

THIRD GRADE: DISCOVERING WETLANDS

PROGRAM OVERVIEW

Key Concepts: Plants and animals that dispersed to Hawai'i on the wind, the waves, or via birds are called native. Native species that evolved to become unique are endemic. Plants and animals that arrived with people are introduced. Endemic water birds are vulnerable to predation by introduced species and habitat loss. Plants and animals in the wetland have undergone adaptations (physical and behavioral traits) that help them survive in this environment. They form a complex, interdependent food web within the wetlands. The health of a wetland is dependent on the quality of its watershed.

Goals: To foster an awareness, appreciation, and sense of stewardship of Hawaiian wetlands and water birds, with an emphasis on life cycles, adaptation, interdependence and ecosystem dynamics.

Objectives: Students will be able to describe the basic geography and biology of a Hawaiian wetland, locate and identify components of the wetland food web, demonstrate life cycles and dispersal mechanisms of wetland plants and animals, and describe some of the adaptations that enable wetland organisms to thrive in their environment. Students will also be able to suggest several ways they can help care for wetlands in Hawai'i.



Next Generation Science Standards (NGSS) *more details on last page

Science Practices:

- Asking Questions
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions

Disciplinary Core Ideas:

- 3-LS1 From Molecules to Organism: Structures and Processes
 - o LS1.B: Growth and Development of Organisms
- 3-LS3 Heredity: Inheritance and Variation of Traits
 - o LS3.A: Inheritance of Traits
 - o LS3.B: Variation of Traits
- 3-LS4 Biological Evolution: Unity and Diversity
 - o LS2.C: Ecosystems Dynamics, Functioning, and Resilience
 - o LS4.B: Natural Selection
 - o LS4.C: Adaptation
 - o LS4.D: Biodiversity and Humans

Crosscutting Concepts:

- Patterns
- Cause and Effect
- Systems and System Models

PROGRAM SCHEDULE

9:00-9:30	Introduction
9:30-11:45	Field Activities: Mucking in the Mud, Wetland Walkabout, Bird Bingo
11:45-12:00	Wash hands, prepare for lunch

KEY CONCEPTS: One type of wetland is a *marsh*. Hawaiian marshes lie between the land and the sea. The high ridges of the islands of Hawai'i catch and collect rainfall. The water flows down the mountains through rivers and streams or travels underground. This rain water eventually forms our wetlands. Plants and animals that came to Hawai'i long ago, without the help of people, are called *native*. Plants and animals that were brought by people are called *introduced*. Animals that visit Hawai'i every year are called migratory. There are five species of non-migratory birds native to Hawaiian wetlands. Four of them are endemic (found only in Hawai'i), as well as endangered (in danger of becoming extinct). Wetland plants and animals have unique and diverse life cycles. Introduced predators threaten endemic wetland birds, and are one of the reasons that wetland refuges were established.



Objectives: Students will be able to describe the basic geography of a Hawaiian marsh, identify four Hawaiian water birds, and name four other species of wetland plants or animals that were introduced to Hawai'i.

Activity: Students will help build a model of a wetland and help demonstrate how some wetland plants and animals may be dispersed. Afterwards, we will review appropriate behavior before entering the wildlife refuge.

FIELD ACTIVITIES (Three rotations)

MUCKING IN THE MUD

Key Concepts:

1. Many different plants and animals, including algae, fish, crayfish, insects, frogs and birds help make up the food web of the wetland.
2. Wetland plants and animals have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.
3. Changes (natural or human-caused) to the physical characteristics of the wetland ecosystem can affect the ability for organisms to survive and reproduce.

Objectives:

Students will be able to:

1. Identify various components of the wetland food web and describe how they are interdependent.
2. Describe the unique life cycles of at least two organisms found in the pond.
3. Describe how changes (natural and/or human-induced) to the wetland can disrupt the food web.

Activity: Under a shady area near the pond, students will gather in a circle to create a wetland food web demonstrating the interdependence among the plants and animals in the wetland. With the help of colorful diagrams, students will learn about the unique life cycles of some of the aquatic life before venturing to the water's edge with dip nets and bins. Working in small groups, they will probe in the mud, grasses, and shallow water to collect some of the smaller animals that live in the wetland. All organisms will be shared with the larger group, and then gently returned to their wetland homes.



WETLAND WALKABOUT

Key Concepts:

1. Wetland plants and animals have diverse and unique life cycles but all have in common birth, growth, reproduction, and death.
2. The wetland birds have unique traits that help them survive. Some of the traits are inherited from their parents, others are a result from interaction with the environment.
3. The refuge is a protected place for the endangered wetland birds. It requires a lot of effort to keep the bird's habitat safe from pollution, predators and people.

