Culminating Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Focus Questions</th>
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<tbody>
<tr>
<td>What are your beliefs and values about conservation?</td>
<td>People in a community have a responsibility to protect the environment and make different choices depending on the issues related to the conservation of resources.</td>
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<tr>
<td>Explain the roles and responsibilities of citizens.</td>
<td>People in a community have a responsibility to protect the environment and make different choices depending on the issues related to the conservation of resources.</td>
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<tr>
<td>How do we participate in reducing the negative effects of pollution or conservation action?</td>
<td>People in a community have a responsibility to protect the environment and make different choices depending on the issues related to the conservation of resources.</td>
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<td>What are the benefits and values of the people involved?</td>
<td>People in a community have a responsibility to protect the environment and make different choices depending on the issues related to the conservation of resources.</td>
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<td>What do people feel about pollution or conservation action?</td>
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### Sample Rubric for Culminating Activity

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<tbody>
<tr>
<td><strong>Social Studies:</strong> Citizenship / Participation</td>
<td>Action plan clearly identifies the problem, who is affected by it, and the value systems that are important. Plan shows appropriate process, critical thinking, and innovative solution.</td>
<td>Action plan clearly identifies the problem, who is affected by it, and the value systems that are important. Plan shows appropriate process and evidence of critical thinking.</td>
<td>Action plan is limited; needs more development to show how solution will be reached.</td>
<td>Action plan is unclear; shows inappropriate process or solution.</td>
</tr>
<tr>
<td><strong>Points</strong></td>
<td>Evidence shows that action plan was carried out and includes students' reactions to the plan with suggestions for follow-up in the future.</td>
<td>Evidence shows that action plan was carried out.</td>
<td>Evidence shows that some of the steps in the action plan were completed.</td>
<td>No evidence of completing the action plan is provided.</td>
</tr>
<tr>
<td><strong>Group Work (Laulima – Cooperation)</strong></td>
<td>Participates fully in group task; shares appropriately; listens attentively; and encourages others</td>
<td>Participates fully in group task; shares appropriately and listens attentively</td>
<td>Demonstrates effort but needs work on listening attentively and/or cooperating</td>
<td>Lacks effort and cooperation; shows poor listening skills</td>
</tr>
<tr>
<td><strong>Points</strong></td>
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I NOTICED:
De-bait Goes On!

- What are your beliefs and values regarding the conservation of fishponds in Hawai‘i?
- How do we participate responsibly in civic action?

Hawai‘i DOE Content Standard

Social Studies: Citizenship/Participation
• Students understand roles, rights (personal, economic, political) and responsibilities of American citizens and exercise them in civic action.

Grades 6 – 8 Performance Indicators

• Explain the roles and responsibilities (social, political, economic) of citizens and the importance of participation for the benefit of society.
• Select a concern that requires positive action for a designated group/community.

Key Concepts

• Issues related to the conservation of fishponds involve different perspectives depending on the values and beliefs of the people involved.
• People in a community have a responsibility to identify and evaluate solutions to issues, such as fishpond conservation, based on recognition of their own and others’ values and beliefs.

Activity at a Glance

Groups of students analyze different perspectives as they assume the roles of citizens in a mock town meeting to debate the issues surrounding the future of the community’s fishpond.

Time

3 - 4 class periods

Skills

oral communication, critical thinking, evaluating sources of information, identifying and clarifying personal values
Assessment

Students write a summary that:
- explains the roles and responsibilities of citizens involved in the debate;
- describes the importance of participation in civic actions for the benefit of society; and
- clarifies their own personal values related to the issue of fishpond conservation.

Vocabulary

intrinsic – belonging to the real nature of a thing; inherent or natural
subjective – not objective; personal
ecological – living organisms and their relationship to the environment
derived – to get or receive something from a source; received
values – the beliefs or standards of a group of people

Materials

Provided:
- student reading
- student activity sheet
- role cards
- teacher key

Needed:
- paper
- color markers
- costumes (optional)

Advance Preparation

Make copies of the student reading and student data sheet for each student. Make one set of
the role cards, cut, fold and place in a container.

Teaching Suggestions

Note: The fishpond controversy in the student reading is based on a hypothetical newspaper
article; the positions of government, groups and individuals are fictional.

Part 1

1. Generate a discussion with the class to define “value system.” (A value system is a set of
   standards or beliefs determined by a specific group of people.) Review the different types of
   value systems. See box on following page and write these on the board.

