

E MĀLAMA IĀ HAWAI'I (Take Care of Hawai'i)



Grade 6



Lesson at a Glance

Students view a video about caring for native Hawaiian forests and then integrate information from the video, a student reading and a vegetation map of the Islands to develop their own interpretation of ways of balancing human needs and needs of wildlife.

Key Concept

Responsible environmental interaction involves consideration of human effects on other life forms as well as the wise use of natural resources.

Objectives

Students will be able to: 1) interpret maps showing the status of original vegetation in Hawai'i; 2) describe ways the Hawaiian environment has been changed by people; and 3) express their ideas about ways of balancing the differing needs of people and wildlife.

Time

three class periods

Subject Areas

Hawaiian studies, language arts, social studies

Materials

student reading (provided) and "We All Need the Forest," 'Ōhi'a Project video

Teacher Background

Scientists believe that native Hawaiian rainforests originally grew down to the Islands' coasts. By the time Europeans arrived in the Hawaiian Islands lowland forests had been cleared from most areas. In the last 200 years, human **impact** on the Islands' **ecosystems** has accelerated dramatically. As the maps in the student reading clearly illustrate, much of the original Hawaiian vegetation cover has been lost. Approximately 25 percent may still remain. Various reasons for this drastic alteration of the Hawaiian landscape are described in the student reading. However, all human activity has an effect on the **environment** as people alter the landscape to meet their needs for survival.

Endemic Hawaiian plant and animal species are very vulnerable to human introductions of non-native species. The limited distribution of many **native** species tends to make them even more vulnerable to disturbances. Since so few native ecosystems remain intact, it is essential that these areas be preserved and managed to protect our Hawaiian natural heritage.

Teaching Suggestions

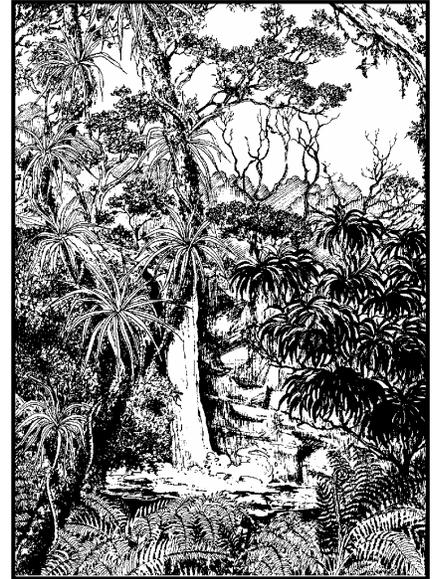
1. Show the 'Ōhi'a Project video to students.
2. Discuss the three major themes of the video: *lōkahi* (harmony), *ho'ololi* (change) and *mālama* (care). See the 'Ōhi'a Project Video Appendix for more information about using the video.
3. Ask students if change is always negative. Review the process of change or evolution that gave rise to unique Hawaiian plants and animals. Contrast this with change that has come too quickly with the arrival of people in the Islands.
- ✓ 4. Distribute the student reading with the maps. Explain that "replaced" indicates areas where virtually no original native vegetation remains and that "degraded" areas still contain some native species.
5. Ask some students to integrate information from the video, the student reading and the map to create their own interpretation of ways that we can balance human needs and the needs of wildlife. They could work individually or in groups to develop booklets, skits or educational displays. These interpretations could be organized around the three themes of the video (see no. 2 above).
6. Ask students to share their interpretations and discuss how human needs and needs of wildlife can be balanced.
7. Emphasize that often there are no clear rights or wrongs regarding ways to use the land. People have different values that often conflict, especially concerning the natural environment. Focus students' attention on actions they can take to protect the natural environment:

- Spread the word about native environments to others—share your interpretation with other classes.
- Volunteer for a service trip project to pull unwanted plants from parks or natural area reserves (contact your local Sierra Club chapter or the Division of Forestry office of the Department of Land and Natural Resources).
- Enjoy native forests and encourage others to do so.
- Write letters to legislators and editors of local newspapers supporting conservation.

