Exploring Hawai‘i’s Forests

Developed by:
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Grade Level: Fourth Grade

Purpose: This curriculum is designed to communicate:
I. How the forests of Hawai‘i are physically and biologically structured.
II. The organisms make up Hawai‘i’s forests and how they interact with each other and their environment.
III. How science and conservation are working together to study the Hawai‘i’s forest and manage the resources within the habitat.

Hawaii Content and Performance Standards (HCPSIII):
Standard 1: The Scientific Process: Scientific Investigation: Discover, invent, and investigate using the skills necessary to engage in the scientific process.

Benchmarks
SC.4.1.1 Describe a testable hypothesis and an experimental procedure.
SC.4.1.2. Differentiate between an observation and an inference.

Standard 2: The Scientific Process: Nature Of Science: Understand that science, technology, and society are interrelated.

Benchmark
SC.4.2.1. Describe how the use of technology has influenced the economy, demography, and environment of Hawai‘i.

Standard 3: Life and Environment 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.

S.C.4.3.2 Describe how an organism’s behavior is affected by its environment (e.g., courting, nesting, feeding patterns).

Standard 4: Life and Environmental Sciences: Structure And Function In Organisms: Understand the structures and functions of living organisms and how organisms can be compared scientifically.
Benchmark
SC.4.4.1 Identify the basic differences between plant cells and animal cells

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.

Benchmark
SC.4.5.2 Describe the roles of various organisms in the same environment
SC.4.5.3 Describe how different organisms need specific environmental conditions to survive

**Topic and Driving Question:**
What is unique about the Hawai‘i’s forest, what lives there, what interactions exist between the organisms that live there, and how is it culturally important for Hawaii?

**Rationale:**
Hawai‘i’s forest ecosystems are very diverse; this can be attributed to the amount of rainfall that falls in an area and the elevation in which it is found. These ecosystems provide a habitat for a menagerie of plant and animal species, as well as, support the lifestyle and culture of island residents. This curriculum promotes an enhanced understanding within Hawaii’s youth on how Hawai‘i’s forest ecosystems function, the problems that they face, and how we can care for them. This unit includes hands-on, inquiry-based lessons and activities to promote and enhanced learning about Hawai‘i’s forest ecosystems.

**Concept Map for Unit:** See below

**Formative Assessment:**
Students will demonstrate continued learning throughout the unit through successful completion of activity specific worksheets, accurate data collection, and daily written explanations of what they did, saw, and learned for each activity.

**Summative Assessment:**
Students will present their complete knowledge about the Hawai‘i’s forest ecosystems through research and completion of a poster that characterizes a specific forest ecosystem type, the organisms that live there, and its climate. Students will research the amount of rainfall that falls annually in their ecosystem.
and the elevation it is located within. Students will determine the plant and animal species that live in their ecosystem, what they look like and how they grow. Students will create a poem that describes their forest ecosystem and the emotions they feel their ecosystem provokes. Students will improve their communication skills during an oral presentation on their project.

