

Papa ‘Ōlelo: No Kaloko Loko I‘a
(Vocabulary for Kaloko Fishpond)
Ha‘awina ‘Ekahi (Lesson 1.1)

Common Core Standard:

- Ecological Systems—Understand the locations and characteristics of marine ecosystems

General Learner Outcomes: Complex Thinker (The ability to demonstrate critical thinking and problem solving), Quality Producer (The ability to recognize and produce quality performance and quality products)

HĀ Standards: Strengthened Sense of Hawai‘i

Grades 8-12 Performance Indicators:

Students:

- Describe what fishponds were used for in early Hawai‘i;
- Fishpond parts using vocabulary provided and their function;
- How fishpond parts contribute to fishpond health;
- Why wai (fresh water) is a defining trait of fishponds.

Key Concepts:

- Fishing methods for near shore fish differed from those used for fishpond harvesting.
- Fish often have three names (Hawaiian, Common, and Scientific) of which knowing the Hawaiian names is central to perpetuation of fishing practices.

Activity at a Glance: Students are introduced to fishpond parts and function.

Vocabulary: Pā Loko, Ki‘o Pua, Mākāhā, Kaloko, Kahe, Kia‘i Loko, Pūnāwai, Loko

Assessment:

- Identifies and describes fishpond parts and their function;
- Describes the importance of wai and kai for fishponds.

Time: 1 Field trip or class visit

Skills: identification and function, vocabulary.

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Materials: Hawaiian Language Dictionary,

Advance Preparation: Review material, print readings, schedule place based visits

Suggested Teaching Strategy for Fishpond Visit:

1. **Visual Aid (30 Minutes)** The fishpond is similar to the human body. Each loko part (e.g., kahe, loko) can be thought to have a corresponding human body part. For example, the pā loko or kuapā in the loko acts as a kua (backbone) and pā (solid surface) for the human body. The visual aid is intended to teach learners fishpond vocabulary commonly used at Kaloko and other fishponds throughout Hawai‘i. Terms in this poster are used by kama‘āina (natives) from the area. This knowledge creates a kahua (foundation) for learners to build on in future visits.
2. **Flashcards (30 - 40 Minutes)** Review the vocabulary with students prior to engaging in the on-site learning activity to follow. Reinforce teachings provided in the previous lesson by having students identify which body part correlates with the vocabulary word(s) they learned. Encourage discussions that describe similarities between body and fishpond parts.
3. **Regeneration (15 Minutes)** Students will have participated in an hour session. Provide students with a regeneration moment to step away for snacks, water, and restroom.
4. **Place Based Learning (1.5 Hour) [When groups are visiting for 2.5 to 3 hours]** Place based learning activity should consider (1) group size, (2) group age, (3) group familiarity with place, and (4) acclimation of the learners. Plan for the safety and work review, along with, gathering of tools to take 15-20 minutes. Added time will need to be considered for walking to and from worksite (with transporting tools and materials).
5. **Worksheet (30 Minutes)** The worksheet is intended to solidify vocabulary words with place based learning. This ‘āina based activity will take 45 minutes. Provide students with time to explore the loko. Encourage them to observe how each part contributes to the overall function and productivity.

Reflection and Sharing (30 Minutes) Regroup with students. Open the space to group sharing to review and solidify the vocabulary covered.

Discussion Questions:

- What is the pā loko? Where is the pā/kua on your body? What is the function of the pā loko?
- What is the kahe? Where is the kahe on your body?
- What is the mākāhā? Where is the maka on your body? How does this relate to the fishpond?
- What is hā? How does the hā describe the mākāhā?
- What did you notice when you explored the loko?
- How does the pā loko function?

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- What do you think would happen if we cemented the pā loko? How would this affect the loko?
- How do you think fish move in the loko? What kinds of fish are drawn to the ki'o pua? How could we use the ki'o pua?
- What happens with mixing of fresh and salt water? Where do you think this mixing occurs? How might this shape fishpond use and care?

Teaching Resources:

- 2003. Project Kāhea Loko: The Call of the Pond. A Teacher's Guide to Hawaiian Fishponds. Grades 4-12. The Pacific American Foundation in cooperation with Waikalua Fishpond Preservation Society Hawai'i Department of Education University of Hawai'i Sea Grant College Program.
- Resource Units in Hawaiian Culture. Donald D. Kilolani Mitchell. Kamehameha Schools, 1992. Project Gutenberg.

Background Material:

Pā loko: The pā loko (sea wall) is approximately 30-40 ft. wide and 6 1/2 feet high stretching for 250 yards. Another common term used to refer to the pā loko is "kuapā." This term describes the function of the kua as a literal backbone for the fishpond that forms a pā or wall. The stones in the pā loko maintain uhaū humu pōhaku (traditional dry stack masonry) that does not rely on the use of mortar. This method allows water to circulate, waves to naturally filter through upon impact, and fish to house themselves within the stones. Overtime, portions of the pā loko were cemented likely to help reduce the need for human maintenance. Though seemingly beneficial, this method decreases water percolation and does not allow for waves to naturally break through. Instead, waves forcefully push into the wall leading to breakages. As shifts in land tenure and economy increased the pā loko was flattened resembling a natural reef. Native Hawaiian elder, Peter Keka, who worked on the pā loko as a child led the rehabilitation efforts. Under his supervision and expertise traditions of Kaloko uhaū humu pōhaku are perpetuated by lead mason, Benson Chong.

In the mid 1900's when the area was threatened by development Emory and Soehren located and document sections of the pā loko that remained preserved. This finding played a foundational role in protecting the area from development and irreversible destruction.

