

SECOND GRADE: CYCLES IN NATURE PROGRAM OVERVIEW

Key Concepts: The natural world works in cycles. Cycles in nature interact with one another; they are interconnected. There are many different kinds of plants and animals that live in Hawai'i's lowland forest and stream habitats. Biodiversity is critical to the health of people and the environment. We can all work together to help maintain nature's natural ability to sustain life and create balance.

Goals: To foster an awareness and appreciation of nature, with emphasis on natural, biological and physical cycles; to expose students to the common plants and animals found in present lowland Hawaiian forest and stream environments. To gain an understanding of the connection between biodiversity and the health of people and the planet.

Objectives: Students will be able to describe the life cycle of flowering plants with emphasis on the dependence of animals for pollination and seed dispersal. Students will describe the water cycle, the different states of water and identify where water is found on Earth. They will express an understanding of the nutrient cycle, observe the diversity of decomposers found in the soil and explain their importance. Students will also be able to make observations about the different kinds of life found in Hawai'i's forest and stream environments, and be able to explain the importance of biodiversity.



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
- Obtaining, Evaluating, and Communicating

Information Disciplinary Core Ideas:

- LS2.A: Interdependent Relationships in Ecosystems
- LS4.D: Biodiversity and Humans
- ESS2-C: The Roles of Water in Earth's Surface

Processes Crosscutting Concepts:

- Cause and Effect.
- Structure and Function.
- Patterns

PROGRAM SCHEDULE

9:00 - 9:30	Introduction to Cycles in Nature
9:30 - 10:15	Field Activities: 1st rotation
10:15 - 11:00	Field Activities: 2nd rotation
11:00 - 11:45	Field Activities: 3rd rotation
11:45 - 12:15	Lunch
12:15 - 12:30	Terrarium Building/Recycling/Composting and Summary

INTRODUCTION

Key Concepts:

The natural world works in cycles; cycles help to keep nature in balance.

1. The forest and stream are home to many different kinds of plants and animals.
2. Biodiversity is critical for the health of the forest and stream habitats.

Objectives:

Students will be able to:

1. Describe five cycles in nature.
2. Identify examples of plants and animals found in forest, soil, and stream habitats.
3. Explain the importance of biodiversity.

MORNING FIELD ACTIVITIES (three rotations)

Water Cycle and Stream Biodiversity

Key Concepts:

1. Water is constantly moving from one place to another and from one state to another.
2. Compared to saltwater on the planet, there is very limited freshwater available for human use.
3. The freshwater stream is home to many different kinds of plants and animals.
4. We must conserve and take care of our freshwater resources; water is life!

Objectives:

Students will be able to:

1. Explain how water changes from one state to another (liquid, solid, gas) throughout the water cycle.
2. Identify where freshwater can be found on Earth and describe where we get our drinking water from on the island of O'ahu.
3. Identify at least three organisms that can be found in Hawai'i's freshwater stream.
4. Describe ways we can help to care for our freshwater sources.

Activity: Students will gather at the edge of Makiki Stream to review the water cycle and the different states of water (solid, liquid, gas) with the help of colorful props. Through an interactive demonstration, students will learn where water is found on Earth with emphasis on the difference between the amount of saltwater versus the limited amount of freshwater available for human use. After the brief introduction, students will explore the stream using dip nets and buckets to discover the plants and animals in Makiki stream. They'll assess the health of the stream based on the diversity of life. Before leaving the stream, students will be asked to consider ways they can help conserve freshwater sources and maintain the health of the stream.



Nutrient Cycle & Decomposer Diversity



Key Concepts:

1. Nutrients are recycled through plants with the help of decomposers.
2. Decomposers include bacteria, fungi, and animals such as worms, termites, and ants.
3. Soil biodiversity is a critical for the health of the forest habitat.

Objectives:

Students will be able to:

1. Explain the process of nutrient cycling.
2. Identify important decomposers in the forest and describe their role in the nutrient cycle.
3. Explain the connection between soil biodiversity and the health of the forest.