**Overview of Lessons Chart:** See below

**Sources:**
Sustainable Island Products  www.SustainableIslandProducts.com
Recycle Hawaii  www.recyclehawaii.com
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<th>Timeline</th>
<th>Lesson and Topic</th>
<th>Concepts</th>
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<td><strong>Week 1</strong>&lt;br&gt;1 Hour Session</td>
<td>Unit Introduction to Hawaii’s Forests &amp; Pre-assessment</td>
<td>What a scientist is and what the goals of a scientist are.</td>
<td>Students will identify what they know and what they want to know about science. They will learn about what a scientist does to prepare them for the following lessons.</td>
<td>Students will draw themselves as a scientist researching something they would be interested in learning about. Student will also complete the unit pre-assessment test.</td>
<td>“I am a scientist poster”</td>
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<td><strong>Week 2</strong>&lt;br&gt;2 (1 ½ hour) Sessions</td>
<td>The Great Archeological Dig &amp; Taxonomy and Me!</td>
<td>Difference between plant and animal cells. How organisms are organized and names. The importance of a scientific name.</td>
<td>Students will be able to explain the differences between plant and animal cells. Students will be able to explain how organisms are grouped and named and the importance of a scientific name.</td>
<td>Students will conduct a lab analysis experiment to determine the differences between plant and animal cells. Students will observe the characteristics of organisms belonging to the kingdoms in which they are grouped.</td>
<td>“Lab Analysis” worksheet, “Know I Know Cell Much” test, “Kingdoms” worksheet, “Taxonomy and Me” test, and “Characteristics” worksheet.</td>
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<td><strong>Week 3</strong>&lt;br&gt;1 hour 45 Minute Session</td>
<td>A Dispersing Knowledge</td>
<td>How native plants got the Hawaiian islands.</td>
<td>Students will be able to describe the different ways plant species naturally get to the Hawaiian islands.</td>
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<td>“The Seed Detectives” worksheet, “A story of a Seed” Homework Assignment, and Class Discussion.</td>
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<td><strong>Week 4</strong>&lt;br&gt;1 hour 30 Minute Session</td>
<td>Botany Basics</td>
<td>How plants are identified, and the importance of plant identification.</td>
<td>Students will be able to describe how plants are identified and explain the main parts of the plant used for identification.</td>
<td>Students will complete a leaf rubbing allowing students to better observe the characteristics of different leaf types. Students will also complete a proportional drawing of a whole plant.</td>
<td>“Leaf it to me to be Observant” activity sheet, “The Botanist in Me” activity sheet, “The Difference Between” activity sheet, and “A Botanical Beginning” test.</td>
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<td><strong>Week 5</strong>&lt;br&gt;2 hour 30 Minute Session</td>
<td>It Ain’t Easy Being Green</td>
<td>Plant requirements, and how plants obtain these requirements.</td>
<td>Students will be able to explain what a plant needs for survival, and how each of these requirements are met.</td>
<td>Students will form a hypothesis and conduct a plant requirement experiment to illustrate what happens when each requirement is not met.</td>
<td>“Oh, Shoots! A Test,” and plant observation drawing and class discussion.</td>
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<td>Week 6</td>
<td>Food for Thought</td>
<td>Food chains, food webs, and the transfer of energy between organisms.</td>
<td>Students will be able to describe what a food chain and food web is. Students will be able to describe the importance of each link in a chain and web.</td>
<td>Students will put native organism food chain cards in order by reading riddles on back of cards. Students will then draw the organism of each card onto the sidewalk with chalk. Students will draw organisms the proper order and with the proper labeling.</td>
<td>Sidewalk drawings and discussion.</td>
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<td><strong>Week 7</strong></td>
<td><strong>2 Hour Session</strong></td>
<td><strong>A Symphony of Decomposers</strong></td>
<td>Students will be able to describe the process and importance of decomposers. Students will also be able to explain how to be more environmentally responsible.</td>
<td>Students will observe live decomposers found in soil and draw them. Students will then conduct a class experiment to observe the decomposition rates of various items.</td>
<td><strong>“The Breakdown” test, and class discussion.</strong></td>
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<td><strong>Week 8</strong></td>
<td><strong>1 hour 30 Minute session</strong></td>
<td><strong>Flower Frenzy</strong></td>
<td>Students will be able to describe the parts of a flower and the use of each part in pollination. Students will be able to describe the importance of pollination and the products that come from it.</td>
<td>Students will construct a flower diagram out of construction paper and label each part. Students will use diagram to learn the process of pollination. Students will press and dry flowers to create art.</td>
<td>Completed “Flower Part Smarts” diagram, “Life Cycle of a Flower” Assignment, and “Flowers, Birds, Wind, and Insects” activity sheet.</td>
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<td><strong>Week 9</strong></td>
<td><strong>2 Hour Session</strong></td>
<td><strong>In From Out of Town</strong></td>
<td>Students will be able to explain the negative impacts caused by introduced species in Hawai‘i.</td>
<td>Students will play a board game that illustrates how these organisms disturb native organisms and what we can do to help.</td>
<td>Class discussion.</td>
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<td><strong>Week 10</strong></td>
<td><strong>1 Hour 40 Minute Session</strong></td>
<td><strong>The 8 Realms and Post-assessment</strong></td>
<td>Students will be able to explain how the environment influences the organisms that are present. Students will be able to describe the windward and leeward sides of an island and how that determines the environment.</td>
<td>Students will learn about the Hawaiian vegetation zones that are determined by elevation, rainfall, and the dominant organisms that inhabit each. Students will create a poster that illustrates each zone which includes the organisms that live there.</td>
<td>Ecosystem poster and discussion session.</td>
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* Sessions are broken up within each lesson by activities. Session times provided in table are total times for each lesson.