

# *Discovering* Hualālai, *Protecting* the Watershed: An 'Aina-based Virtual Curriculum

*The lesson plans and activities in this 'aina-based virtual curriculum will teach students about the ecological and cultural significance of Hualālai and how human impacts on the environment affect Hawaii's water.*

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## **CURRICULUM OVERVIEW**

### **Introduction**

This ‘Aina-based virtual curriculum is designed to introduce students to the high elevation habitats of Hualālai. These high elevation areas are not readily or easily accessible to the public. It is also in these high elevation areas where endemic or native forests are located and being restored, moreover these high elevation native forests are important for Hualālai’s watershed. It is important for people, such as the students living on Hualālai, to know about the native forests and their role in the watershed and water cycle.

The goals of this curriculum are to provide virtual learning opportunities for students to engage in these high elevation areas from the homes or classrooms. There are several pedagogical themes that underpin this virtual curriculum and will help foster critical thinking: systems thinking, sense of place, and ways of knowing. This curriculum can be used as a stand alone or in conjunction with larger place-based experiential learning projects. This curriculum aligns with the Next Generation Science Standards:

### **Curriculum Objectives:**

After completion of this curriculum learners will be able to:

1. Know is meant by the term “watershed” and be able to identify the components of a watershed,
2. Begin to familiarize themselves with key endemic species that inhabit Hawaii Island high elevation native forests areas of watersheds, with specific emphasis on Hualālai/UoH restoration site.
3. Have an increased awareness of the cultural significance of Hualālai, with emphasis on cultural uses of plants and protocol for sacred spaces
4. Understand the interconnectedness of watershed (components, systems)

### **HDOE General Learner Outcomes**

Self-directed Learner (The ability to be responsible for one’s own learning)

Community Contributor (The understanding that it is essential for human beings to work together)

Complex Thinker (The ability to demonstrate critical thinking and problem solving)

### **Targeted Grade Level Hawaii State Standards**

#### Next Generation Science Standards (NGSS)

2-LS2 Ecosystems: Interactions, Energy, and Dynamics

2 ESS2 Earth’s Systems

ESS2.C The Roles of Water in Earth’s Surface Processes

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

MS-LS2-3

LS2.A Interdependent Relationships in Ecosystems

#### Common Core

*Grade 4:*

Economics Anchor Standard 10 Exchange and Markets (Content Standard SS4.3.10.1)

Geography Anchor Standard 15: Human Populations: Spatial Patterns and Movements (Content Standard SS.4.3.15.2)

Geography Anchor Standard 14: Human-Environment Interaction: Place, Regions, and Culture (Content Standard SS.4.7.14.1)

### **Kamehameha Schools Learner Outcomes**

‘Ike Kūpuna

Aloha ‘Āina

Mālama and Kuleana

Academic Competence

Self-efficacy

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**Mahalo nui loa**

Uluha‘o o Hualālai and the authors would like to thank the Ka‘ūpūlehu Foundation for funding this project. Mahalo nui loa to our interviewees for sharing their mana‘o.

## **RESOURCES**

The following resources are provided for teachers and students. Each of the following resources will be linked on the updated UOH website for virtual engagement.

In addition to these pages and/or resources, there will be associating virtual tour video and video clips.

### **SPECIES CARDS -- PLANT ID BOOK**

### **WATERSHED VOCABULARY**

#### **English Words**

Watershed

Endemic

Native

Indicator Species

Pollination

Pollinator

#### **Hawaiian Words**

Ahupua'a

Kilo

Malama

#### **Resources**

Crossword Puzzle

Word Search

A'alii Coloring page (eye-hand coordination 2-5 yrs old)

## LESSON PLAN 1: SYSTEMS: 'IWI AND MAMANE

### Introduction

A system is a group of interacting and interconnected entities working together as a whole unit. An ecosystem is considered a system, where biological species are interdependent. More specifically, an ecosystem is a biological community of species that are interdependent upon one another and within an environment. The pollination relationship between Hawaiian honeycreepers and native flowering trees, such as 'Iwi (*Drepanis coccinea*; scarlet honeycreeper) and Māmane tree (*Sophora chrysophylla*) that inhabit the high elevation forests of Hualālai.

### Learning Objectives

1. Student will learn about the various species of Hawaiian forests, including endemic honeycreepers, Māmane, Koa, and Ohia trees, A'alii, pukiawe, and ohelo ai shrubs that grow on Hualālai;
2. Students will recognize the relationship plants have with native birds;
3. Students will describe the process of plant pollination.

### Resources:

[Video](#)

### Activities:

1. Review video
2. Crossword Puzzle
3. Word Search
4. A'alii Coloring page (eye-hand coordination 2-5 yrs old)
5. Seeds propagation experiential activity: Please contact Uluha'o for seeds!
6. Discussion questions: These questions can be discussed in group or individually in a reflection journal.

