

'Ewa 'Āina Education Initiative

Unit Plan: Restoring Coastal Ecosystems - <https://cutt.ly/BKPj2VZ>

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'Ewa 'Āina Site: One`ula Beach, `Ewa Limu Hui

Detailed Lesson #3

Lesson Title: One`ula: Past, Present, and Future

Essential Unit Questions Addressed

How have humans impacted the biodiversity in the One`ula area?

- Identify and explain the anthropogenic impacts that have altered the biodiversity in the One`ula area
- Propose ideas to help conserve this ecosystem

Educational Standards

[HS-LS4-5.](#) Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

[HS-LS2-6.](#) Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

[HS-LS2-7.](#) Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*

[HS-ESS3-4.](#) Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*

HĀ framework and/or Hawaiian Culture integrated into this lesson

The [HĀ framework](#) and cultural values are intertwined throughout this lesson. This lesson will increase a student's sense of belonging and sense of Hawai'i because they will be learning about an issue that is in their own community ('Ewa Moku) and in an ecosystem that many of them frequent (coastal dunes/beaches), while actively engaging in the preservation of that ecosystem. Students will also gain a sense of responsibility as they become part of the stewards of this area. Hawaiian culture and language in the form of place names, plant names, and the mo'olelo of the plants will be woven throughout the lessons.

Materials needed

Videos, Media, Lesson Presentations/Resources

websites

- Limu Traditions - <https://seagrant.soest.hawaii.edu/limu-traditions/>
- Growing a Network of Limu Practitioners - <https://seagrant.soest.hawaii.edu/limu-practitioners/>
- The Limu Hui - KUA <http://kuahawaii.org/limu-hui/>
- Limu: Learning about Hawaii's Edible Seaweeds <https://cutt.ly/pKIAuHz>

videos

- Limu Maneaua and Limu Kohu - Dr. Isabella Abbott <https://vimeo.com/696187601>
- Limu Presses: [WATCH THIS TO LEARN HOW TO MAKE YOUR OWN PLANT PRESS](#)
Or see page 122 of Limu: Learning about Hawaii's Edible Seaweeds (see above)

printed material

[Laminated Question starters handouts](https://cutt.ly/XKIO7dZ) - <https://cutt.ly/XKIO7dZ>

Recommended Resource:

A Field Guide to Hawai'i's Coastal Organisms: Algae and Invertebrates

By Joanna Philippoff, Caroline Wood, Kanoe Morishige, Florybeth F. La Valle, Matthew Wood, and Anuschka Faucci

Curriculum Research & Development Group University of Hawai'i at Mānoa, 2018

<http://opihi.crdg.hawaii.edu>

(available for sale)

Supplies

To be collected by teacher

For limu presses:

- News Paper
- Cardboard
- blotting paper or wax paper
- Index card
- Scissors
- Rubber bands
- phone books or weights

For classroom discussions:

- Poster Paper
- Markers/Paint
- Clipboards and notepaper (for handouts)

To be collected by KUA Hawai'i or on your own:

Samples of limu varieties, samples of pressed limu and other supplies/visuals to talk about

how One`ula has changed over time

Pre-Lesson Preparation

Reach out to the 'Ewa Limu Hui to see if they may be able to provide an in-person, on-site presentation at One'ula Beach Park as a huaka`i (field experience). Set a date (and back-up dates for inclement weather or other issues).

Huaka`i Preparation:

- Prepare for logistics utilizing the `Āina Site Visit Logistics and Pre-Planning Guide available via the following URL <https://cutt.ly/ZGNzAxX>
- Prepare students for their visit, learn E Hō Mai - <https://cutt.ly/wJxZUc6> and practice - Oli audio recording - <https://apps.ksbe.edu/kscholars/oli/>
- Collect permission slips and waivers
- Discuss protocols and expectations for behavior on site. Go with an assistant, if possible.

Learn about native Hawaiian limu by reviewing this excellent resource: Limu: Learning about Hawaii's Edible Seaweeds - <https://cutt.ly/pKIAuHz> as well as A Field Guide to Hawai'i's Coastal Organisms: Algae and Invertebrates.

Hawaiian names for seaweeds also have two parts. *Limu* is a general Hawaiian name for a variety of kinds of plants which grow in or around water, whether fresh or salt. In addition, the term is applied to some mosses, liverworts, lichens, and algae growing in damp places. When referring to a specific type of plant, a second, descriptive word follows. Sometimes the prefix "Ii" (meaning *limu*) is attached to the descriptive term, as in "Ii*poa*" or "Ii*pe'epe'e*."

Many of these second terms are descriptive of some color, taste, or appearance:

Limu 'ele'ele --'black limu'

Limu alani -- 'bitter limu'

Limu pālahalaha --'spread out limu'

Limu wāwae'iole --'rat's foot limu'

Other specific names refer to where the limu is found, or reflect a cultural meaning or value:

*Limu Ii*poa** --'limu gathered from the deep'

*Limu Ii*pe'epe'e** --'hidden limu'

Limu kōhu -- 'supreme limu'

Limu lepe-o-Hina --'the fringe or shawl of Hina'

From Limu: Learning about Hawaii's Edible Seaweeds, page A-2

<https://cutt.ly/pKIAuHz>

Pedagogy Used

Instructional Sequence

In Class

Teacher Does	Students Do
Write the following on the board and ask students to solve the riddle.	Students read the Hawaiian words and English translation and try to answer the riddle.

