

Invasive vs Native Debate

Prepared by Jesse Gibson, Lead Watershed Educator for One Cool Earth 2016-17

Adapted by Victoria Carranza, Education Director for One Cool Earth 2017-18

Lesson Overview:

In this lesson students will explore how humans interact with their environment, specifically plants, and how they support us physically as well as financially. Then, they will play a game that reveals how human impact can affect the ecosystem by altering the species that exist in it. They will take a tour on campus to identify plant species, benefits of plants in general, and choose carefully from plant selections in order to positively impact the landscape using low impact development (LID) techniques.

Diggln' to Topics:

Invasive, Native, Adaptation, Low Impact Development (LID), Drought Tolerant, Recharge, Stormwater, Landscaping

Grade Level:

In full with digital media and handouts, this lesson is designed for 3rd-5th grade and 6th-8th Grade. The physical activity and campus tour is for K-8. See bottom of activity plan for K-2 adaptations.

Inside or Outside:

This lesson can be done entirely outside. The physical activity game will be difficult to do inside so plan to host outside.

Suggested Time Allowance:

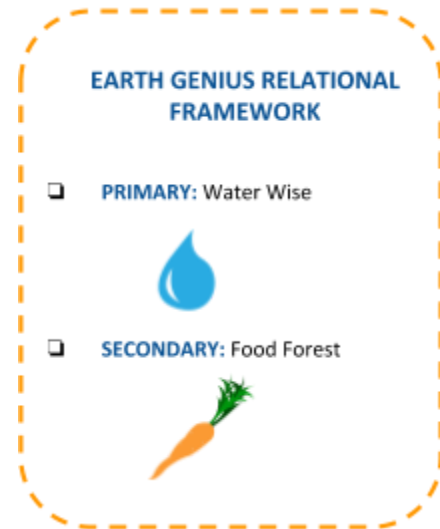
Part 1 - Video, Slideshow, and Handout (25 minutes)

Part 2 - Physical Activity and Wrap Up (35 minutes)

Learning Objectives:

- Understand & identify the concept of an invasive versus a native species
- Explore human impacts of introducing invasive species in the local environment
- Debate if humans are invasive or not
- Learning the values of native species and how they can restore an environment
- Differentiate weather versus climate and what climate zone we live in that adapted and native plants thrive in too
- Not all non-natives are invasive. Students will debate and identify beneficial versus challenging adapted versus invasive species

Essential Question(s) that Connect CCCs and SEPs:



- How can we model the flow of energy? How can we model the cycling of matter? (Model with physical game using human bodies and meaningful play; colored chips and humans represent invasive versus native species) ([Energy & Matter](#); [Developing & Using Models](#))
- What is already known about this pattern? How can I best communicate about this pattern? ([Patterns](#); [Obtaining, Evaluating, & Communicating Information](#))
- How does this landscape currently work? Is there a problem present? How can I design a system to solve this problem? (Observe variable such as angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow in certain areas identified; is it cooler under the oak? What is erosion rate on that hillside versus that?) ([Systems](#); [Asking Questions & Defining Problems](#))

Materials:

Part 1 - Visual Aids and Handout

- Review [Slideshow](#) on Invasives (unless you have on your campus to tour- check!)
- Review [Slideshow](#) on Natives (unless you have on your campus to tour- check!)
- [Handout](#)
- [Climate Zone Map](#)
- Clipboards for students (30 for class)

Part 2 - Physical Activity

- (x) of total poker chips for physical activity; (x) of each color; at least 3 different colors
- Whistle/Bell/Chime
- Wristbands (one color; same; maybe just cut an old t-shirt for bands...)
- Cones

EG Team Support Needed:

- Access to and identification of native and invasive plants and adapted but not harmful non-native plants (to show live examples during tour in garden or in class and perhaps pointing out on campus during the game outside; example ice plant on hill, deerweed next to it, etc.)

Prep:

- Ask teacher to show [Video](#)
- Review slideshows and craft your visuals accordingly outside
- Preview the MERITO's [Native School Habitat](#) for information on how to describe native versus non-natives and invasives for your own knowledge
- Walk the campus before touring and starting this lesson so you as an instructor can predetermine what route you will take for the game and to show the class any native or invasive species or non-harmful non-natives. For example, nasturtiums are invasive, taking over creek banks rapidly, and yet beneficial for the garden as a great food forest item.
- Bring potted plants from our nursery to share live examples of natives with students that are used for restoration projects and LID designs
- If powerpoint is not available or omitted, it is recommended to have print out versions of the invasive species if not available to show live on campus (ex. Iceplant on hillside)
- **Before Play Begins:** Designate a playing area by placing cones at edges/corners of the playing field. (30' x 60' area works well for 20 students.)

- Scatter playing chips throughout the area (each different colored chip represents a different need for a plant or animal to survive. (White = Shelter/Space, Red = Food/Minerals, Blue = Water)
- Be sure to provide enough chips so each player may collect one chip of each color during the first round in order to survive.

Activity Procedure:

Engage:

Today, we will be meeting certain plants that live around us and we will be talking about different kinds that people think are good and bad. Write 3 titles on the whiteboard and ask students to describe what “Invasive”, “Adaptive”, and “Native” means.