2. Distribute a copy of the student reading to each student. Have students take turns reading
   it aloud in class.

3. Divide the class into groups and give each a student activity sheet. Ask students to
   complete the sheet analyzing the value system of each group or individual (fisher, scientist,
   kūpuna, developer, business people, and student group) and list their reactions to the
   proposed development.
Value Systems

Aesthetic focus on appreciation of intrinsic (natural) and subjective (not objective; personal) qualities, such as beauty of an area

Cultural related to maintenance of practices and attitudes of a culture

Ecological concerned with living things and the function of ecological (living organisms and their relationship to the environment) systems

Economic related to the exchange of goods and services

Educational concerned with benefits derived (received) from learning

Legal concerned with the law and its enforcement or application

Recreational related to the use of leisure time


4. Discuss students’ responses and review each group or individual’s position, beliefs and values. (Refer to the teacher key for the answers and note that students may discover answers not listed on the teacher key.)

Discussion Questions

• What are some of the issues groups face in considering whether or not to restore a fishpond?
• Which of the beliefs are based on fact and which are based on opinion?
• Which beliefs are based on economic values? Which are based on cultural values? Do some groups have more than one value system?
• Is it important to restore fishponds? Why or why not?
• What are some solutions?

Part 2

5. Divide the class into small groups of no more than three to four students per group. Pass around the container of role cards and have one member from each group draw a card.

6. Ask each group to read the role card and discuss as a group the following question: Does your group’s role support the restoration of the fishpond? Why or why not?

7. Distribute the student data sheet to each group and have students complete it and identify the value system expressed on their role cards.
8. Tell students that they will be presenting the position described on their role cards at a mock town meeting to be held in class. Set a date for the meeting and review students’ responsibilities. To prepare for the meeting, they will need to review the student reading and glean information that will support their position.

9. Each group may also wish to prepare a poster or diagram to use in their presentation detailing the impact fishpond restoration may or may not have on their community.

10. Stage a town meeting in the classroom with each group presenting its position. You may suggest students dress their part to heighten the dramatic quality of the experience. Give each group a time limit for presenting and allow time for other groups to respond.

11. Have each student write a summary of the debate, addressing the points identified in the assessment activity.

Portions of this activity were adapted from: *The 'Ohi'a Project*, Grades 7-8, “Case Studies.” Bishop Museum and Moanalua Gardens Foundation.

**Adaptations/Extensions**

- Have students identify a fishpond in their school community and study an issue or problem connected to the pond. Ask students to recommend a solution and implement a civic action (for example pond clean-up, planting of native plants, removing alien species, or rebuilding pond walls). See the Appendices for a list of resource people on each island that may assist in the organization of a service project at your local fishpond.

- Invite individuals or members from a group who are connected to a fishpond to come and speak to the class. Have students ask questions and categorize each speaker’s response according to the value system and beliefs.

- Have students produce a mock television newscast from the student reading or role cards. If your school has access to video equipment, videotape the newscast and share it with your school community.

- Stage a mock trial – fishpond owners versus developers or scientists versus developers.
School Group Blocks Fill-in of Kūpono Fishpond

By Frances Fisch
Leemoo Wire Service

KŪ'Ē, Hawaiʻi – A dozen or so students from Mālama Middle School and their families and friends blocked bulldozers today from destroying Kūpono – their community’s fishpond.

The group formed a human chain similar to early Hawaiians who would transport stones from the mountains to the sea to build their ali'i's fishpond rock walls.

As they linked arms chanting, “Mālama our ‘ama‘ama!” equipment operators sat stunned in silence idly waiting for further orders from their superiors.

“I've never seen anything like this before,” said Hardhat McKenzie – the supervisor on duty at the construction site. “These folks mean business!”

Mālama students and their supporters decided to become involved when plans were announced to fill in their community's 117-acre fishpond to pave the way for 100 affordable new homes.

Moonee May, President of the Coalition of SOS or Save Our (open) Spaces, voiced her concern.

“My group regularly visits Kūpono. This is a perfect place for us to become re-energized, rejuvenated and to restore a sense of spiritual well-being. The beauty, tranquility and serenity make it an ideal place to re-connect with oneself.”

But land developer, Bill D. Lott, reminded his opponents that the project has widespread community support.

“It’s not as if we haven’t done our homework,” said land developer, Bill D. Lott. “We've been very open about our
School Group Blocks Fill-in of Kūpono Fishpond (continued)

intentions (the housing project) and have involved the community every step of the way.”