<p>My little fish without entrails, but alive, is very good to eat, and is greatly desired by chiefs and common people.</p> <p>Answer: The seaweed</p> <p>In `Ōlelo Hawai`i:</p> <p><i>Ku'u wahi i'a 'a'ole ona na'au, a he keu na'e kona ola, a'ono ke 'ai 'ia, a makemake nui 'ia e nā ali'i a me nā maka 'āinana.</i></p> <p><i>Ka limu.</i></p> <p>Originally from Henry P. Judd, Hawaiian Proverbs and Riddles, p. 75. Honolulu: Bishop Museum Bulletin 77, 1930. Copied from Limu: Learning about Hawaii's Edible Seaweeds [diacritical marks added]</p>	
<p>Ask students what they know about Hawaiian limu and write it on the board. Ask about their names, how they grow, where they can be found today, their uses, how abundant or scarce they may be, and anything else they find important to share.</p>	<p>Students share what they know about Hawaiian limu.</p>
<p>Write down names of various limu on the board: Limu 'ele'ele, Limu kala, Limu koele, Limu kohu, Limu huluhulu waena, Limu hina, Limu līpoa, Limu loloa, Limu manauea, Limu pālahalaha, Limu wawae'iole. Explain that Hawaiian names for limu have two parts. Limu _____ (descriptor). (See explanation above) Ask students to name any other limu that they may know of in whatever languages they know.</p>	<p>Students take notes on limu names in Hawaiian.</p>
<p>Show the video of Dr. Isabella Abbott, world-renowned expert on native Hawaiian limu. https://vimeo.com/696187601 and ask students to take notes about what she says about limu.</p>	<p>Students watch the video and take notes.</p>
<p>After showing the video, have students share something new they learned from Dr. Abbott and something they would like to learn.</p>	<p>Students share something new they learned and something they would like to learn.</p>
<p>Have students do research on different types of limu using online resources such as Limu: Learning about Hawaii's Edible Seaweeds, Appendix 5. https://cutt.ly/pKIaUHz and printed copies of "A Field Guide to Hawai'i's Coastal Organisms: Algae and Invertebrates" if available.</p>	<p>Students use computers to do online research and take notes.</p>

<p>Tell students that they will be going on a huaka`i to One`ula in `Ewa, which was once known for abundant limu on its shores (see Unit background). Have them do research on the history of limu in `Ewa (see websites under materials) and the statewide Limu Hui http://kuahawaii.org/limu-hui/.</p>	<p>Students do research on the Limu Hui.</p>
<p>For Huaka`i</p>	
<p>Prepare students for the huaka`i.</p> <ul style="list-style-type: none"> - Review plants and plant names - Review coastal ecosystems - Teach/Review E hō mai - Discuss protocols and expectations for behavior on site - Tell them what they need to wear/bring 	<p>Students pay attention and are well-prepared for the huaka`i.</p>
<p>Prepare student clipboards with laminated question starters. Bring copies of “A Field Guide to Hawai`i’s Coastal Organisms: Algae and Invertebrates” if available. Bring limu press supplies except for phone books or weights. Ask students to help.</p>	<p>Students help prepare supplies.</p>
<p>Bring students to One`ula and meet guest speakers. Consider doing cultural protocol to show respect.</p>	<p>Students greet guest speakers in a respectful manner.</p>
<p>Ask guest speakers to talk about the history of One`ula and how things have changed over time. It is a story typical of many coastal areas in Hawai`i. Have students walk along the beach with the guide while taking notes.</p>	<p>Students walk with the guide, paying attention, asking questions, and taking notes on their clipboards.</p>
<p>Set up an outdoor classroom in a shaded and non-windy area. Ask guest speakers to describe limu species that they have brought and tell any mo`olelo or interesting facts about them. Ask them to show examples of pressed limu and explain how they are used for research and learning.</p>	<p>Students take notes on their clipboards/ ask questions.</p>
<p>Create limu presses using limu samples provided. Have students write the names of the limu on the card so that they remember it. They should also write their names on the outer cardboard. (If it is too windy or otherwise difficult to do onsite, see if you can bring the limu back to class.)</p>	<p>Students follow directions in making limu presses. They use their creativity to make their own unique presses.</p>
<p>Collect the limu presses and secure them tightly</p>	<p>Students help to collect, secure, and</p>

<p>with rubber bands. Bring them back to class and put them under heavy phone books or weights. Check on them in about a week to see if they have dried and are not moldy. The newspaper may need to be changed.</p>	<p>put presses under weights when back in class. They check on their presses.</p>
<p>As a closing activity, have students work in groups to brainstorm and illustrate the threats to the biodiversity at One`ula as well as solutions to those threats. Give them large paper to write/draw on and ask them to explain solutions. They may also use their pressed limu on the posters.</p>	<p>Students work in groups of 3-4 and create a visual of current threats to the One`ula ecosystem while including potential solutions/research ideas. Part of their poster includes what they want One`ula to look like in the future.</p>
<p>Set up opportunities for students to present solutions to KUA speakers and to peers. This can be done virtually or in person.</p>	<p>Students practice and deliver their presentations to guest speakers and their peers.</p>
<p>Closure (Review, formative/summative assessment)</p> <ul style="list-style-type: none"> ● discussions ● poster idea presentations 	
<p>Accommodations for at least 3 types of diverse learners</p> <ul style="list-style-type: none"> ● Sentence starters allow all students to join in the conversation ● Opportunity for paired learnings ● Chunked learning for PBL 	
<p>How This Lesson Relates To the Unit Summative Assessment</p> <p>This lesson is the culminating activity for this unit. Students will learn and experience first hand about this ecosystem. The plants that they grew in previous lessons or limu presses may be gifts to `āina stewards. Students will be able to learn how we have affected this type of ecosystem and design and envision the future of One`ula and other coastal sites.</p>	