

Grades 2-3



HOLOHOLO KOLOA MAOLI

Going on a walk with the Hawaiian duck

Focus Questions: What is the natural habitat for the Koloa maoli? Where should they live and what should they eat to be healthy?

Lesson at a Glance: Students will learn the appropriate natural habitats for the Koloa maoli by visiting various mock habitat types in the classroom and completing a fun worksheet.

Key Concepts

- Habitats provide food, water, shelter and space for living creatures.
- In nature, plants and animals must find the right habitat in order to survive. Plants and animals depend on each other.
- People modify the physical environment, which affects plants and animals.
- Some habitats, especially those that are artificial, can provide basic needs for living creatures but may not be suitable for the long term.
- Like humans, wild animals need healthy diets to survive.

Objectives: Students will be able to:

- Examine the ways in which people modify the physical environment and explain the effects of these changes.
- Distinguish between habitat types that are “healthy” or “unhealthy” for the Koloa maoli.
- Describe the natural food that Koloa maoli should eat.
- Describe the unnatural food that Koloa maoli should not eat.
- Explain why the Koloa maoli need proper habitat to survive and relate that concept to other species, including humans.

Subject Areas

science, social studies, health

Time: three class periods

Materials

- habitat signs saying: wetland, taro lo‘i, native forest, parking lot, playground, swimming pool
- poster boards and construction paper
- glue
- scissors
- old magazines (e.g. nature, sports, travel, Hawai‘i, family)

- crayons
- Holoholo Koloa worksheet (one copy per student)
- videos and photos of Koloa (see DVD and CD)

Standards and Benchmarks

Science Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION: Discover, invent, and investigate using the skills necessary to engage in the scientific process

Topic: Scientific Inquiry

Benchmark: SC. 2.1.1: Develop predictions based on observations

Science Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT: Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment

Topic: Interdependence

Benchmark: SC.2.1.1: Describe how animals depend on plants and animals

Benchmark: SC.3.3.1: Describe how plants depend on animals

Science Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION: Understand genetics and biological evolution and their impact on the unity and diversity of organisms

Topic: Unity and Diversity

Benchmark: SC.2.5.1: Identify distinct environments and the different kinds of organisms each environment supports

Benchmark: SC.3.5.1: Describe the relationship between structure and function in organisms

Health Standard 1: CORE CONCEPTS: Understand concepts related to health promotion and disease prevention

Topic: Healthy Eating and Physical Activity

Benchmark: HE.K-2.1.3: Describe the benefits associated with a healthy diet

Social Studies Standard 7: Geography: WORLD IN SPATIAL TERMS - Use geographic representations to organize, analyze, and present information on people, places, and environments and understand the nature and interaction of geographic regions and societies around the world

Topic: Human and Physical Characteristics in Spatial Terms

Benchmark: SS.2.7.1: Identify and explain the human (man-made) and physical (natural) characteristics of a neighborhood or the community

Topic: Environment and Society

Benchmark: SS.3.7.4 Examine the ways in which people modify the physical environment and the effects of these changes

Teacher Background Information

The Koloa maoli is also known as the Hawaiian duck. It lives in the main Hawaiian Islands but its numbers are very small. It is considered an endangered species, with only about 2,200 birds left. Most Koloa maoli are now found on the islands of Kauai, Ni'ihau, and Hawai'i.

Like most ducks, Koloa maoli like to live in areas where there is freshwater (wetlands). But this duck is special. It lives in *makai* (toward the ocean) as well as *mauka* (toward the mountain) areas. A proper habitat should provide food, water, shelter and space for a living creature. Most Koloa can be found in freshwater wetlands, both natural and human-made such as mountain bogs, streams, plunge pools at the bases of waterfalls, watering ponds for stock animals, flooded pastures, golf courses, taro *lo'i* (patches) and coastal wetlands. Taro *lo'i* fall into the category of agricultural wetlands and are not natural but they provide habitat for birds and food for people. In addition to aquatic habitats, Koloa use grasslands and riverbanks near wetlands for nesting, feeding and resting. They also frequent upper forest bogs and streams.



Photo by Brenda Zaun, USFWS



Photo by Brenda Zaun, USFWS

Koloa maoli are dabbling ducks. They are known to be good divers but usually feed by “tipping” rather than submerging. You might see them “bottom up” in the water, with their necks stretched down to gather food (see photo to right). Dabblers also “dabble.” They have bills that are specially designed to strain small invertebrates and plant material from the surface of the water. Koloa maoli eat primarily small invertebrates such as aquatic

insects, snails and crustaceans. They also eat freshwater *limu* (algae) and seeds of grasses, sedges and other plants. They sometimes graze on grasses and legumes (bean-type plants) similar to geese. Note that fish are not part of the normal diet. Invasive fish (mosquito fish and tilapia) compete with Koloa maoli for food and degrade water quality.