Kahe and Mākāhā: The fishpond contains two kahe (channels) [also referred to as "kāheka] that are located at the north and south end of the pā loko. These lanes are commonly referred to as "auwai."

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The 'au can be understood as a neck that juts into the fishpond where the wai (freshwater) flows acting as the lungs for the fishpond. These kahe provide greater water circulation for the fishpond. The kahe located at the northern end of the fishpond is deeper in depth and shorter in length than that at the southern end of the fishpond. Construction style suggests that each may have served a particular purpose but were generally located in an area where water could circulate through the 11 acre fishpond.

Traditionally, within the kahe there were mākāhā (sluice gates) used to regulate the size of fish allowed to enter and exit the fishpond, in addition to, catching fish for seasonal harvests by lowering and raising the mākāhā. These mākāhā act as the eyes watching the fish that enter and exit the pond and breath of the fishpond. Materials used to construct the structure relied upon readily available material.

Ki'o Pua: There are at least three ki'o pua (nursery ponds) formed by rocks walls portioning sections from the greater pond that are located at the northwest, northeast, and southeast corners of the fishpond. These smaller ponds are described as being used to separate fish by size and type. Segregating fishes from Kaloko nui (larger, central pond) protected fishes from predators and allowed for easier more strategic catches.

Kia'i Loko: Prior to western contact fishponds were cared for by kia'i loko (fishpond guardians). These beings take human and spiritual forms who oversee proper use and interaction with the fishpond. Kaloko Fishpond is known to have mo'ō (water guardians) and kia'i (guardians) (See Kelly 1971). Throughout history as land tenure in Hawai'i changed from communal to private land tenure practices for caretakers did too. The fishpond transformed from a kia'i loko to an owner-lessee model. Patterns of change are noticed in fish distribution and sharing practices. Mo'olelo (traditions) teach us that fish from this fishpond were likely preserved for the high chiefs and their entourage. Overtime, as monetary economy was introduced to Hawai'i fish were transported along trails and shipped off island for commercial purposes. While fish sharing practices were maintained the selling of fish for monetary income became prevalent.

Pūnāwai: Freshwater is central feature of all fishponds. Within Kaloko Fishpond there are pūnāwai (springs) that provide freshwater from Hualālai. These underground springs provide essential habitat for fish, vegetation, birds, and insects. Each of these life forces rely on specific fresh to salt water ratios for optimum living conditions. Infrared studies findings suggest that freshwater most intensively flows into the fishpond southeast and eastern shoreline. Studies suggest that freshwater flow to the fishpond has declined significantly in the past 30 years.

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Threatened by development (e.g., removal, adverse alterations, water impacts) and climate change (e.g., sea level rise, warming water). Protection of these habitats contributes to the longevity of specie diversity and ultimately, existence. Rehabilitation efforts at the fishpond have improved native shore bird habitat providing nesting and foraging areas. These transformations are bringing observable benefits of increased native bird presence and reestablishment of nests. Students of Kealakehe High School have played a key role in opening spaces for our native birds to nest.

Lā'au: A variety of native plants can be found along the fishpond shoreline. Invasive species removal efforts led by the hui and park service have helped to restore the native seedbank. Transformations have led to the return of makaloa a native sedge has reestablished along the eastern bank. Historically, this plant was gathered by weavers from the area. Interwoven with this native sedge is 'ākulikuli (*Sesuvium portulacastrum*) a native vine gathered for food. These two plants help to filter toxins from the fishpond. Other plants along the shoreline include the kīpūkai (*Heliotropium curassavicum*), 'ae'ae (*Bacopa monnieri.*), uhaloa (*Waltheria indica*), has (*Hibiscus tiliaceus*), and pā'ūohi'iaka (*Jacquemontia ovalifolia* ssp. *sandwicensis*). Opening of fresh water springs has led to an increase in limu 'ele'ele a building block for fishponds providing food for fish.

Intensive removal of the pickle weed (*Batis maritima*) since 2015 have increased habitat for the native plants mentioned. Pickle weed, an aggressive invasive grows in floating mats in the fishpond and as ground cover along the edges. As the plant biodegrades it deposits thick layers of muddy sediment into the fishpond. These negative impacts threaten the health of the ecosystem. Hand removal efforts of Hui Kaloko-Honokōhau and the park service through monthly community workdays have been key to removal and reestablishment of the native seed bank. Educational groups from Hawai'i, Turtle Island, and beyond of all ages have stepped into the fishpond.

I'a: Oral histories describe 'ama'ama (mullet) as a fish raised and harvested in Kaloko Fishpond. Techniques for harvesting included use of the kahe and mākāhā and cross netting. These larger harvests were seasonal with more regular catches occurring with the use of imu (fish traps). This fishing method trapped shoreline fish that dwell near and within the pā loko. Fishing techniques are covered in lessons 3.

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This reduction in fresh water flow has resulted from the development of wells directly above and adjacent to Kaloko. Further stress placed on the watershed (e.g., deforestation, climate change, drought, decrease in rainfall) threaten fresh water flow. Protection of fresh water sources is crucial to the future of Kaloko Fishpond, fisheries, and other fresh water dependent ecosystems.

Manu: Kaloko provides a wetland habitat crucial to a variety of native birds. Residents include the ae'o (endangered black necked stilt), auku'u (night heron), kolea (golden plover), and 'ulili (wandering tattler). Occasionally, the kioea (bristle thighed-curlew), 'akekeke (ruddy turnstone), and 'alae ke'oke'o (Hawaiian coot) frequent the area.