

It's a Dilemma!



Activity

Students read, discuss, think critically and write about a hypothetical dilemma concerning aquatic nuisance species.

Grade level: 6-8

Subjects: language arts, science, social studies

Setting: Classroom

Duration: 1 class period

Key Terms: dilemma, responsibility

Objectives

- Students will examine their own values and beliefs related to the environment and invasive species.
- Students will listen to and respect the values, beliefs and opinions of others.
- Students will evaluate possible actions they might take that have an effect on the natural environment.

Materials

- Copies of *Dilemma cards*
- Writing materials

Background

It is the major purpose of this activity to provide students with an opportunity to come to their own judgment about what they think are the most responsible and appropriate actions to take in situations involving aquatic nuisance species. It is not the intent of this activity to prescribe “right” and “wrong” answers for the students, only to increase awareness of how different actions may result in the introduction or spread of aquatic nuisance species.

Preparation

- Before the activity, copy and cut out enough *Dilemma Cards* for each group of students.

Directions

- Divide the class into groups of four and give each group a stack of *Dilemma Cards*. Place them face down at the center of the group.
- Each student should draw a single card from the top of the stack. Individually, each student studies the situation, decides what he or she should do, and formulates his or her reasons.
- When the students are ready, typically in less than three minutes, the first student reads the situation and options aloud to the rest of the group. The student gives the decision he or she has chosen and describes the reasoning involved. In turn, each of the other members of the group is invited to comment on the dilemma and what he or she would do in the situation. The discussion of each dilemma by the members of the group should take about five minutes. The person whose dilemma is being discussed will lead the group and can ask other members of the group questions. Group discussion gives the students experience in having ideas examined by peers and is intended to remind students of the need to take personal responsibility for decision making. It is not necessary for the students to reach a consensus; there are legitimately ranging views of the most appropriate and responsible actions to take in many situations. The purpose is to provide students with an opportunity to examine, express, clarify and take responsibility for their own reasoning.
- After the first student returns their dilemma card to the bottom of the stack, the next student will continue the same process until all students have had an opportunity of express their decision and rationale about a dilemma.

Evaluation

Choose a dilemma and:

- Write a short paragraph on the positive and negative effects of all the options listed for that dilemma.
- Indicate what additional information, if any, is needed to make a responsible and informed decision.
- Give two opposing and convincing arguments on how to respond to this dilemma.
- Identify what you judge to be the most responsible decision; explain your reasoning.
- Explain how someone else could reach a different, yet valid opinion with the same information.

Extensions

- Student can create their own dilemma card relating to an aquatic nuisance species or environmental issue of their choice. Dilemmas may be left entirely open-ended, with no options suggested.
- Adapt this exercise to a debate format.

Source

This activity is an adaptation of “Ethi-Reasoning”, from the *Project WILD K-12 Curriculum and Activity Guide* by the Council for Environmental Education.

Washington State Science & Environmental Science Standards:

6-8 LS2A – An ecosystem consists of all the populations living within a specific area and the nonliving factors they interact with. One geographical area may contain many ecosystems.

6-8 LS2D – Ecosystems are continuously changing. Causes of these changes include nonliving factors such as the amount of light, range of temperatures, and availability of water, as well as living factors such as the disappearance of different species through disease, predation, habitat destruction and overuse of resources or the introduction of new species.

6-8 LS2E – Investigations of environmental issues should uncover factors causing the problem and relevant scientific concepts and findings that may inform an analysis of different ways to address the issue.

6-8 LS3E – Adaptations are physical or behavioral changes that are inherited and enhance the ability of an organism to survive and reproduce in a particular environment.

ESE Standard 1 - Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

Dilemma Card

Hydrilla is a submerged aquatic plant named after Hydra, the nine-headed water-serpent of Greek mythology because of its ability to grow a new plant from a tiny stem fragment. Native to Africa, Asia, Australia and parts of Europe, *Hydrilla* was introduced to Florida waters in the 1950's where it was cultured for the aquarium industry. Since this time, *Hydrilla* has spread to the waterways of all southeastern states and four states on the west coast (including Oregon and Washington). This plant was most likely spread by people dumping aquariums too close or directly into lakes and streams. *Hydrilla* grows very quickly (an inch or more a day) and forms dense mats of vegetation that shade out native aquatic vegetation, destroy fish and wildlife habitat and create harsh conditions for other species by decreasing oxygen and increasing water temperature. The thick *Hydrilla* canopy also has detrimental impacts on sport fisheries, recreation (e.g., boating, swimming) and agriculture industries. **Would you:**

