



8TH GRADE
STEAM & SOCIAL STUDIES





BACK TO THE FUTURE

Driving Question:

How does the addition or removal of one species affect an entire ecosystem?

Materials Needed:

Science journal, sketchbook, writing utensil, microhabitat materials such as two-liter bottles, terrariums, soil, water, plants and organisms, device for research and photography

In this lesson, students will:

- recognize how the removal or addition of one species can alter an entire ecosystem.

TEKS:

Science: 8.11(A)(B)(C)
 Social Studies: 8.10(C); 8.29(E);
 8.30(C)(D); 8.31(A)(B)
 Art MS 3: 1(A)(B)(C)(D); 2(B);
 4(A)



SPINNING THE COCOON

Watch the following [video](#) with students about how reintroducing wolves to Yellowstone affected the rivers in that ecosystem. Ask students to brainstorm other ways that introduced species could affect an ecosystem and write them on the board. The responses can be negative or positive. Next, ask students to focus specifically on humans and how we positively or negatively affect ecosystems, and write down their ideas. Explain that all species have their own niche, or specific place, within an ecosystem. If they leave this niche, then another species moves in. Because the new species may interact differently with other species in the ecosystem, this can cause a huge shift in the entire ecosystem. Ask students in what ways they think a new species moving in can affect an ecosystem. They may come up with competition for food or other resources, predation, or even the species itself being prey. Explain that these seemingly minute changes can impact future generations of all species in an ecosystem.

KERNEL OF KNOWLEDGE

There are now 41,415 species of animals and plants on the International Union for Conservation of Nature Red List, the foremost authority in threatened and endangered species. Of these, 16,306 species are threatened with extinction.

THROUGH THE LENS



Allow students to consider the Upcycle questions and have them research and create a video in Flipgrid to answer them. Be sure students understand that, as settlement moved westward in the mid-to-late 19th century, bison, a source of life for many Native American tribes, were killed off almost entirely.

When they relate this to a contemporary issue of biodiversity, they may mention migratory species such as the pronghorn, elk, mule deer and/or antelope. They may even mention bison and how, due to being in controlled environments such as Yellowstone National Park, these animals have ceased their former migration patterns. Places like Yellowstone create isolation and limit biodiversity. This is a result of continued settlement in surrounding areas that were formerly grazing land where bison could roam free. Have students identify potential solutions to this problem such as fencing, predator control, wildlife corridors and/or more conservation areas.



METAMORPHOSIS

Students will design and create a living micro-ecosystem on which to ethically test various hypotheses. Students might choose to create an aquatic system in a terrarium or two-liter bottle, or a terrestrial system. In whatever system they chose, they should include plant life as well as some living organism such as insects or small fish. It is advised not to allow students to use birds or mammals due to ethical issues. Once established, students should take careful notes and photographs of the ecosystem over a predetermined length of time. Roughly a month is usually enough to see “norms” in such a small ecosystem. Students can take a few minutes at the beginning of each class to record population numbers and make notes about growth and resources. After a set amount of time, students will introduce a new species to the habitat and write a hypothesis about what they think will occur when the new species is introduced. It may be a new plant, bug or fish species. Students will continue to observe their ecosystem and record data similar to what they were recording prior to the addition of the new species, as well as data about how the new species interacts. After a predetermined length of time, students will write a final report detailing how the species that was introduced affected the ecosystem, and what implications this might have for a large-scale ecosystem.

Students can augment their written records with daily photos of the ecosystem throughout the experiment, and then edit together a visual journal of the changes. Voiceover or graphics explaining the process and timeline also may be added.

UPCYCLE

Have students consider the following questions:

1. How did westward expansion change the biodiversity in America, and how does this relate to contemporary issues in the nation as we settle more land?
2. Evaluate solutions to the biodiversity problem currently found in and around Yellowstone National Park.
3. Would it be possible to have lawmakers address this issue and solve this problem? If so, how?



eARTh

Introduce your students to the term appropriation in art. This involves the use of pre-existing objects or images with little or no transformation applied to them, often shifting the meaning of the initial object. Appropriation has taken many forms throughout art history. One of the most famous women artists' to use ready-made objects for appropriation was Meret Oppenheim. Her body of work involved many themes, including the use of irony in the objects that she appropriated for her work. For example, one of her most famous pieces is a fur covered teacup, saucer and spoon. Although it is interesting to look at, it is no longer useful in its new form. Another of her pieces was an iron to which she attached nails causing it to shred anything that it "ironed." Show your students examples of Oppenheim's work and talk about how they are ironic. Also, discuss how the students define appropriation versus stealing. Are they different? Why or why not?

Now, instruct the students to brainstorm some everyday objects that they could appropriate and turn into a new and ironic works. The viewer should still be able to easily discern what the initial object was, as well as understand how the student has adjusted the object to no longer be useful as it was in its original form. Although the end result will be a somewhat useless object, it should still have the principles of design at the forefront of its conception. When finished, the students should display their appropriated sculptures and talk about the creative choices that they made in their work, as well as how they altered the purpose of the original object.

Community Garden

- Often, especially after a natural disaster, people are forced from their homes into unfamiliar places where they have no family, friends or home. Ask your students to brainstorm ways that they might help people who have been displaced from their homes. Ideas might include collecting cans and staples for a food pantry, gathering clothes to donate to a local shelter or accumulating toiletries to send to disaster areas.

- One nonprofit that builds homes for families in need is Habitat for Humanity. Contact your local organization and ask how you and your students can help build houses for those in need! [Visit](#) their website for more information and to contact your local Habitat for Humanity.



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. A career as an ecologist requires a bachelor's or higher degree in ecology or a related science.

Environmental Advocate - Environmental advocates lobby on behalf of environmental groups and individuals to try to implement policies that conserve and protect our environment and ecosystems. Most environmental advocates have a bachelor's degree in political science or communications.



CAREER HIGHLIGHT

Ecologist and conservationist Chris Morgan uses television and film to share information about one of the most feared and misunderstood terrestrial creatures. His work with bears crosses continents as he works to educate people and prevent the unnecessary reduction of bear populations, and promote recovery in places where bears previously inhabited.

