

The background of the image is a lush forest. The upper portion shows a dense stand of tall, thin trees with green foliage against a bright sky. The lower portion shows a body of water, likely a pond or stream, which perfectly reflects the trees and sky above. The water is dark, creating a clear mirror image of the forest canopy. The overall scene is peaceful and natural.

8TH GRADE
STEAM & SOCIAL STUDIES



MUSSEL-EY INVADERS

Driving Question:

How can we use knowledge of species interactions to help counteract the detrimental effects of invasive species?

Materials Needed:

Pictures of common invasive species such as Japanese honeysuckle, kudzu and cane toad, science notebook, writing utensil, device for research

In this lesson, students will:

- recognize that invasive species compete against native species for ecosystem resources and can lead to irrevocable change in those ecosystems if not controlled.

TEKS:

Science: 8.11(A)(B)(C)
 Social Studies: 8.11(B); 8.29(A)(B)
 Art MS 3: 1(A)(B)(C); 2(A)(C); 3(B);
 4(A)(B)



SPINNING THE COCOON

Begin by showing students images of invasive species and ask what they all have in common. Explain that all of these species, as well as many others, were introduced into an ecosystem. These particular species were so well adapted to the ecosystem, and had few natural predators in them, that they outcompeted native species and either reduced or eliminated them. These invasive species can completely change or destroy an ecosystem if not controlled.

Ask students how invasive species come to be in new ecosystems, and briefly discuss how the cane toad was introduced to Australia and how kudzu was brought in to try to help control erosion. Other organisms such as cogon grass and zebra mussels are brought in unintentionally. Show students an [image](#) of the zebra mussel and discuss how it was unintentionally introduced in the Great Lakes but has now made it as far south as Texas. It is wreaking havoc on our lakes and quickly invading more waterways. Campaigns have been launched to try to curb the spread, but as recently as July of 2018 the zebra mussel was discovered in new places such as Lake Grapevine in North Texas.

KERNEL OF KNOWLEDGE

In her five-year lifetime, a single quagga or zebra mussel will produce about five million eggs, 100,000 of which will reach adulthood. The offspring of a single mussel will in turn produce a total of a half-billion adult offspring.



METAMORPHOSIS

Students will research the zebra mussel to discover what biotic and abiotic factors it needs to survive, and how that compares to the needs of native species. They will further research the life cycle, modes of transportation and detrimental effects of the zebra mussel. Students will use this information to come up with a plan for curbing their spread. Students may devise a way to interrupt their reproductive cycle, eliminate their ability to attach to substances or chemically divert them with pH changes. Together, the students will critique their method to check for problems it might cause for native species and identify possible adjustments to prevent those problems. Students will then prepare a presentation detailing their hypothesis of how their method would work, along with its strengths and drawbacks, to share with Texas Parks and Wildlife.

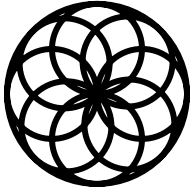


THROUGH THE LENS

Using Flipgrid or another recording app, have students record a presentation detailing their hypothesis to combat invasive species in the area. Send the presentation(s) to Texas Parks and Wildlife.

UPCYCLE

Students will further research zebra mussels to find a purpose for the populations currently existing in Texas. They may have brought Lake Erie back to life by filtering the water, but what other uses do they have? Is it possible to use them to feed hungry people within the community? Can their shells be used for building and infrastructure? Can the things that make them successful as a species be used to benefit humans?



KALEIDOSCOPE

The introduction of invasive species was not an issue in the Colonial Era or in the early years of our republic. They came, usually by accident, on ships. Have students research what types of non-native plants and animals were brought to America prior to 1900. Have them compile lists, and compare and contrast each in groups. Ask them why settlers might have brought these species over. Provide time for discussion and questions.

Near the end of the lesson, point out that our national parks, which are managed by the federal government, are so concerned with some invasive species they require all watercraft to be inspected before they are allowed to dock. In Glacier National Park, they are desperate to rid the lakes of invasive lake trout that a license is not required to fish. In Yellowstone National Park, lake trout are not allowed to be placed back into the water because it is a predator of the bull trout, which is an endangered native species. Ironically, the lake trout was introduced to bring people to the park after the railroad was built.



eARTh

Invasive species are a serious issue in many parts of the world – even in our own backyards. Once you have defined invasive species, show your students this [video](#) which further explains the process of invasive species in a new land and uses beautiful graphics to help tell the story.

After the video, ask students if they think they would have learned as much from the video without seeing the images. Why or why not? Look back at the images and freeze the video to focus on specific frames. Discuss the elements of art and the principles of design used in the selected frames.

Next, divide your students into groups of 3-4. Have them choose one invasive species to research. They should identify where the species originated, what it eats, who are its natural predators, where it was introduced, how it got there and its impact on the land it now inhabits. Once they have this information, they will create a comic book or graphic novel to illustrate the story. They can create their book from different perspectives such as that of a person who experiences the effects of the invasive species, from the perspective of a narrator, or even the invasive species itself. Encourage them to really push their creativity! Their drawings should be clean-lined and colored neatly – just as you would see in an illustration or comic book. You can staple together sheets of copy paper or research different ways of binding books to take it up a notch.

Once the students finish, give each group the chance to read one another’s stories and offer feedback. Also, display the books where other students and teachers can see them.



Community Garden

- Create the books as directed in the eARTh section, but focus on invasive species that are directly affecting your area. Use only line drawings to create the images in the books so that they can be made into coloring books, and distribute them to local organizations, grocery stores, etc. Include suggestions on how to address the issue and prevent it from happening with other species.



CAREER CONNECTION

Ecologist - An ecologist studies the interrelationships between organisms and their environments. For example, they may research how the creatures in forests, deserts, wetlands or other ecosystems interact with each other, as well as their environments. Ecologists must hold a bachelor's or higher degree in ecology or a related science.

Research Biologist - Research biologists study interactions between species both in the lab and the field. They may study an organism as minute as microbes or as advanced as humans, and work to understand how these organisms might benefit or hurt each other. Most research biologists have a master's degree.



CAREER HIGHLIGHT

Rachel Carson, author of *Silent Spring*, is perhaps the most famous conservationist and ecologist in the United States. Carson's essays, based on her research, became some of the most loved and hated ecological writings of her time, inspiring change that brought species such as the bald eagle back from the brink of extinction.



