

LESSON 5 Shorelines in Trouble

Lesson at a Glance

After learning about the shoreline habitat and some of the organisms that live there, students will be introduced to some problems which could impact this ecosystem. Students are given information to read on traditional Hawaiian *Ahupua'a* management of the watershed, and how these methods helped preserve the natural resources. Next, they are given a short article to read on modern issues related to the health, use, and management of our watersheds, particularly the shorelines.

Students note the actions that both groups used that sustained the habitat and cite ways that past practices still work in present day. Students work in groups using a problem solving graphic organizer to brainstorm solutions to their shoreline management problems. Each group presents ideas and solutions to the class.

Lesson Duration

Two or three 60-minute periods

Essential Question(s)

How can communities manage and care for their coastal environments?

Key Concepts

Proper land management is vital to sustaining our surrounding shoreline and ocean habitats.

Instructional Objectives

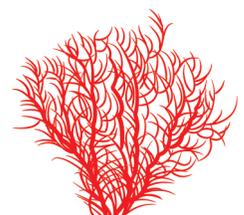
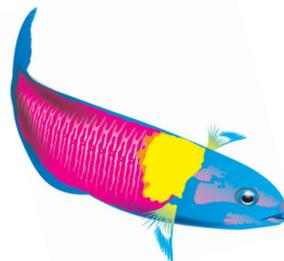
- I can speak clearly and confidently.
- I can monitor my own reading by rereading, looking for context clues, and asking for help.
- I can paraphrase and retell a reader what was read without coaching.
- I can recall important facts.
- I can use language from the selection when paraphrasing.

Related HCPSIII Benchmark(s):

Language Arts LA.3.6.1
Use oral language to obtain information, complete a task, and share ideas and personal opinions with others.

Language Arts LA.3.6.3
Give verbal and non-verbal feedback to a speaker to promote mutual understanding.

Language Arts LA.3.6.4
Clarify spoken messages by restating, questioning, or elaborating.



Assessment Tools

Benchmark Rubric:

Topic		Discussion and Presentation	
Benchmark LA.3.6.1		Use oral language to obtain information, complete a task, and share ideas and personal opinions with others	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Use creative oral language to obtain information, complete a task, and share ideas and personal opinions with others, in a highly effective way	Use oral language to obtain information, complete a task, and share ideas and personal opinions with others	Use typical oral language that sometimes aids in obtaining information, completing a task, or sharing ideas and personal opinions with others	Use inappropriate oral language that does not aid in obtaining information, completing a task, or sharing ideas and personal opinions with others
Topic		Critical Listening	
Benchmark LA.3.6.3		Give verbal and nonverbal feedback to a speaker to promote mutual understanding	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Give insightful verbal and nonverbal feedback to a speaker to promote mutual understanding	Give verbal and nonverbal feedback to a speaker to promote mutual understanding	Give superficial verbal and nonverbal feedback to a speaker that promotes some mutual understanding	Give very little relevant verbal and nonverbal feedback to a speaker to promote mutual understanding

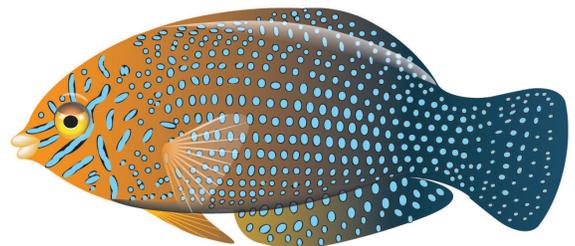
*Note: the meeting of this benchmark will depend on the conversations between students

Topic		Critical Listening	
Benchmark LA.3.6.4		Clarify spoken messages by restating, questioning, or elaborating	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Clarify spoken messages when needed by restating, questioning, or elaborating, with specific details, in a highly effective way	Clarify spoken messages when needed by restating, questioning, or elaborating	Clarify some spoken messages when needed or only partially clarify a message by restating, questioning, or elaborating	Clarify very few spoken messages when needed by restating, questioning, or elaborating or use these listening strategies ineffectively

Assessment/Evidence Pieces

Lesson

- Student Worksheet: *Shoreline Problem Solving*
- Assessment Tool: *Group and Self-Evaluation*

