INVASIVE AND NATIVE SPECIES

Year Round Grades 4-6

Description:

In this active and competitive game, students experience how a community of native animals and plants changes over time in response to resource availability in their habitat. Students collect data during the game and then graph and analyze how predators, limited resources, habitat health, and invasive species can disrupt the natural ebbs and flows of native communities.

Duration & Type of Program:

1 hour, depending on pace and depth

Materials

- *Easel and flip-chart or dry-erase board*
- *Marker*
- *Nerf ball, or other type of soft ball for throwing*
- *Colored headbands or arm bands (3 colors, enough of each color to outfit entire class, i.e. 12 kids, 12 of each color band)*

PRE-LESSON

- *Game preparation:*
  Set up your playing field. Make a large rectangle with cones at the 4 corners. There should be at least 20 m separating the ends.
- *Set up your data table on the white board (See example table below).*

	# Native species	# Non-native species	# Invasive species	# Predator
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
….				
….				

-
  - *Designate an area for "circling up" before you start and in between rounds to review what is happening*
  - *Re-focus students and check for understanding in between rounds by asking them what happened that round. For example: Mary, you were a sparrow and now you're part of the habitat. What happened?"*
  - *Be clear when you're introducing the non-native species that the habitat students use the same signs that it has in past rounds. The non-native species are the only ones who will use different signs.*

- *Cones*

Goals:

- *Students will understand that nature/ resources/ habitat/ populations are constantly changing*
- *Students will understand and graph population change over time due to resource availability*
- *Students will understand that good habitat with adequate resources is the key to survival*
- *Students will understand how invasive species may out-compete native populations for habitat and resources*
- *Students will understand the difference between non-native and invasive species*

Standards:

5.ESS3.1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3.5.ETS1.2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Sources:

Author(s)
Original lesson plan by: Project WILD, www.projectwild.org

Oh Deer Game Directions adapted from Project Wild Teacher's Guide

- *If your predator has lousy aim, have them gently tag the native species with the ball*

PROCEDURE

Preparing the Game

1. *Ask students to brainstorm a list of things they think a plant species needs to survive in its habitat. From the brainstorm list, ask students to pick the 3 they feel are most important. Write these in a journal entry and explain why they chose each one.*
2. *Review the definition of habitat and 4-5 essential components of habitat. Habitat is where an animal or plant lives and the basic essential components of habitat are food, water, shelter, and space. Since we are learning about native and invasive plant species, we are going to focus on water, light, and space.*
3. *Introduce the native species and habitat you're focusing on. To tie in the the Vital Signs investigation for the year, use local native and invasive shrub species.*

a. Native

i. Mapleleaf viburnum, chokecherry, sweet fern, bunchberry (also known as creeping dogwood), meadow rose, highbush blueberry, highbush cranberry, lowbush blueberry, winterberry

b. Invasive

ii. Burning bush, honeysuckle, alder buckthorn (also known as glossy or smooth buckthorn), common buckthorn, multiflora rose, Japanese barberry

4. Ask the students to count off in fours. Starting the game with ¾ habitat and ¼ species typically works really well. Have the 1's go to one end of the field and stand in a line about shoulder-width apart. This group is the native species. Have the 2's, 3's, and 4's line up at the opposite end of the playing field, facing the 1's. This group is habitat.

Invasive species modifications by:
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Vital Signs Program

https://blogs.cornell.edu/cibt/labs-activities/labs/oh-deer-mary-bowman/

Playing the Game

__Alternate/ additional activity: Project Wild- Oh Deer!

https://blogs.cornell.edu/cibt/labs-activities/labs/oh-deer-mary-bowman/

4. *During each round of the activity, each native species may choose to look for any one of its three basic resource needs. When a native species is looking for:*

a. Light: Put hands over stomach
b. Water: Put hands over mouth
c. Space: Put hands over head
d. A native species cannot change what it is looking for until the next round.

5. *Each student that represents habitat should decide which habitat resource he or she wishes to be. Like the native species, the habitat students may not change within the round, but can change the following round.*
6. *Before each round, count the number of native species and make a note of this number on the whiteboard chart.*
7. *Have the two groups (native species and habitat) turn their backs to each other. Each native species should make the sign for the habitat resource that it is looking for, and each habitat resource should make the sign for what it wishes to be.*
8. *Count down from 5 to give students time to choose. When you get to zero they must turn around while still holding their signs.*
9. *Give them a signal and let the native species walk/run to the habitat and find a student who has the same sign. The native species that finds what they need will survive and reproduce, and need to take the habitat resource back to the starting place (Have species student lock arms with the resource student and bring him back to the species line. The resource student becomes a native species). Native species that do not find the resource they need die and become habitat (representing natural population flux). If more than one native species tries to get the same habitat component, the one to get there first survives.*

10. *Tell the students that this represented one year in the life of this native species population and ask what happened. Most of the native species should have found what they needed and successfully reproduced. This has resulted in an increase in the native species population.*
11. *Have the students perform this activity for at least 7-10 more rounds (representing 7-10 years). Keep the pace brisk.*

- *After the 4th round, introduce a predator. The predator may move along the sidelines, stalking the native species. Each round the predator may throw a Nerf ball at a native species. If the Nerf ball hits a native species, it dies and may return in the next round as habitat or as another predator. If you allow the predator population to increase, keep data records on this population as well. You may want to limit the number of throwing attempts a predator has each round (depending on the demeanor and accuracy of your predator!).*

12. *In the fifth round, introduce an invasive species. Distinguish the invasive species and the native species with different colored headbands, armbands, tags, etc. Like the non-native species, the invasive species has come from a different place and has no predators, but has the same habitat needs as the native species:*

Light: *Hands over stomach*
Water: *Hands over mouth*
Space: *Hands over head*

13. *Explain that the invasive species is able to out-compete the native species for food, water, shelter, and space. The non-native species also has no predators in its new habitat.*

Line the invasive species up in front of the native species, as far up as the halfway point on the playing field. The invasive species may select resources from the habitat first. They make take 2 habitat items each instead of just 1 each. Then the native species may select from the left-over resources. The predator may not throw the Nerf ball at the invasive species, but may still prey on the native species. Prepare for a chorus of "Not fair!" or "Oh no!" from the native species. Run this scenario for 1 or 2 rounds, or until the native population crashes.

POST-LESSON/ CONCLUSION

- *Discuss the changes in the native species population over time. Use the flip-chart or dry-erase board to graph the native species population over the 10 rounds/years. Encourage students to use their experience and the graph to explain what happened to the native species population through time.*
- *Guided discussion or essay questions may include:*

a. In what years does the population increase/ decrease most dramatically?

b. Why do you think the population crashed in Year x?

c. Why does the population increase in Year x?

d. Why doesn't the population fluctuate as much in Years x through x?

e. Summarize students' ideas and claims.

- *Graph and discuss the changes in the native species population, non-native species population, and invasive species populations over time. Ask students to use their experiences and the graph to explain/ talk through what happened to the native species and the invasive species through time. Guided discussion or essay questions may include:*

A. *What impact did the non-native species have on the native species?*

B. *What impact did the invasive species have on the native species?*

C. *As a scientist or manager interested in maintaining native species populations, how would you ensure the health of the native species population?*

D. *Would you try to manage the introduction of non-native or invasive species? If yes, at what point? What would you target?*

- *Summarize students' ideas/ hypotheses/ conclusions.*