- Encourage everyone you know who has a fish to boycott the aquarium industry for causing this problem in the first place.
- Spray all infested waterways with herbicides.
- Invent a mechanical harvester that will physically remove the huge masses of *Hydrilla* from waterways.
- Prevent the spread of *Hydrilla* through public education programs.
- Pretend there isn't a problem because you don't like to fish or go swimming anyway.
- Other

Dilemma Card

The *Red-Eared Slider* is a medium-sized turtle native to south-central United States. It has a dark shell, yellow stripes on its neck and legs, and a bright red or orange patch just behind each eye. Considered an aquatic nuisance species in Oregon, they compete with native turtles for food, basking and nesting sites, and can spread diseases to which native turtles have no immunity.

Five years ago you bought a *Red-eared Slider* from your local pet store. Now your turtle is getting too big for his aquarium and you are tired of taking care of him anyway. **Would you:**

- Release your turtle in a local pond.
- Sneak your turtle into the neighbor's water garden.
- Drop your turtle off at the zoo.
- Donate your pet to a children's museum, school, community center, nursing home, friend or neighbor.
- Sell your turtle on Craig's List.
- Contact your local Oregon Department of Fish and Wildlife for advice.
- Other

NOTE: In the state of Oregon it is illegal to buy, sell, possess or transport a red-eared slider. See Oregon Administrative Rules, Division 56.

Dilemma Card

The *Red swamp crayfish*, native to southeastern United States, is the most invasive crayfish in the world. It has been introduced to Africa, Asia, Europe, and throughout North America including Oregon and Washington. It is dark red with raised bright red spots covering the body and claws. *Red swamp crayfish* may outcompete native crayfish for food and habitat. They are also known to weaken stream banks through extensive burrowing, leading to erosion and stream sedimentation. *Red swamp crayfish* have been introduced intentionally as a food source, as bait for popular warm water fisheries, or through the biological supply trade for its use in schools.

Your class has been studying crayfish for the past few months. Now that the lesson is over, your teacher is wondering what he/she should do with the live crayfish that were ordered online through a biological supply company. **Would you:**

- Humanely euthanize the crayfish.
- Release the crayfish in a local pond.
- Contact the biological supply company and find out what species of crayfish you have.
- Have a crayfish boil - yummm.
- Suggest that next year the school look into ordering a native crayfish species for the science project.
- Other

Dilemma Card

New Zealand mudsnail are tiny aquatic snails that have invaded freshwater habitats of Australia, Europe, Asia and North America, including Oregon and Washington. They tolerate a broad range of temperature, salinity and water quality, and have no natural predators in the United States. In large numbers these small snails can completely cover a stream bottom, compete with native snails for food and crowd out native aquatic insects that provide a food source to native fish species. The *New Zealand mudsnail* is typically spread by "hitchhiking" on boats, rafts, boots, clothing, pets and other recreational gear.

You are a fish biologist working in a river that is known to contain *New Zealand mudsnail*. You will be traveling to a completely different watershed tomorrow and only have one pair of waders and boots. **Would you:**

- Use your waders and boots again tomorrow; you were only in the river for a few minutes anyway.
- Put off your work for a couple days and let your gear thoroughly dry out before moving to the next watershed.
- Soak your waders and boots in a chemical disinfectant for 15 minutes and pour the liquid down a storm drain.
- Before leaving the river, brush all of the mud and plant material from your gear.
- Spend a few minutes looking around for signs of *New Zealand mudsnail*. If you don't see any, assume that it is fine to move into the next watershed.
- Other

NOTE: because the mudsnail can reproduce asexually, it only takes one individual to start a new population in a new watershed.