Objectives:

Students will be able to:

1. Identify at least three wetland plants and describe their unique lifecycles, including dispersal method.
2. Observe and describe examples of traits that are inherited and/or are a result from interaction with the environment that help the birds survive in the wetland.
3. Locate and distinguish clues left behind by predators, including tracks, scat, and animal homes.
4. Identify ways people are helping to protect endangered species and wetlands in Hawai'i.

Activity: Students will explore and investigate the path and vegetation along the edges of the wetlands. Focus will be on identifying wetland plants and animals in different stages of their life cycles. Specific activities for each day will vary depending upon what's found along the trail, but will probably include tasting pickle weed, collecting insects, looking for nesting birds, investigating a predator trap, and analyzing tracks and scat.



BIRD BINGO

Key Concepts:

1. Wetland plants and animals are adapted, or suited, to their environment. Hawaiian water birds have adapted and changed overtime to become endemic, or unique, to Hawai'i.
2. The physical structures of the birds, function to help them survive in a wetland habitat. These are examples of traits that are passed down from parents to young.
3. The wetland birds also have behavioral traits that help them survive, some of which are inherited from their parents, while others may be the result of interacting with the environment.
4. Endemic Hawaiian water birds (coot, stilt, duck, and moorhen) are now endangered species due to a number of human-caused changes.

Objectives:

Students will be able to:

1. Describe various physical adaptations and behavioral traits of Hawaiian wetland birds.
2. Predict where in the wetlands different bird species are likely to be found.
3. Identify the primary reasons why Hawaiian wetland birds are now "endangered" species.



Activity: After reviewing the physical and behavioral traits of Hawaiian wetland birds, students will sit at the edge of the pond to play Bird Bingo! They'll use binoculars to locate birds within the refuge, observe their physical traits and behaviors, and identify some of the more common wetland vegetation. The game will conclude with a brief discussion on how we can all help care for the endangered water birds and wetlands in Hawai'i.

SUMMARY

Key Concepts: Wetlands are very important places for both wildlife and people. There are many ways we can help care for wetlands in Hawai'i.

Objectives: Students will be able to outline three things they can do to help care for Hawaiian wetlands.

Activity: In our brief summary, we will share an amazing story of one determined woman who was responsible for the creation of this refuge. Students will be asked to identify some of the reasons Hawaiian wetlands are such special places, and then brainstorm about ways they can help care for wetlands in their daily lives.

***More background information on the Next Generation Science Standards (NGSS) to be added soon!**

Below are the NGSS for Third Grade Life Sciences that are emphasized in HNC's Wetland program. HNC is currently in the process of compiling additional background information as well as pre/post activities that are aligned with the new standards. Thank you for your patience with this!

Science Practices:

- 1 - Asking Questions.** Ask questions based on observations to find more information about the natural and/or designed world(s).
- 3- Planning and Carrying Out Investigations.** Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
- 4 - Analyzing and Interpreting Data.** Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)
- 6 - Constructing Explanations and Designing Solutions.** Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. Use evidence (e.g. observations, patterns) to support an explanation. Generate and/or compare multiple solutions to a problem.

Disciplinary Core Ideas:

3-LS1 From Molecules to Organism: Structures and Processes

LS1.B: Growth and Development of Organisms

- * Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (*All have in common birth, growth, reproduction, and death.)

3-LS3 Heredity: Inheritance and Variation of Traits

LS3.A: Inheritance of Traits

- * Many characteristics of organisms are inherited from their parents.
- * Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.

LS3.B: Variation of Traits

- * Different organisms vary in how they look and function because they have different inherited information.
- * The environment also affects the traits that an organism develops.

3-LS4 Biological Evolution: Unity and Diversity

LS2.C: Ecosystems Dynamics, Functioning, and Resilience

- * When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

LS4.B: Natural Selection

- * Sometimes the differences in characteristics between individuals of the same species provides advantages in surviving, finding mates, and reproducing.

LS4.C: Adaptation

- * For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

LS4.D: Biodiversity and Humans

- * Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

Crosscutting Concepts:

Patterns.

- * Patterns of change can be used to make predictions. (3-LS1-1)
- * Similarities and differences in patterns can be used to sort and classify natural phenomena (L-LS3-1)

Cause and Effect.

- * Cause and Effect relationships are routinely identified and used to explain change. (3-LS3-2)

Systems and System Models

- * A system can be described in terms of its components and their interactions. (3LS4-4)