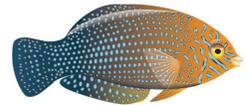


Materials Needed

Teacher	Class	Group	Student
<ul style="list-style-type: none"> Chart paper Method to view PowerPoint <i>Global Sea Level Rise</i> 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None

Instructional Resources

- PowerPoint Presentation: *Global Sea Level Rise*
- Student Reading: *Problems with Run-off in Shoreline Areas*
- Student Worksheet: *Shoreline Problem Solving*
- Teacher Answer Key: *Shoreline Problem Solving*
- Student Reading: *Ancient Hawaiian Ahupua‘a System*
- Student Reading: *The Hawaiian Ahupua‘a*
- Assessment Tool: *Group and Self Evaluation*
- Assessment Tool: *Teacher Resource Checklist-Shorelines in Trouble*



Student Vocabulary Words

erosion: the breakdown and transportation of solid materials.

pollution: introduction of substances (chemicals, ash, smoke, dust etc.) to the soil, water or atmosphere that are harmful to organisms.

sustainability: a process of resource use to ensure there is enough of the resource for future generations.

Lesson Plan

Lesson Preparation

- Review the Science Background provided in the Unit Overview.
- Review and make copies of the Student Readings *Problems with Run-off in Shoreline Areas*, *Ancient Hawaiian Ahupua‘a System*, and *The Hawaiian Ahupua‘a*, one per student.
- Make copies for each student of the Student Worksheet *Shoreline Problem Solving*.
- Preview PowerPoint *Global Sea Level Rise* and make arrangements to project it.

I. Solving Problems in the Shoreline Habitat

- Show PowerPoint *Global Sea Level Rise*. Discuss with students how the sea level rise in these slides would affect them. Discuss how they think sea level rise would affect shoreline habitats in Hawai‘i based on the images they just viewed. Point out that sea level rise is a natural activity that affects shoreline habitats. As a class, brainstorm and discuss ways that natural and human activities affects the shoreline habitat. You may want to create a “cause and effect” chart to help students to understand the impact we have on this habitat, both positively and negatively.
- Divide students into groups to investigate solutions to the problems they read in *Problems with Run-off in Shoreline Areas* and from the chart.

- C. Assemble students, and count off one through four. Tell students to join their numbered group, and to choose one problem in the shoreline habitat that they read about. Students must come up with a solution to their chosen problem, using the Student Worksheet *Shoreline Problem Solving*.
- D. Call upon groups to present their proposed solution(s) to the problem they identified.
- E. Explain to students that even people long ago came up with ways to solve and prevent some of these problems. Introduce the ancient Hawaiian *Ahupua'a* system as one method people used in the past to protect resources.
- F. Option: You may want to have students fill out the self/group assessment sheet.

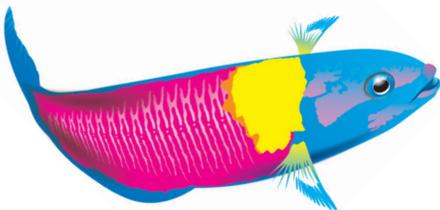
II. *Ahupua'a: Ancient Hawaiian Land Management*

- A. After students have developed their ideas on how to solve threats to the shoreline, briefly introduce students to one solution the ancient Hawaiians used to manage the land and water from the mountains-to-the-sea, known as *Ahupua'a*.
 - 1) Show students a diagram, and point out the shoreline habitats in the illustration.
 - 2) Identify the kinds of agriculture, mariculture (cultivation of marine organisms for food), and fishing practices of the Hawaiians.
- B. Distribute the Student Readings *Ancient Hawaiian Ahupua'a System* and *The Hawaiian Ahupua'a*. Explain that students will be asked to stand and read their article to someone else, and then, in turn, listen carefully as another person reads to them.
 - 1) Have students take their article with them and line up according to their birthday; January at one end; December at the other.
 - 2) "Fold the line" to create two lines. Lead the last person, so that each student is facing a partner. Have partners stand at arms length. Starting on one side, have each student state his/her birthday to the other person facing them.
 - 3) Then explain that they are going to take turns reading aloud one paragraph at a time. The listener must listen carefully, and then paraphrase; that is, say in his/her own words, what the reader just read. Then, the students switch reader/listener roles, and continue alternating until they finish the article. The teacher should model the process with a good student reader.
- C. Reassemble the entire class. Lead a class discussion in which you identify the types of modern technologies, land use practices, and related shoreline problems. You may want to have students compare and contrast their ideas with the *ahupua'a* system. How are they the same? How are they different? How can the ideas be combined to help the environment?