Dilemma Card

You have purchased a beautiful piece of property next to a lake. When you built your house, your best friend said he would do the landscaping around the house for a very good price, so you agreed. You were going to be out of town for a few weeks and this is when your friend would be able to work on your yard. When you returned, your friend had planted *yellow flag iris* along the lake! Despite its invasiveness, it is still being sold in stores and nurseries. The beautiful yellow flowers have made this plant a very popular ornamental for use in water gardens. Your best friend was very proud because he was able to save you so much money and time, but you know that *yellow flag iris* is an aquatic nuisance species that has the potential to take over the entire lake! **Would you:**

- Say what a great job your friend did and forget the impact of this aquatic nuisance species.
- Demand that your friend pull out the *yellow flag iris* and burn it on the spot.
- Share your knowledge about aquatic nuisance species with your friend and try to figure out what other native plants could be used instead.
- Say thank you graciously and spray everything with a plant herbicide after they leave.
- Get angry with your friend for using plants that will potentially ruin the lake and demand a refund.
- Other

Dilemma Card

Purple loosestrife was first brought to New England in the early 1800's as an ornamental plant. The plant moved rapidly north into Canada, south into Virginia and west through the Great Lakes, earning it the nickname the "purple plague". This aquatic nuisance species now exists throughout much of the United States and is a serious threat to wetland biodiversity. Each *loosestrife* plant can produce millions of tiny seeds that are carried along by wind and water. As a result, many wetlands once inhabited by a rich diversity of native plants are now overrun by dense stands of *purple loosestrife* that can be thousands of acres in size. It can out-compete native plants, alter wetland hydrology and eliminate habitat used by migratory waterfowl and other wildlife. *Purple loosestrife* is sold commercially despite its devastating effect on natural communities. It is promoted by horticulturalists for its beauty as a landscape plant and by beekeepers as a nectar plant. **Would you:**

- Start a nation-wide spraying program for *loosestrife*.
- Forget about the problem because it is obviously beyond our control.
- Notify each state of the problem and hope that will take care of things.
- Inform the public about the dangers of landscaping with *purple loosestrife* and include horticultural society, nursery-owners and natural resource managers in the information distribution.
- Develop a biological control, similar to something that controls the spreading of *purple loosestrife* in its native Europe.
- Other

Dilemma Card

You are a farmer who has just received an agricultural permit to grow cabbage on a parcel of land that is near a wetland. After planting your crop, you notice what looks to be a number of small beaver wandering around the area late one evening. Upon closer examination you realize a colony of *nutria* has taken up residence on your property – and they are eating your cabbage! You do some research online and find out that *nutria* are an aquatic nuisance species. They reproduce very rapidly, feed almost entirely on vegetation (including agricultural crops) and create burrows that cause bank instability and erosion. Nutria may look cute, but they are damaging your property and costing you a lot of money you can't afford to lose! **Would you:**

- Hire a professional trapper to capture and exterminate the *nutria* on your property.
- Build a fence around your field to keep the *nutria* out.
- Consider moving your crop to a field that is further away from the wetland. Crops close to water will be more attractive to *nutria* than those further from water.
- Just try to live with them. Hopefully they won't eat your entire crop.
- Try scaring the *nutria* away with loud noises, high pressure water sprays or consider getting a large dog.
- Other

Dilemma Card

Your next door neighbor has a small pond on his property close to the Columbia River. His pond is currently overgrown with aquatic vegetation, so he has decided to stock the pond with *grass carp* to keep the vegetation under control. Although this sounds like a reasonable solution, you are a bit worried because the pond is often flooded by the Columbia River during high flow events. You also know that *grass carp* are nonnative to the Columbia River and have the potential to out-compete native fish species for food, remove important native aquatic vegetation, introduce parasites and disease, and threaten water quality. **Would you:**

- Make sure your neighbor obtains a permit and purchases *triploid grass carp*, which have been genetically altered to make them sterile, just in case they get loose.
- Mind your own business; it's your neighbor's pond.
- Report him to the proper authorities. *Grass carp* are a prohibited aquatic animal species in the state of Washington, meaning they can't be possessed, sold, transported or released into state waters.
- Help him build a dyke on his property to protect the pond from flooding.
- Tell him to pull out the vegetation by hand and stock the pond with native fish species.
- Other

Dilemma Card

While walking along the Oregon Coast with your family, you stumble upon a large wooden object that is covered with barnacles, sea weed and what appears to be a weird looking star fish. You realize that you may have found a piece of Japanese tsunami debris. **Would you:**

- Take a photograph of the debris and leave it where you found it.
- Push the debris back into the ocean, it will wash away eventually.
- Clean off the organisms as best you can and throw the wooden object away in the garbage.
- Drag the wooden object up onto dry land, or throw it into the garbage leaving all of the organisms attached.
- Don't do anything; you might get sick from touching it!
- Contact your local Oregon Department of Fish and Wildlife/Washington Department of Fish and Wildlife authorities and tell them what you found and where it was located.
- Other