- For younger students, ask them if they have heard those words before and ask them to share with their partner what they have heard about them.... Does the class know one word better than the other? Can they think of similar words to help them break it down? (Example: invade/invasion; adapt)
- Show class different potted plants from our nursery and share with them that it is very important to us that we keep propagating, or making more of these kinds of plants. Why are these plants special to us? What does it mean to be native? They are all native. If you do not have potted plants to show them, then use the Natives Slideshow and pick some to share about.

Explore:

Set up for your Presentation from the laminated images on the slideshow and handout worksheets (Part 1). Ask them if they have heard of or seen these types of plants before in the Invasives Slideshow. After, ask them “Do you think humans are invasive?” Tell them to think about this question and not blurt out answers or opinions just yet. Just pondering it as they go through the next activity will get them thinking about a bigger question on human impact and the great debate people have about humans affecting nature versus humans being nature. (Answer: There is no one right answer.)

Explain:

Make a transition from inside to outside once you have talked about behaviors. Get the students mentally prepared to play a game outdoors. Ask them what kinds of behaviors are we looking for when we go outside to play this game that involves running, tagging, talking in a big group (example: no shouting and yelling bad words, acting out of hand and not talking about the lesson, bumping/tackling, etc).

Explain to your students that:

- One of the most serious threats to the natural communities of plants and animals today is the introduction of non-native plants and species by humans. When certain non-native or exotic plant species is allowed to invade a natural native plant population, the results can be devastating for the natives. Often natural diseases or predators are not brought with the plants to their new homes, thus causing a great growth in population. This can lead to a decrease in native plant and animal diversity in a region as these uncontrolled species increase in number. The non-native often out-competes native in obtaining the essential requirements for growth.
- This decrease in diversity affects many different food chains and may lead to a monoculture of plants and animals where once there was a variety. Loss of endemic or native species may mean loss of valuable genetic material, which could someday provide valuable medicines or foods. Loss of diversity makes our world a little less interesting and less beautiful.

The following game will introduce your students to the dilemma of the deadly invaders. (adapted from [Battlefield Earth](#))

- a. **Round One:** All players will be native to the specific area. Everyone will line up along the edges of the playing field at the start of each round. At the sound of the whistle/bell/chime, players will enter the playing field, collect one of the three different colored chips and return to the edge of the playing field. After all of the students have returned to the sideline, they return to the playing field and collect another chip of a different color. Once again, they go to the sideline, returning a third time for the third colored chip.
- b. After a player has collected all three colored chips, he or she moves to the sidelines to wait for the signal to end the round. All players should survive the first round.
- c. **Round Two:** This round will be played the same as Round One, but will now include non-native species. Two players wearing colored headbands represent a non-native species. The non-native species are more aggressive and will be allowed to collect two chips per trip into the playing field. The non-native will also be allowed to return to the playing field as often as they are able but must collect three different colors in order to survive. The native species will be considered a survivor if he or she collects three different colored chips as they had done in Round One.
- d. Sound the whistle to end Round 2. Identify the survivors. Evaluate by comparing population size and impact the non-native had on the natives.
- e. **Round Three:** Native species that did not survive Round Two become non-native for this round. Give each new non-native an armband. Continue to play Round Three just like Round Two.
- f. At the end of Round Three, most, if not all, of the native population should not survive. Evaluate as in Round Two.

Extend:

After Round Three, discuss with your students what they observed as they were playing the game. As a class, have them begin to figure out how and why those students who played as the initial non-native species were not only able to survive, but to actually take over the entire playing field.

- As you gather up again as a group, point out some examples of native versus invasive species on campus. Did they notice anything about that area? Example: shade/biodiversity/water needs/wind resistance/erosion rate/etc.
- Could they find an area nearby that could be a good place to restore? How? Now, transition into the graphic organizer....

Evaluation:

Do a group share out of each group's design. Ask them to include the following in their presentations.

Write on your graphic organizer:

The game we played was a good model because the _____ cookies/headbands showed how _____ causes _____.

I know that _____, _____, and _____ are excellent choices for native plant selection when designing a waterwise garden.

If we changed _____ to the developed area on campus, then it would solve _____ which is an example of Low Impact Development (LID).

Extension Activities:

- The National Gardening Association has a planting strategy tool online [here](#)
- Local and native plants resources can be found at the One Cool Earth office from propagation to history of plants
- MERITO's [Native School Habitat](#)
 - Plant and create a native plant guide!
 - [California Native Plant Society Guide for San Luis Obispo County](#)

Tips and Caveats:

- Reinforce the concept that although a lot of plants are wild and edible, they should never go picking and eating a plant they are not certain is edible. It is always best practice to not attempt to be your own science experiment!

Adaptations for K-2

- K-2 will follow the same Part 2 of the lesson.
- For Part 1, instead of the academically rigorous video and handout, show samples of the invasive species and get students to talk about if they have ever seen them before and where.
- Definitely have samples of plants for K-2 to clip and have them identify them at the end of class. Take time to have them talk using think-pair-share any patterns they see to identify the plants you bring for samples.

Curriculum Cited:

- [Battlefield Earth](#)
- MERITO's [Native School Habitat](#)