e.g., data from Statistics Canada, Parks Canada, and other websites).*

B 3.5 identify various factors related to human activity that have an impact on ecosystems (*e.g., the introduction of invasive species; shoreline development; industrial emissions that result in acid rain)*, and explain how these factors affect the equilibrium and survival of ecosystems (*e.g., invasive species push out native species and upset the equilibrium in an ecosystem; shoreline development affects the types of terrestrial and aquatic life that can live near lakeshores or river banks; acid rain changes the pH of water, which affects the type of aquatic life that can survive in a lake).*

Grade 9 Applied Biology: Sustainable Ecosystems and Human Activity

B 1.1. analyse, on the basis of research, how a human activity (*e.g., urban sprawl, use of pesticides, and fertilizers, creation of pollution, human interaction with wildlife)* threatens the sustainability of a terrestrial or aquatic ecosystem

B 2.3 compile and graph qualitative and quantitative data on organisms within an undisturbed or disturbed ecosystem (terrestrial or aquatic)

B 2.5 analyse the effect of factors related to human activity on terrestrial or aquatic ecosystems by interpreting data and generating graphs

Grade 9 Academic Canadian and World Studies: Interactions In The Physical Environment

B 1.3 assess environmental, economic, social and/or political consequences for Canada of changes in some of the Earth's physical processes/

B 1.4 explain how human activities can alter physical processes and contribute to occurrences of natural events and phenomena

B 2.1 analyse interrelationships between physical processes, phenomena, and events in Canada and their interaction with global physical systems

Grade 9 Academic Canadian and World Studies: Liveable Communities

E 2.1 assess the impact of urban growth on natural systems (*e.g., impact of urban sprawl, vehicle use, and waste disposal on water and air quality)*

Grade 9 Applied Canadian and World Studies: Interactions in the Physical Environment

B 1.3 explain how human activities in their local region can have an impact on natural processes.

Grade 9 Applied Canadian and World Studies: Managing Canada's Resources and Industries

C 2.2 describe Canada's major exports and imports, and assess some of the environmental, economic, social and political implications of Canada's current export and import patterns

Grade 9 Applied Canadian and World Studies: Liveable Communities

E 1.3 describe ways in which communities can improve their environmental sustainability

E 1.4 identify actions that individuals can take to live more sustainably, and explain the benefits for their local community

Procedure

1. Ask students to imagine they are immigrants. Tell them they will be moving to a faraway country that they know little about. They have heard the conditions are harsh and unfamiliar. Talk about what kinds of plants they would take in order to ensure survival. Be sure that students consider taking plants that will provide food, shelter, clothing and medicine in the New World.
2. Read aloud *A travelling we will go* to the students to provide them with an opportunity to begin thinking of what items and plants they would find useful in their new trek to this unknown land. .
3. Assign an invasive plant to each pair of students. Use the plants and species as provided. Students will notice that the species and plant lists the common and scientific names.

4. Using the internet (if available) and/or resource brochure and pamphlets, students are to find out the following information for their plants:
    - *What is the common and scientific name of you plant or species?*
    - *From what region did your plant or species originate*
    - *When did your plant or species arrive in Canada?*
    - *Did people bring it intentionally or did it arrive by accident?*
    - *If people brought it intentionally, why did they bring it?*
5. Using their map, they will locate information about the plant or species origins on the map and colour in where the plant or species originally came from. Students will then rotate and ask and share with their peers where their invasive plants or species had originated and will colour in those countries on their own map.
6. Once all of the invasive species cards have been researched and marked down on the world map, ask students as a whole class:
    - *How do the reasons plants or animals that were brought to Canada compare with the reasons you talked about at the beginning of the lesson?*
    - *Are non-native plants still being brought to Canada today? (**YES**)*
    - *Surely, most immigrants no longer fear they will be unable to find food, clothing, and medicine in their new homes. Why do you think people are still bringing plants to Canada? (**Familiar plants, ornamentals, herbs, folk remedies, special recipes**)*
    - *Today, immigrants aren`t the main cause of non-native plant or species introductions. Who is bringing the plants or species now?*

A travelling we will go!

Read aloud to students to begin imagining what items they will bring on their trek to the new unknown land.

The first great wave of immigration started in the mid-1800s. Not surprisingly, some of the most problematic invasive species in Canada arrived at the same time. They didn`t come here on their own! They were brought here. Our country was not just a melting pot of people; it was a melting pot of plants and species!

