



Lesson 10: Alien Invasions

What invasive species exist in your area and how have they affected the local ecosystem?

Grade Level: Middle School 6-8

Essential Question:

What invasive species exist in your area and how have they affected the local ecosystem?

Performance Expectations: Next Generation Science Standards:

MS-LS2-1.

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2.

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Key Understandings

Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. Sometimes humans and other species may have been inadvertently or intentionally introduced to an ecosystem. This can have a variety of effects on a system.

Common Student Misconceptions or Challenges

Students may not know that some species have been introduced to an ecosystem by humans. Nor may they see that this could have widespread repercussions on the ecosystem as a whole.

Objectives:

At the end of this lesson, students will:

- *Understand* that there are multiple reasons why a species may have been introduced to a system.
- *Understand* that these species can have a wide variety of effects on an ecosystem.
- Recognize a few invasive species found in or near their home and research area.

Assessment opportunities:

At the end of this lesson, you will be able to assess students through:

- Having them add to their field guide entries to provide a complete and in-depth picture of both their organism as well as the system as a whole.

Background Information

Though “alien invasives” often brings to mind weedy plants, like dalmation toadflax and Canada thistle, there are a number of animals, fungi and microorganisms that also fit the description. By definition, an alien invasive is an exotic species that can propagate itself, and causes harm to the environment (often through loss of native biodiversity) or to humans. Plants usually are the most accessible and easily studied of the invasive species, and there are many resources available. Non-plant invasive species that are important in Wyoming include *Batrachochytrium dendrobatidis*, the fungus that is devastating amphibian populations, whirling disease of fish (a protist), white pine blister rust (another fungus), and West Nile virus. One that we’re all familiar with is the European starling. Wyoming is fortunate in that many of the species that afflict other parts of North America are not found here (yet).

Not all weeds are alien invasives, of course. Some of our pestiest weeds are natives, and many non-native species are not invasive. Others spread but don’t displace native species; these are called “naturalized,” and dandelions are a good example. Of course, some alien species are indispensable to us—consider wheat and cattle.



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Materials:

- Computers
- Internet
- Research books

Time Commitment:

1-2 45-class period

Vocabulary:

- alien
- native
- non-native
- exotic
- naturalized
- weed
- pest
- invasive

Preparation:

- Have resources available for students to use for research (computers, books etc.)
- A good place to start is the National Invasive Species Information Center, <http://www.invasivespeciesinfo.gov/index.shtml>
- Outlaw Weeds of the West by Karen M. Sackett (2014) covers many of the important weed species found in Wyoming. It is written at a middle/high school level.
- Teaching About Invasive Species Tim Grant, ed. (2014), provides background, program descriptions, and activity ideas for K-12 teachers.
- Weeds of the West, Tom D. Whitson, ed., is a complete reference and pictorial guide to weeds of the western US. It does not include an identification key.
- USDA Plants database has a list of all the noxious weeds found in Wyoming (<http://plants.usda.gov/java/noxious?rptType=State&statefips=56>) with links to the species.
- WGF has a good page on aquatic invasive species.

Directions:

1. Students will review their list of organisms to determine if any are non-native or introduced species.
2. If they find any they will determine:
 - a. What organism did you find?
 - b. What is its range?
 - c. Where did it come from and how did it get here?
 - d. What problems are caused by it?
 - e. What can be done to control it?
3. The above questions are very open-ended, and some additional specific questions are as follows:
 - a. What are the effects of the species on native populations?
 - b. Is the non-native species causing issues for the native populations such as decline in any other populations?
 - c. Why is the invasive species causing decline in others?
 - d. How is this affecting the biodiversity of the area?
 - e. Is anything being done to control the species?
 - f. Should something be done to control the species or keep the population numbers from increasing? If so what? If not why?
4. As a class answer: In what ways can invasive species affect and ecosystem? Develop a list and give some examples.