Activity: At first glance, this forest is home to little more than bushes and trees. Sitting in a log circle under the canopy of the forest, the HNC educator will lead the students through an interactive overview of the

nutrient cycle. As investigative scientists, students will use bug jars and brushes to search the damp soil for hidden organisms that break down fallen branches and leaves and make it possible for the towering forest to exist. Students will assess the diversity of life found among the decomposers in the soil habitat and discover the important connection between biodiversity and the health of the forest.

Plant life and Gas Cycles

Key Concepts:

1. The life cycle of a flowering plant includes the production of a flower, fruit, seed, sprout, seedling, sapling, and mature tree.
2. Plants need water and sunlight to grow.
3. Plants depend on animals for pollination and seed dispersal.
4. Plant and animal diversity are important for the health of the forest.

Objectives:

Students will be able to:

1. Describe the life cycle of flowering plants.
2. Identify what plants need to grow and survive.
3. Explain the importance of animals for pollination and seed dispersal.
4. Identify examples of pollinators and animals that disperse seeds in Hawai'i's forests.



Activity: Most of us know that seeds sprout seedlings, but where do the seeds come from? With fun interactive costumes, we'll role play the life cycle of flowering plants, emphasizing the role of animals in pollination and seed dispersal. We'll then proceed on a treasure hunt through the forest, looking for various plants, identifying plant parts and the diversity of pollinators. Along the trail, we'll stop to pay our respect to the towering trees as we discover the important interaction among plants and animals in the gas cycle.

AFTER LUNCH ACTIVITIES

Terrarium-Building

Throughout the day students will have collected parts of each of the five cycles in nature. We'll add soil from the forest to your jar along with gravel and work together to create a class terrarium. Students will add water collected from the stream, decomposing plant material, seedlings, and even some decomposers from the forest. In the end, you'll have a mini Makiki Valley to take back to your classroom - the perfect souvenir to remind you of how all the cycles work together in nature.

Recycling & Composting (if time permits)

Students will sort their trash into HNC's various recycling bins and contribute all vegetarian lunch scraps to our worm bin and/or compost pile. All non-recyclables, alas, must be taken back to school.

SUMMARY

Key Concepts:

1. Cycles in nature are interconnected; we (people) are part of these natural cycles.
2. Biodiversity is critical for the health of people and the planet.
3. There is a finite supply of natural resources on Earth. We must follow nature's example and recycle what we use to ensure that we always have the food, water, and raw materials that we need.

Objectives:

Students will be able to:

1. Describe how natural cycles relate to one another.
2. Explain the importance of biodiversity for the health of people and the planet.
3. Identify ways we can help to take care of nature, including the conservation of water and biodiversity.

Activity: The Program Coordinator will present the five giant cycles created in the morning introduction. Together, we'll review the cycles and discuss their interdependence based on observations in the field. The group will end with a discussion on various ways to emulate nature's cycles and care for natural resources at home.

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

Below are the NGSS for Second Grade Life Sciences and Earth Systems that are emphasized in HNC's Cycles in Nature 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.** Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

6 - Constructing Explanations and Designing Solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. Generate and/ or compare multiple solutions to a problem.

8 - Obtaining, Evaluating, and Communicating Information. Builds on prior experiences and uses observations and texts to communicate new information. Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.

Disciplinary Core Ideas:

LS2.A: Interdependent Relationships in Ecosystems.

* Plants depend on water and light to grow. (2-LS2-1)

* Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

LS4.D: Biodiversity and Humans.

* There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)

ESS2-C: The Roles of Water in Earth's Surface Processes

* Water is found in the ocean, rivers, lakes, and ponds. Water exists as a solid ice and in liquid form. (2-ESS2-3)

Crosscutting Concepts:

Cause and Effect.

* Events have causes that generate observable patterns. (2-LS2-1)

Structure and Function.

* The shape and stability of structures of natural and designed objects are related to their functions). (2-LS2-2)

Patterns.

* Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (2-ESS2-2), (2-ESS2-3)