Two years ago, Lott pulled together community leaders to have a “talk story” session about the project.

Through monthly discussions, leaders from both sides identified Kūpono as the area that would be the least affected by the project.

“The water, electrical and sewer lines are ready to go,” said community leader, Meg A. Monopolee. “If Mr. Lott tried to build elsewhere the infrastructure would not be in place. He would end up tearing up a larger area of what we want to preserve.”

Other community leaders agreed citing the urgent need to build affordable housing.

“We need homes built and now!” said community leader and Executive Director Helen H. Omeless of Wee Care – a shelter for homeless families. “I can understand the historical significance of these rock-wall fishponds. But we’ve got babies living on the streets, using cardboard boxes for a crib. It seems that some of us are somewhat confused about our priorities.”

But Mālama Middle School students had some reservations.

“I know we need homes,” said Mālama sixth grader, Ah Mah Ama. “But we use this pond as our living classroom to study its ecosystem. This is home to so many creatures, and someone’s decided to kick them out!”

Lott, claims the group is being impractical.

“They’re misinformed,” Lott said. “Families here in Kūʻe are suffering because there are no affordable homes for them. I drive by a dozen or so homeless families everyday who really need a house to live in. The majority of the community supports this development.” Lott also mentioned that part of the plan is to include a three-acre park with baseball and soccer fields.

“This is a win-win situation for everyone,” Lott said.

According to community leader and project supervisor, Hardhat McKenzie, Kūpono fishpond would be the best place in the area to build homes.

“The other areas being considered would require Mr. Lott to condemn property owners’ land so that he could build roads to access the new development,” McKenzie said. “Sounds to me that Mr. Lott has the community’s best interest at heart.”

Mālama students, relatives and friends learned of the project just days before bulldozers converged on Kūpono fishpond.

“It’s not like we had all year to plan and organize,” said Mitch Mākahā, organizer of the group. “My son came to me upset about what was going to happen to the fishpond, and I
School Group Blocks Fill-in of Kūpono Fishpond (continued)

decided that if it meant this much to him, then we needed to do something about it.”

In ancient Hawai‘i loko kuapā (shoreline fishponds) were used exclusively by ali‘i.

The combination of the rock walls and the mākāhā (sluice grate) made the loko kuapā unique to Hawai‘i.

“You will never find anything like these ponds in the world,” said Dr. Klive Kamaru – expert in fishpond archaeology at the University of Owyhee.

“Considering that this structure is over 400 years old and relatively intact, our government should be considering ways to restore this pond, not destroy it.”

Kamaru and his colleagues are a few of the professors at the university who bring their students to the pond to participate in regular field studies.

But state attorney, Luke E.L. Swere, pointed out that for Kamaru to continue his visits to Kūpono, the state would need to make vast improvements on the fishpond, which they can ill afford.

“The amount of money it would cost taxpayers to make the necessary improvements to the pond would be phenomenal. The state is at risk by allowing groups to visit the fishpond in the first place. Potentially, the state could be held liable for anyone who is injured on the property while currently under our jurisdiction. This is a class action suit waiting to happen,” E.L. Swere said.

When loko kuapā were built, it took thousands of people living within the ahupua‘a to move 25-pound boulders from the uplands to the ocean.

The amount of time it took to construct and maintain the fishpond was lengthy.

One senior family member of the Mālama group recalls his ‘ohana’s connection to the fishpond.

“My ancestor was ali‘i to this ahupua‘a,” Kupuna Aka Mai said. “There are chants in our family’s genealogy that describe this fishpond, the kinds of fish that were raised here and the plants that were grown in this area and used for medicines. This is where my kūpuna lived and now these people want to destroy it!”

But businessman, Entre Penure supports the idea of progress claiming the development will attract more homebuyers to this part of the island and stimulate the economy.

Penure who owns several wedding chapels – two directly built on fishpond walls – says it’s time for the community to look toward the future.

“This is an exciting opportunity for this community to generate income,”
School Group Blocks Fill-in of Kūpono Fishpond (continued)

Penure said. “Businesses will be established as a result of more homes being built. People will have jobs. I predict that in a few years this community will be the next Waikiki!”

Another resident who supports the idea of bringing more tourists to Kū‘e is Sam Shrood, owner of Fishpond Fun – an eco-tourism business that provides recreational activities for tourists at Momi fishpond.

