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| **Course(s):** Grade 7 Science, Science 1206, Environmental Science 3205 |
| **Curriculum Expectations:*** 318-6 explain how biodiversity of an ecosystem contributes to its sustainability (<http://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/sci1206/unit1.PDF>)
* 1.31 describe the impacts of introduced species (<http://www.ed.gov.nl.ca/edu/k12/curriculum/cot_environmental_science_3205.pdf>)
* 306-3 describe interactions between biotic and abiotic factors in an ecosystem (<http://people.stu.ca/~pheeney/sciencegr07interactions.pdf>)
* 318-5 explain various ways in which natural populations are kept in equilibrium, and relate this equilibrium to the resource limits of an ecosystem (<http://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/sci1206/unit1.PDF>)
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| **Overview:** Students will participate in an activity that demonstrates the effects of invasive species on the native species, and the overall biodiversity, of an ecosystem. |
| **Materials:***Teacher** SMARTBoard Invasive Species
* Invaders Activity Sheet
* Gym/ outdoor space

*Students** 2 colours of markers (arm bands, flags, pinnies)
* Dodge balls
* Computers
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| **CURRA Reference:**  For more research on this topic see “Marine wildlife of the Gros Morne national park region” – Joeseph S. Wroblewski or visit Fisheries and Oceans Canada (<http://www.nfl.dfo-mpo.gc.ca/e0018292>) and the CURRA (<http://www.curra.ca/new_initiatives_membranipora.html>).  |
| **Lesson Details:** *(Allow two, one hour periods)**Lesson One** SMARTBoard Invasive Species will introduce students to the definitions of invasive species, native and non-native species (Stop when Invaders! slide is reached)
* Once students have been introduced to these concepts they will participate in the Invaders! Activity
* See Invaders Activity Sheet for activity instructions
* Results from each season will be recorded and used for the next lesson

*Lesson Two (computer lab if possible)** Using the results recorded during the Invaders activity, ask students to create a line graph for each scenario
* Using the graph, have students complete the question portion of the Invaders Activity Sheet
* Finish SMARTBoard Invasive Species (the background of the invasive bryozoan species, *Membranipora membranacea*, found in Bonne Bay)
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| **Assessment:*** Discussion questions included in activity sheet and on the last SMARTBoard slide
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| **Notes:**  |

**Invaders Activity**

(*For Teacher Use*)

 This activity is intended to model the effects of invasive species on native species within an ecosystem. Invaders can be played indoors or outdoors, but will require room for students to spread out and run.

Scenario One: In this season students will be divided into four groups. 3 groups will be assigned the role of “essentials” and one group will be assigned the role of “native species” (use markers to visually identify one group). “Essentials” will choose which essential they represent (they must be this item for the whole season): food, shelter, or space. “Native species” will also have to choose one of the three essentials for which they will search for during that season. Groups will start in their action position (see below) with their backs to each other at opposite ends of the playing field. When the whistle signals the beginning of season one, groups will turn and face each other and run to find a match to their action. Students that find a match remain or become “native species”. “Native species” that do not find their essential “die” and become part of the “essentials” group. Play out four seasons, recording the number of native species after each round.

*Actions are as follows (or can be modified):*

* *Food – student acts like they are holding up and eating a hamburger*
* *Shelter – student holds arms above head like the peak of a roof*
* *Space – student holds arms out to the side* ***or*** *can do jumping jacks*

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| Season | Native Species |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

Scenario Two: Choose one student to become a “predator”. This student can roam the boundaries of the playing field using a dodge ball to tag their prey. “Predators” must hit one “native species” to survive the season. The “native species” that is tagged will become a predator for the next season. You may put a one or two prey per predator limit (one for smaller class sizes).

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| Season | Native Species | Predators |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |

Scenario Three: Choose about a third of the “native species” group to be “invasive species” (use other coloured marker). Give “invasive species” advantages like starting closer to the “essentials” group, or a 1-2 second head start. These advantages represent the characteristics discussed in the SMARTBoard lesson (rapid reproduction, wider range of tolerance), but do not explain this to students. “Predators” can also not hit “invasive species” (because they usually lack a natural predator in their new surroundings!).

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| --- | --- | --- | --- |
| Season | Native Species | Predators | Invasive Species |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |

Discussion Questions

1. How did the introduced predators in scenario two affect the native species population?
2. How did the introduction of invasive species impact the native species group?
3. How did the introduction of invasive species impact the predator group?
4. What do you think the special advantages given to the invasive species group during the activity represented?
5. Why is it difficult for native species and invasive species to co-exist successfully within an ecosystem?