Loss of natural habitat is one of the key threats to the Koloa maoli. Wetland areas have been impacted significantly over time primarily for development. Not only are wetlands important as habitat for native birds and plants, they also break

down nutrients, pesticides and bacteria, recharge our water table, store carbon, and serve as buffer zones that protect areas from flooding and sedimentation. Coastal wetlands are especially valuable because they are usually located between areas where people live and work and the ocean, which can bring high waves that could damage human structures.

Hybridization with feral Mallards is another key threat. This issue is not addressed in this activity, however see “Koloa or Mallard - which is it?” activity (grade 7) for more information on this critical issue.

Teaching Suggestions

Preparation:

With your students, create signs for each habitat type on poster boards and props (e.g. simple cut-outs) representing three healthy and unhealthy habitats for the Koloa maoli within your classroom. Have students cut out multiple examples of the following types of things from old magazines.

- **wetland** – tall grasses, grassy mounds, insects, snails, small crayfish and shrimp, wetland birds
- **taro lo’i** – taro plants, insects, snails, taro farmers, wetland birds
- **native forest** – trees, ferns, stream, insects, *limu* (algae), forest birds
- **parking lot** – cars, trucks, motor oil bottles, soda cans, bags of chips
- **playground** – playground equipment, toys, baseball, basketball, crackers, bread, candies, popcorn, kids playing
- **swimming pool** – inflatable toys, popcorn, snacks, soda cans, kids playing in the pool

Glue the cut-outs onto construction paper to make them sturdy.

Part One

- 1) Begin by asking students what is a habitat. (A habitat is an area that provides shelter, food, and space for living creatures.)
- 2) Have students brainstorm various types of habitats for wild animals they are familiar with like: *honu* (sea turtles), frogs, pigeons, geckos, sharks. Write their thoughts on the board, including what these animals eat.
- 3) Help students understand the differences between a natural and unnatural habitat by classifying their answers above into the two categories. If they did not mention unnatural habitats, have them think of some examples.
- 4) Show a close up picture of a Koloa maoli (native Hawaiian duck) so that they can see what type of bird it is. Explain that the Koloa maoli is the endangered native duck only found in Hawai’i. Ask students to predict

- where the Koloa maoli might like to live. What kinds of habitat would it need to survive? (wetlands)
- 5) Explore the Koloa maoli's habitat and behavior by watching part of the videos that are provided. Look for the Koloa as it swims, dabbles (tips into the water and stretches its head and neck into the water to reach submerged plants), walks and stands. Discuss how its bill is designed to remove food from the water, straining small invertebrates and plant material from the water surface.
 - 6) Ask the focus questions: *What is the natural habitat for the Koloa maoli? Where should they live and what should they eat to be healthy?*

Part Two

- 7) Place the cut-outs and habitat signs (see Preparation section) in six different areas of the classroom to create the various habitats.
- 8) Have students work in teams of two and tell them that they will go on a *holoholo* (walking) adventure. Instruct each team to visit the habitats in random order, picking up one item from each area that represents a food source for the Koloa maoli. Have one student of the team hold onto the "healthy" food items and the other student carry the "unhealthy" items.
- 9) After about 5 minutes, gather students back together and discuss what they picked up. Have them sort the food items as natural (healthy) and unnatural (unhealthy) foods for the Koloa.

Healthy: stream insects, wetland grasses, *limu*, snails, crayfish and shrimp
Unhealthy: popcorn, bread, chips, hot dogs (basically any human food)

- 10) Have students identify which habitats they considered healthy and unhealthy for the Koloa maoli, and explain why.

Healthy: wetland, taro *lo'i* (not natural but could be healthy), native forest
Unhealthy: parking lot, playground, swimming pool

Part Three

- 11) As a reinforcement activity, give each student the worksheet and crayons. Have each student complete the worksheet, following the correct path of the Koloa maoli to the native forest. (The path should go from the Koloa to the wetland to the taro *lo'i* to the forest in the mountains.) They can color the entire worksheet. Discuss any questions students may have about the Koloa and the worksheet.

Assessment

You could assess students by:

- effectiveness in working as a team
- selection of the right foods and habitats for the Koloa maoli
- explanation of choices regarding healthy and unhealthy food for the Koloa maoli
- ability to transfer knowledge about habitat needs to other species
- proper completion of the worksheet

Extended Activities

- Make displays of the healthy and unhealthy food items for the Koloa maoli. Put the displays up at school, especially visible to parents who may not realize that feeding wild birds like ducks is not a good thing for the bird or environment. (One of the reasons not discussed yet is that feeding non-native ducks like feral Mallards increases their population and creates problems for the Koloa and other wildlife. Nuisance problems for the neighborhood include: excessive feces near human eating places, ducks begging for food and getting run over by cars. It's also hazardous and unhealthy for wild birds to eat unnatural foods.)
- Have students make signs that say something to the effect of “**do not feed the ducks.**” The signs could have a picture on the front and reasons on the back as to why people should not feed the ducks. See where their creativity takes them! Have them take their signs home to share with their household.
- If you have access to the ‘Ōhi‘a Project, consider doing these activities for grades 2-3: “A Wild Wetland Journey” and “Floaters, Waders and Divers” to reinforce the concepts of wetlands and wetland birds.