“We have about five to six hundred visitors everyday,” Shrood said. “They love this place. It gives them a real feel for what Hawai‘i was like back then.”

Shrood provides tourists with cultural experiences at Momi fishpond from pole fishing to crab catching to sharing stories about the area where early Hawaiians thrived.

Shrood is also known for his floating restaurant on the fishpond where island residents flock to dine on seafood cuisine.

“If these homes are built, it will be just the beginning of better things to come,” Shrood said. “By developing this area, we can anticipate more visitors to this side of the island, which will generate more jobs for our community.”

But K.B. Cruz, a local fisher, says the development will destroy fishing grounds that he and his family have fished for generations.

“This is my ‘aina,” Cruz said. “My father, my father’s father, and my father’s father’s father have fished here for years. If these homes are a go, then we gotta go.”

Cruz claims that as a result of the new housing development, untreated sewage will be dumped into the ocean killing fish and other marine life that co-exist.

“These bananas don’t know what they’re doing!” Cruz said. “Instead of filling in they should try and figure out a way to make the fishpond productive. So many people here in Kū‘e have to buy food from the big supermarket chain. What this government should be doing is to give Kūpono back to the people so they can grow fish and limu.”

Gov. Benny N. DeJests assured both sides that he will carefully consider all positions before making a final decision.

“The bottom line is we can’t make it affordable if we have to build elsewhere,” Lott said. “Kūpono is the ideal location.”
<table>
<thead>
<tr>
<th>Recreational</th>
<th>Employ the benefits of leisure fishing.</th>
<th>Supports</th>
<th>K.B. Cruz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal</td>
<td>Liability issues are a concern.</td>
<td>Supports</td>
<td>Luke E.T. Swee</td>
</tr>
<tr>
<td>Educational</td>
<td>Educational activities at the Fishpond will cease.</td>
<td>Opposes</td>
<td>Ah Man Anna/Mel Hannah, Mieko Yamada</td>
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<td></td>
<td>The Fishpond could be used to raise fish to be sold at area markets.</td>
<td>Opposes</td>
<td>Dr. Kyle Kamarian</td>
</tr>
<tr>
<td>Economic</td>
<td>Housing for people will be built.</td>
<td>Supports</td>
<td>Sam School</td>
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<td></td>
<td>Homes for the needy and low-income economy increase revenue and stimulate the local development will provide more jobs.</td>
<td>Supports</td>
<td>Huen H. Owless/Bill D. Leto/Bruce Pente/Harding McKenzie</td>
</tr>
<tr>
<td>Educational</td>
<td>Organizations will cease.</td>
<td>Opposes</td>
<td>Middle School Students from Malama/Dr. Kyle Kamarian/Ah Man Anna/Mel Hannah, Mieko Yamada</td>
</tr>
<tr>
<td>Cultural</td>
<td>Ancestral ties are important.</td>
<td>Opposes</td>
<td>K.B. Cruz/Miura Ake Mei</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>Cultural practices will be lost.</td>
<td>Opposes</td>
<td>Moonee May</td>
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**Value System**

1. Fact (check one) based on belief(s) held by people involved.
<table>
<thead>
<tr>
<th>People Involved</th>
<th>Position</th>
<th>Belief(s) (based on fact or opinion)</th>
<th>Value System</th>
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**Student Activity Sheet**
Role Cards

Moses Moi, Inc.
A conglomerate of fishers who are dedicated to restoring the fishpond. Their goal is to re-stock the pond and raise fish and limu (seaweed) to be sold in local stores. They would like their community to become self-sustaining by growing more food locally.

Cy N. Tists, Ltd.
A group of scientists supporting restoration efforts of the fishpond. This group currently uses the fishpond for scientific observation. Primarily they use it to observe fish in their natural habitat and study how the fish respond to currents, tides and the changes in seasons. They would like the pond to be used as a site for college students to gain practical experience.

A group of cultural practitioners who want to see the fishpond fully restored. They support restoration and have committed to eliminating invasive species and re-planting with native plants. Their goal is to offer educational and community group workshops at the fishpond that would focus on moʻolelo (stories), native vegetation in the surrounding area and its significance to Native Hawaiians. They donate their time to mālama (care for) the pond.
Role Cards

D.E. Veloper, Corp.
A wealthy group of land developers have submitted a proposal to the city to construct 100 affordable new homes on the fishpond site. The homes would offer low-income families an opportunity to buy a home. They have already agreed to donate part of their profits to the neighborhood intermediate school. The proposed development will provide jobs to unemployed construction workers in the community.