Extended Activities

- Have students cut photos from magazines or draw pictures of activities that show human interaction with the natural environment (such as land clearing, home building, farming, or outdoor recreation). Each student should have at least two drawings or photos. Collect all students' pictures and divide the class into groups of four. Shuffle pictures and distribute them evenly to each group. For each picture, ask students to:
 - a) Identify the activity.
 - b) Explain how the activity could have an impact on the environment.
 - c) Identify whether it is an appropriate or inappropriate activity from their point of view and list reasons.
 - d) Speculate as to why the activity is done.
 - e) Suggest ways the activity could be altered or substituted to satisfy the person's needs and minimize harm to the environment.
- Work on improving the schoolyard environment. Send students out in the schoolyard and have them make a list of activities that cause damage to the environment. Discuss alternative activities to correct the situations. Consult the head custodian or groundskeeper and have him/her react to the suggestions. Select a few activities on which to focus. Ask groups of students to come up with tangible ways to correct the problems (e.g., make posters, send memos to other classes, make signs, put extra rubbish cans out). Examples of solutions to problems are:
 - a) Throw refuse in rubbish cans.
 - b) Walk on sidewalks or trail instead of cutting through plantings.
 - c) Don't write graffiti on walls.
 - d) Plant native trees or shrubs (see Plants and Animals Appendix for a list of suggested plants).
 - e) Care for trees; don't carve on bark or pull on branches.
 - f) Don't leave water tap running.
 - g) Ride bicycle on side of street not over vegetation.
 - h) Clean up dog droppings.
 - i) Start a recycling campaign.
- Ask students to clip newspaper articles regarding environmental issues in Hawai'i (e.g., flooding, channelization of streams, depletion of fish near beaches, golf course development on agricultural land, biomass incineration) and share what they have found with other students.

In the forests, along the shoreline, on the coral reefs, Hawaiian plants and animals have lived in healthy **ecosystems** for millions of years. Some of these plants and animals evolved into new species that could be found nowhere else in the world. They became **endemic** species, like the tiny happy-face spider, the *nēnē* goose, or the monk seal. Some of these species were found in small populations because they lost the ability to disperse, or spread very far. When people came, the habitats of these **native** plants and animals began to change.



The Polynesians burned forests to grow food crops and *pili* grass for house thatch. Sometimes the fires became uncontrollable and spread into the mountains. To grow *kalo* (taro), *‘uala* (sweet potato), and *mai‘a* (banana); raise *pua‘a* (pig) and *moa* (chicken) in the lowland forests; and *‘ama‘ama* (mullet) in the fishponds, the Polynesians needed to make changes to the land and shores.

The first Westerners introduced cattle to Hawai‘i and told the Hawaiians that these animals were very valuable. Kamehameha the Great placed a *kapu*, or ban, on killing cattle. Wild herds of cattle then grew larger and larger and destroyed many forests by eating young tree seedlings and trampling on roots.

As more people arrived, they introduced more foreign plants and animals and began cutting down large areas of native forest for lumber and firewood. They also cleared forests to raise cattle, sheep, and goats.

The forests were severely damaged. Some of the introduced animals, including pigs, ran loose and eventually become wild, or **feral**. The pigs ran through the forests, trampled upon native plants, ate ferns, uprooted the groundcover for roots and bugs, and spread seeds of weedy plants. During heavy rains, the forest soil **eroded** into streams, affecting native streamlife, like the *‘o‘opu* or goby. With fewer forests to absorb and slow the release of rainwater, less fresh water was available for drinking and growing crops. The rainwater just ran off into the ocean, carrying soil and dropping it on reefs where it smothered coral.

Foreign ships carried stowaways such as rats, cockroaches, and mosquitoes to the Hawaiian Islands. Rats ate bird eggs and mosquitoes spread diseases from introduced birds to native birds. Some animals, such as the mongoose, were purposely brought in to control other problem animals. The mongoose was introduced to control rats, but the mongoose is active during the day and rats are active at night! So the mongoose kills relatively few rats, but eats native young birds and birds' eggs.

Many native forests were cleared to make way for sugar cane and pineapple plantations. Sugar cane crops use lots of water, some of which is taken from streams. This causes stream flow to drop and some streams to dry up entirely.