**Discussion Questions:**

What does interdependence mean? Can you think of other animal-plant interdependent relationships other than the one between ‘iwi and mamane? How would you describe the relationship flowers have with pollinators? In what ways might humans have a relationship or interdependence with nonhuman animals and plants?

## LESSON PLAN 2: HUALĀLAI'S HISTORICAL WATER: CULTURE AND MAPPING

### Introduction

Native Hawaiians lived sustainably for hundreds of years, and took part in agricultural practices that were worked in harmony with the 'aina. In order to provide water for themselves and for growing food, Hawaiians had access to many above ground sources of water throughout Holualoa and Hualālai. According to oral history and historical accounts, above ground water was much more plentiful than they are today. The streams ran much more frequently. Freshwater pools were available and Hawaiians would malama (take care of) these fresh water pools and the animal and plant species found in and around these ponds. This means that the habitat found on Hualālai was much different than today.

### Learning Objectives

1. Students will develop an understanding of the historical habitat and above ground water availability of Hualālai;
2. Students will explore the differences between groundwater and surface water;
3. Students will create an illustration of what historical Holualoa (mauka Kona) might have looked like before contemporary development.

### Resources:

1. [Video](#)

### Activity

Discussion Questions: Students will talk about current ecosystems. What do they see around them? What do they think Holualoa looked like 100 years ago? 50 years go? Create an illustration or drawing of what historical Holualoa might have looked like.



## LESSON PLAN 3: WHAT IS A WATERSHED AND WHERE IS KONA'S

### Introduction

In this lesson plan, students will be introduced to watersheds with an emphasis on West Hawaii Island and Hualālai. Students will discover the forested watershed above Kona and begin to think about the relationship between forests and their drinking water.

### Learning Objectives

1. Students will see the high elevation forests of Hualālai virtually
2. Students will learn about the Hualālai watershed and water cycle
3. Students will understand the connection between trees (endemic forests) and Kona's drinking water.

### Resources:

1. [Video on ahupua'a](#)
2. [Water cycle for students](#)
3. [Plant Guide](#)

### Discussion:

Where does the water in your house come from? Why are native trees (and forests) important for our water? What might happen if forests aren't as plentiful? How might you and your ohana and friends help our water cycle?

## LESSON PLAN 4: WAHI PANA-WAHI KUPUNA- WAO AKUA ENTERING SACRED SPACES

### Introduction

The high elevation forests of Hawaii's summits, such as Hualālai, are considered wao akua (realm of the gods). Uluha'o o Hualālai works for the stewardship of wahi pana or wahi kupuna. Historically, these were not places people inhabited or recreated, but rather visited for sacred or culturally significant events or to collect medicinal or other useful plants. When visiting these places they were done in reverence and protocol. In this lesson plan, students will learn about the protocol for entering the wao akua of Hualālai.

### Learning Objectives:

1. Students will listen and observe the video of Hualālai oli;
2. Students will learn about the Protocol of entering wahi pana;
3. Students will virtually engage with place and consider what their own sense of place is.

### Resources:

1. [Video of oli](#)
2. [Video of kilo](#)
3. [Kilo Worksheet](#)
4. [Outline of UoH protocol:](#)

Entrance to Wahi Pana / Wahi Kupuna- Wao Akua

- A. Who you are, Where you come from, what your purpose is.
- B. Empty na'au, self of all negativity and leaving that out of place.
- C. Oli Kahea/Oli Komo, offer a Pule, or mele

- D. Knowing where you are, and your surroundings. Stop at 1st crater, place names, mo'olelo etc
- E. Site- Observation, quiet time, allowing place to be the guide.
- F. Share- Questions of senses (felt, smell, hear etc...), why it is important to care for this forest etc...
- G. Plant ID trail walk, native and non so you know what to help eradicate and how.
- H. Identify threats to the forest (ungulates, invasives esp banana poka, fireweed)
- I. What can we do to help? Everyone plays a part.
- J. Stewardship activities:
  - 1. invasive removal
  - 2. seed collection
  - 3. Out planting
  - 4. GPS tracking of inventory
  - 5. Bird observation
  - 6. Plant Log observation for seasonal calendar

K. Oli Mahalo

Protocol of cleaning shoes, tools, tires- hand in hand with cleaning self

Exiting Cleaning of tools, shoes, tires, and mahalo for experience and gratitude to place.

### **Activity and Discussion**

- 1. Observation Activity:
  - a. Ideally this activity will be done outside, but if this is not accessible can be done inside the classroom. Have students find a quiet place to sit alone. Students will spend 10-15 minutes quietly observing. Encourage students to take a few deep belly breaths to ground themselves and quiet their minds. This activity can be done on multiple days to allow students to see patterns or changes in their chosen spot.
- 2. Discussion Questions for small group or write it now journal:

- a. Have students reflect on their kilo experience by sharing in small groups or by journaling. What did you notice? Describe what you felt, smelled, saw, heard? Describe all the objects, plants, animals and people that were there? How did they interact? In what ways did this experience surprise you? How might the place you were observing change over time?