Baitum, Unlimited
A group of fishpond owners who support restoration for the purpose of eco-tourism. These owners have created a thriving business, which allows tourists to take boat rides across the fishpond. Visitors may also fish for their dinner and if they need access to a restroom, convenient “floating toilets” are available for emergencies. For a significant discount, they will allow local families to visit.

Wed N. Bells, Inc.
A group of wedding chapel owners who support the idea of building wedding chapels on fishpond walls. They are in negotiations with several fishpond owners to erect quaint chapels on their pond walls. A large part of their profits will go towards developing a parking area in an empty lot next to the fishpond, which will provide parking for guests. They help the local economy by attracting tourists to the area and providing local jobs.
Mālama Loko Iʻa

- How have human activities affected the environment of the loko iʻa?
- In what ways can students become involved in caring for fishponds today?

Hawai‘i DOE Content Standard

Social Studies: Citizenship/Participation
- Students understand roles, rights (personal, economic, political) and responsibilities of American citizens and exercise them in civic action.

Grades 6 - 8 Performance Indicators

- Select a concern that requires positive action for a designated group/community.
- Create a plan of action related to the solution (identify the stakeholders involved and the steps to take). (culminating activity)
- Include some evidence of implementation of the plan (letter writing campaign, circulating petition, testifying to appropriate decision makers). (culminating activity)

Key Concepts

- Hawaiian fishponds are affected by a number of human activities including those that cause soil erosion, stream alteration, water pollution, and the introduction of alien species.
- Activities to mālama (care for) fishponds may include helping to restore physical features of the ponds, preventing pollution of streams and coastal waters, helping to remove alien species, planting native plants, and educating others about the value of fishponds.
- Fishponds in Hawai‘i are valuable cultural resources that are being restored and managed for food production, educational enrichment and to reconnect people to the life of the land.

Activity at a Glance

Students investigate a fishpond to learn more about the physical and natural resources and how the pond has been affected by human activities. Students follow up with a culminating activity that demonstrates caring for the loko iʻa.

Prerequisites

De-bait Goes On! and at least one activity from each of the prior units

Skills

observing, reasoning, collecting data, writing
Assessment

Students:
- Write a summary of the ways that human activities have affected the environment of the fishpond.
- Work in small groups to propose a project that they will carry out to demonstrate mālama (caring for) the pond.

Vocabulary

mālama – care for
native – being the place or environment in which a person was born or a thing came into being
alien – not having originated in or not occurring naturally in a particular region or environment
introduce – to bring in or establish, as something foreign or alien
biodegradable – capable of decaying through the action of living organisms
moʻolelo – story, legend, history, tradition
dissolved oxygen – molecules of atmospheric oxygen near the water surface that become mixed in and stay dissolved among the water molecules, expressed in milligrams per liter (mg/l) or parts per million (ppm)
salinity – the total amount of dissolved salts in water, expressed as grams of salts per kilogram of water (g/kg) or as parts per thousand (ppt)

Time

1 class period and a day at the fishpond

Materials

Provided:
- student data sheets

Needed:
- clipboards (one per group)
- pencils
- rubber bands to secure papers to clipboard

Advance Preparation

- Make four sets of the student data sheets.
- Schedule a field site visit to the fishpond. Contact the curriculum coordinator or a person on your island (see Appendices) to make arrangements for your visit. The coordinator will help with scheduling a date for your class to visit the fishpond, lining up resource people to be available the day your class visits the fishpond, providing you with a list of supplies you may need and assisting you with any other inquiries.
- Send home field trip permission slips along with a note to parents about what students will need.
Before Visiting the Fishpond

1. Tell students that the class will be visiting a fishpond to learn more about the ahupua'a, the life in the pond, how the pond works, and ways that human activities affect the pond today. Explain that there will be resource people on site to help them explore at four different learning stations. Review the stations and the key concepts that will be covered.

   • Ahupua'a: In what ways have human activities in the ahupua'a affected the fishpond?
   
   • Life in the Pond: What lives in the fishpond and how do organisms respond to different conditions, including human changes to the environment?
   
   • Loko I'a: How does the fishpond work? How have human activities affected the working of the pond today?
   