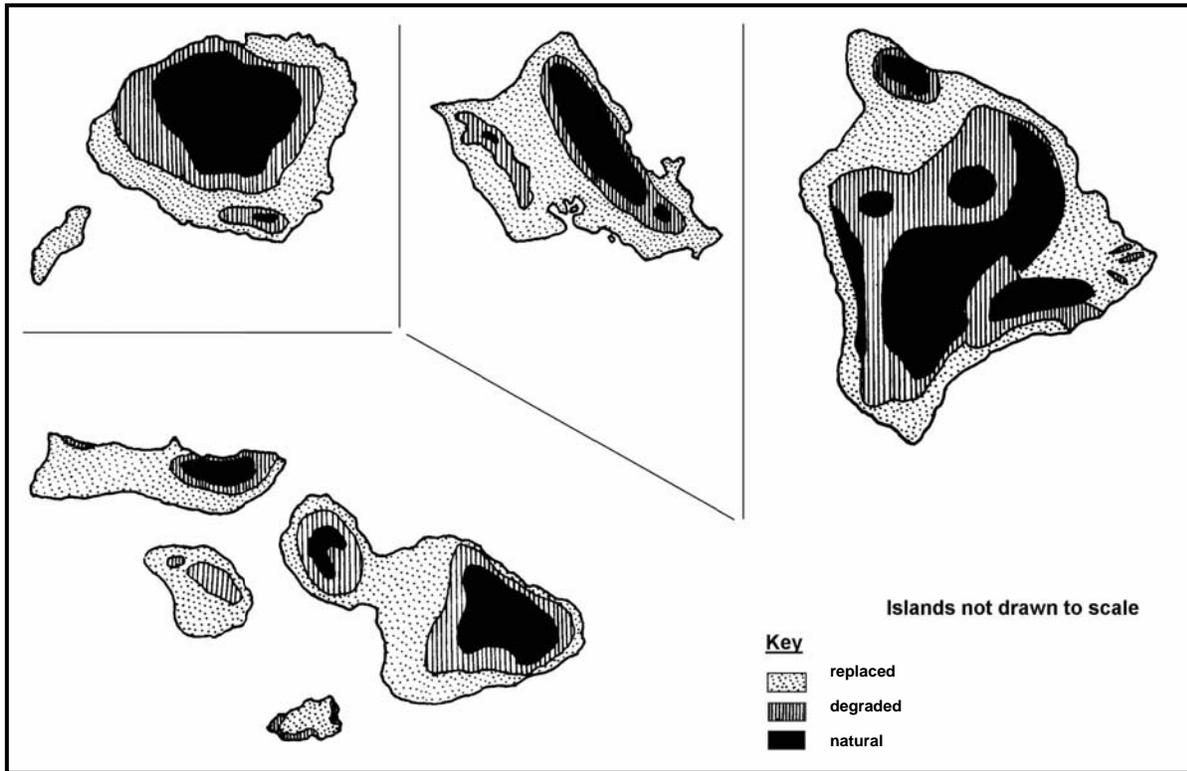
In the late 1800s foresters began replanting forests with trees from all over the world. **Forest reserves** were established to protect both native and replanted forests. Feral cattle and sheep were rounded up by the hundreds and removed from forest reserves. Fences were then constructed to keep the feral animals out. Scientists studied the forest to learn more about native birds and insects.

As the human population in the Islands grew, people needed more land, water and food. More houses, hotels, roads and shopping areas were built and more sewage and garbage needed to be disposed of. Landfills of garbage began to fill up. Litter increased along the highways and populations of native plants and animals become more rare. Many species of birds became **extinct**. People began to realize that we needed to take care of Hawai‘i. Citizens joined organizations like The Nature Conservancy of Hawai‘i or the Audubon Society to support efforts to preserve native ecosystems.

All of these efforts began to make a difference. Forests grew on barren hillsides and thousands of acres were set aside as preserves for **wildlife**. But Hawai‘i still needs care. We have more endangered species here than any place of comparable land size on Earth. Our population continues to grow and demands for land, water and other resources affect our **environment**. Our carelessness and indifference can negatively **impact** our natural environment.

The black areas on the maps on the next page show where our natural or original native ecosystems can still be found in the Islands. The lined areas are places where many introduced plants and animals live along with native species. The dotted areas are places where the native plants and animals have been replaced with plants and animals people have brought to the Islands. Study the maps to see where “native Hawai‘i” still exists on your island.





Adapted from Morgan, Joseph R. *Hawaii: A Geography*. Westview Press, 1983.

What can we do to balance our human needs for natural resources with the needs of wildlife? Use information from the video and this reading to develop a booklet, a skit or an educational display to share with others. Help to spread the word that we need to take care of Hawai‘i—“*E mālama iā Hawai‘i.*”



'ōhi 'a-koa rainforest