Our well-meaning ancestors brought plants from their home countries for several reasons, such as:

- Agriculture: plants used for forage for animals (*e.g., reed canary grass, white and yellow sweet clover)*
- Food: plants used as vegetables and herbs for home gardens. (*e.g., garlic mustard, chicory, burdock)*
- Medicine: plants used in teas, home remedies, and poultices. (*e.g., garlic mustard, dandelions)*
- Landscaping: plants brought for sentimental reasons- to remind homesick immigrants of their homelands. (*e.g., purple loosestrife, giant hogweed)*

More recently, plants have been brought for:

- Wildlife habitat: plants imported to provide food and cover for wildlife. (*e.g., exotic honeysuckle, multiflora rose)*
- Erosion control: plants used to stabilize slopes *(e.g., phragmites, miscanthus)*

Other plants and even species arrived by accident. Canada thistle seeds for example, may have come to this country in mattresses stuffed with dried weeds, shipments of cattle feed, dirt used as ballast in ships to provide stability, or someone pant cuffs. Zebra mussels and spiny water flea are only two examples of species that hitched a ride on travelling vessels that have wreaked havoc and become an invasive species in Ontario.

Names:_____

Species of the Melting Pot

What you need to do:
With a partner and using the internet (if available) and/or resource brochure and pamphlets, you are to find out the following information for your plants:

What is the common and scientific name of you plant or species?

_____

From what region did your plant or species originate?

_____

_____

When did your plant or species arrive in Canada?

_____

_____

Did people bring it intentionally or did it arrive by accident?

_____

_____

_____

If people brought it intentionally, why did they bring it?

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Using provided resources, locate information about the origins of your species on the map and **colour in** where your plant or species originally came from. In a different colour, ask other peers where there invasive species originated and colour in that area on a map. Create a **legend** for your map of what species the colour represents.

Invasive Plants & Species Cards

Garlic Mustard *Aliaria petiolate* Native to Europe Introduced to America in early 1800s Food plant; medicinal plant	**Common Buckthorn** *Rhamnus cathartica* Native to Eurasia Introduced to North America in the 1880s Landscape plant	**Dog- Strangling Vine** *Cynanchum louiseae and C.rossicum* Native to Eurasia Introduced to the northeastern United States in the mid-1800s Landscape plant
Giant Hogweed *Heracleum mantegazzianum* Native from southwest Asia Landscape plant and garden ornamental Introduced to North America approximately in the 1950s	**Eurasian water-milfoil** *Myriophyllum spicatum* Aquatic plant native to Europe, Asia and northern Africa. Introduced to North America in the 19th century May have been introduced by aquarium trade or ballast water of ships	**European Frog-bit** *Hydrocharis morsus-ranae* Aquatic plant native to Europe and parts of Asia and Africa. Introduced from Europe to the Central Experimental Farm in Ottawa in 1932. Ornamental plant
Purple Loosestrife *Lythrum salicaria* Wetland plant native to Europe and Asia. Introduced to North America in the early 19th century. Landscape and ornamental plant	**Wild Parsnip** *Pastinaca sativa* Invasive plant native to Europe and Asia. Introduced to North America approximately in 1943 Edible roots of the plant	**Zebra and quagga mussels** *Dreissena polymorpha & Dreissena bugensis* Native to the Black Sea region of Eurasia. Introduced in the late 1980s by ballast water.
Kudzu *Pueraria montana* Perennial climbing vine native to eastern Asia. First brought to North America in 1876 to landscape a garden at the United States Centennial Exposition in Philadephia, Pennsylvania. Livestock forage, erosion control, ornamental use.	**Sea Lamprey** *Petromyzon marinus* Native to the northern Atlantic Ocean and the Baltic, western Mediterranean and Adriatic Seas. Invaded the Great Lakes in the early 20th through shipping canals.	**Spiny and Fishhook Waterfleas** *Bythotrephes longimanus & Cercopagis pengoi* Small aquatic predators native to Eurasia. Introduced to North America: Spiny waterflea in 1982 and fishhook waterflea in 1998. Introduced to the Great Lakes in ballast water from ocean-going ships.
Round Goby *Neogobius melanostomus* Native to the Black and Caspian seas in eastern Europe. Found in North America in 1990 in the St. Clair River north of Windsor, Ontario. Brought to North America in the ballast water of ships from Europe.	**Phragmites** (European Common Reed) *Phragmites australis susp. Australis* Native to Eurasia, unclear how the species was brought to North America. Aggressive plant that spreads quickly, releases toxins from roots to slow surrounding plant growth.	**Asian Carp** *(many different scientific names)* Includes four species of Carp; Bighead, Silver, Grass, and Black. Native to Eastern Asia, Russia, and China. Introduced by humans to southern United States in the 1960's/1970's to manage algae on fish farms.
Emerald Ash Borer *Agrilus planipennis* Native to Asia, introduced to North America by infested wood. Occurs throughout Southern Ontario. Targets Ash tree species exclusively, kills over 20 species native to North America	**Hydrilla** *Hydrilla verticillata* Native to Asia, potentially Africa or Australia. Introduced to North America in the 1950's as an aquarium plant. Has not been detected in Canada but is found in neighbouring states.	**Rusty Crayfish** *Orconectes rusticus* Native to the Ohio River Basin in the U.S, introduced by fisherman for use as live bait and discarding them, or through people having them as pets and releasing them.