   • Plants/Mo'olelo: Which plants are native to the area? What are the effects of the alien species on the site? What do mo'olelo (legends) reveal about Hawaiian culture?

2. Divide the class into four groups. Distribute the student data sheets and review them with the class. Explain that each group will be responsible for collecting information that will help students develop an action plan to help care for the pond.

3. Have students decide how they will share the responsibility of recording information at each of the learning stations at the pond.

4. Discuss safety precautions and appropriate clothing and footwear for the field excursion. Explain that students will not be going into the water but that they will be walking on the fishpond walls. Remind them to be aware of the significance of the site they are visiting and to treat it with respect.

Investigations at the Pond

• At the fishpond, each group will participate in four learning stations and will rotate approximately every half hour. Answers to the plant data sheet are provided on the following page.

• Remind students to record information at each station.

After Visiting the Fishpond

5. Ask groups to report on their findings at the pond and have students complete the written assessment activity.

6. Discuss students' summaries of the ways that human activities have affected the environment of the fishpond. Distribute the student activity sheet on value systems and discuss it with students.
7. Have students work in their groups to propose a project that would address one of the human impacts at the pond. Introduce the culminating activity (see the Unit at a Glance) and challenge students to develop and carry out an action plan to málama the pond.

Adaptations/Extensions

- Based on their findings at the pond, have each group plan and design a model of the fishpond they visited and what it could look like 10 years from now. Ask students to incorporate a specific value system into their design. Will their future fishpond be used for educational, economical or recreational purposes? Remind students that their design should incorporate a stewardship component.

- Have students adopt a fishpond. Contact the curriculum coordinator on your island to learn about the fishpond nearest you.

**Answers: Plant Data Sheet**

A. ‘Ākulikuli Kai
B. Waina Kahakai
C. Indian Pluchea
D. Silver Buttonwood
E. ‘Ākulikuli
F. Milo
G. Mangrove
H. Hinahina
I. Niu
Plant Data Sheet

Use these pictures and the plant descriptions provided on a separate sheet to find and identify plants growing around the fishpond. Write the letter from the description under the picture that matches it.
Plant Data Sheet (continued)

Draw a diagram of the wall in this area of the pond. On the diagram, mark the general location where you found each type of plant.

Which type of plant is most abundant?

Which is least abundant?

What effects do you think alien plants have on this area? What plant-related actions do you suggest to mālama this pond?
Plant Descriptions

A. 'Akulikuli Kai (alien)  
(*Batis Maritima L.*)  
The pickleweed is a small woody plant with fleshy leaves. It is edible and can be used in salads. Pickleweed is known to have medicinal value. In the Caribbean, it is used to make soaps and glass products.

B. Waina Kahakai (alien)  
(*Coccoloba uvifera*)  
The sea grape is known as the “autograph” tree because marks on new leaves produce white lines. The fruit is made into jelly and alcoholic drinks. The root is used medicinally to cure dysentery. The bark is used as medicine to soothe soars throats.

C. Indian Plucheia (alien)  
(*Plucheia indica*)  
This plant was recently introduced to Hawai‘i. It is a native of southern Asia. Indian plucheia can be found near coastal areas; look for the pink or purple flowers clustered at the branch ends.

D. Silver Buttonwood (alien)  
(*Conocarpus erecta sericeus*)  
This plant grows in or near salt or brackish water and is tolerant of full sun, sandy or alkaline soils. The velvety leaves have silver hairs. The red-brown cone-like fruits are not edible. The wood is excellent for making charcoal and for smoking fish and meat.

E. 'Akulikuli (indigenous)  
(*Sesuvium portulacastrum*)  
This plant grows along the ground, trailing its branches and fleshy stems. It bears a purple flower. The fleshy parts are edible and can be eaten raw or cooked as greens.

F. Milo (Polynesian introduced)  
(*Thespesia populnea*)  
Milo seeds provide a laxative, and the young leaves can be cooked or eaten raw. The dry globular fruits are not eaten at all. The yellowish flowers will wilt as the day progresses, shriveling and turning to a purple or pink color.

G. Mangrove (alien)  
(*Rhizophora mangle*)  
Mangrove was introduced to the Islands in 1902. Their aerial roots trap sediments, which hold together and extend the land area. However, these plants are choking traditional Hawaiian fishponds. The bark and shoots can be used to produce dye.

H. Hinahina (indigenous)  
(*Heliotropium anomalum var. argenteaum*)  
The hinahina has gray or silver leaves and white flowers, which are sometimes used in lei making. If the kōko‘olau (beggar ticks) plant was not available, early Hawaiians would brew the leaves of the hinahina to produce a tonic tea.

I. Niu (Polynesian introduced)  
(*Cocos nucifera*)  
The coconut palm sometimes reaches heights of 100 feet. It has many uses; the coconut fruit is used as a food source and the fronds are used to make baskets. In old Hawai‘i, women were forbidden to eat the milk and meat of the niu.
## Pond Life Data Sheet

**Pond Data:** Salinity _______ (ppt or g/kg)  Dissolved Oxygen _______ (ppm or mg/L)

<table>
<thead>
<tr>
<th>Find</th>
<th>Identify it</th>
<th>Think about...</th>
</tr>
</thead>
<tbody>
<tr>
<td>the most abundant &quot;producer&quot; in the pond</td>
<td></td>
<td>How is this producer affected by human activities?</td>
</tr>
<tr>
<td>an herbivore that feeds on that producer</td>
<td></td>
<td>How is this herbivore affected by changes in water conditions?</td>
</tr>
<tr>
<td>an alien plant or animal in the pond</td>
<td></td>
<td>In what ways does this alien species affect the fishpond? What is your evidence?</td>
</tr>
<tr>
<td>evidence of a plant or animal response to changes in dissolved oxygen</td>
<td></td>
<td>What causes changes in the level of dissolved oxygen in the fishpond?</td>
</tr>
<tr>
<td>evidence of mālama (caring for) this fishpond</td>
<td></td>
<td>What else could you do to mālama the fishpond?</td>
</tr>
</tbody>
</table>
a landform that relates to a Hawaiian mo'olelo
the loko ia
the major physical features such as streams, ridges or wetlands
the boundaries of the ahupua'a

On the reverse side of this sheet, draw a diagram of the ahupua'a where the lagoon is located. Include:

<table>
<thead>
<tr>
<th>Describe something beautiful to you in this ahupua'a.</th>
<th>Something beautiful</th>
</tr>
</thead>
<tbody>
<tr>
<td>How might this material affect the lagoon environment?</td>
<td>Environment (will not break down naturally in the environment that is non-degradable)</td>
</tr>
<tr>
<td>How do our actions on land affect water quality in the lagoon?</td>
<td>Environment (a negative human impact on this environment)</td>
</tr>
<tr>
<td>What other ways can people care for the environment of this ahupua'a?</td>
<td>An example of Malonea for this environment</td>
</tr>
</tbody>
</table>

Hawaiian mo'olelo
What does the mo'olelo reveal about Hawaiian culture and values? Is the landform connected to the lagoon in any way? Explain.

Think about...

Find
Loko I‘a Data Sheet

Date _____  Time _____  Tide Notes __________________________

Type of pond: ____________________________________________

Does this pond have mākahā? ______________________________

A. Use the Walking Wheel and measure:
   1: Length of wall
   2: Width of ‘auwai kai
   3: Width of wall

   Record your measurements on the numbered lines above.

B. Draw an arrow in the diagram above to indicate the direction the tide is flowing through the ‘auwai kai.

C. Measure:
   • the speed that a float travels from one end of the ‘auwai kai to the other:
     __________ ft. per second
   • the water depth in the ‘auwai kai:
     __________ ft.

D. Calculate the flow rate:

   Depth (ft.) x Width of ‘auwai kai (ft.) x Flow (ft. per sec.) x 60/7.5 = GPM (gal. per min.)

   __________ _________ _________ x __________ = __________

E. What is the function of the mākahā and the ‘auwai kai?
### Student Activity Sheet

<table>
<thead>
<tr>
<th>Recreational – related to the use of leisure time</th>
<th>Legal – concerned with the law and its enforcement or application</th>
<th>Educational – concerned with benefits derived from learning</th>
<th>Economic – related to the exchange of goods and services</th>
<th>Ecological – concerned with living things and the function of ecological systems</th>
<th>Cultural – related to maintenance of practices and attitudes of a culture</th>
<th>Value System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life in Loko ‘Ia</td>
<td>The Ahupua’a</td>
<td>Aesthetic – pertaining to the appreciation of intrinsic and subjective qualities, such as beauty of an area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Make an X in the column that BEST describes the value system that is the focus of each learning station at the fishpond. Describe which of these value systems are important to the action plan that you propose for the fishpond.

**Name**

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