Extended Activities

Invite a guest speaker from Sierra Club, Hawai'i Nature Center, or Nature Conservancy.

Write letters to the legislature about students' concerns.



LESSON 5 Student Reading

Problems with Run-off in Shoreline Areas

Many people live and work close to shoreline habitats. This is great for people that want to explore the tide pools and learn about the animals that live there, but humans also can cause problems for the habitat. There are several different ways that we as humans can impact shoreline habitats.

One big problem is the run-off that comes from the hillsides and drains down into the ocean. Run-off happens when it rains and the rainwater flows over the land and picks up loose dirt called silt, rubbish and different chemicals and carry them to the ocean. When new homes, shopping centers and roads are built a lot of dirt is exposed and when it rains, it gets picked up and washed down to the ocean. When the silt flows into the ocean it can cover up coral and limu and block the sunlight they need to grow.

Rain water or run-off can also pick up different chemicals and send them down into the shoreline habitats. Chemicals are sprayed on fields and parks and golf courses to help them grow. But if these chemicals wash down into the shoreline habitat they can kill the plants, animals and corals that live there.

Another problem is rubbish that gets washed into the ocean and up onto the shoreline areas. Not only is the rubbish ugly, sometimes animals think they are food and eat them. This can make the animals really sick.

In addition to run-off there are many other human impacts. These include: marine debris, invasive species, coastline alteration, erosion, and trampling the reef and tidepools, etc.

How do you think that some of these problems could be eliminated?



LESSON 5 Shoreline Problem Solving

SITUATION: Identify a situation we have in Hawai'i that can impact the health of our shoreline habitats.

PROBLEM: State the specific problem, include the cause, how does it impact and who does it impact.

POSSIBLE SOLUTION IDEA 1

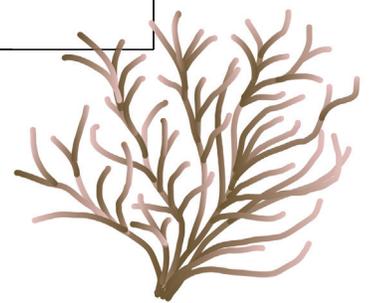
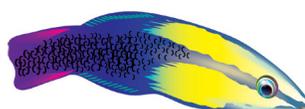
POSSIBLE SOLUTION IDEA 2

Pros:

Pros:

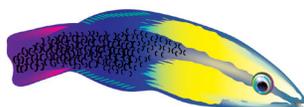
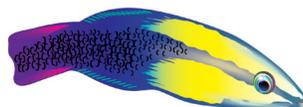
Cons:

Cons:



CHOOSE A SOLUTION & MAKE A PLAN.

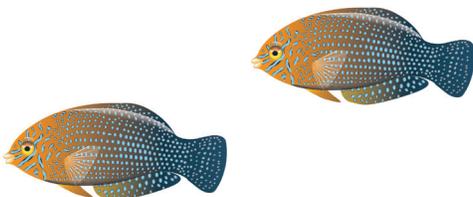
REASONS WHY YOU CHOSE YOUR SOLUTION.



LESSON 5 Teacher Answer Key

Shoreline Problem Solving

<p>SITUATION: Example: There is a lot of construction of new homes.</p>	
<p>PROBLEM: Example: Construction causes a lot of loose dirt and erosion that can harm our streams, and make runoff water muddy. The muddy water makes it difficult for plant life to get enough sun, and they die. As a result, the oxygen level in the water goes down, and fish die.</p>	
<p>POSSIBLE SOLUTION IDEA 1</p>	<p>POSSIBLE SOLUTION IDEA 2</p>
<p>Example: Plant more grass around construction sites to help stop the erosion.</p>	<p>Example: The state government could halt all new construction until all the habitats are healthy.</p>
<p>Pros: Grass not only looks pretty, but also helps hold the soil in place.</p>	<p>Pros: This would really help protect our islands; they are so fragile. If we keep the islands beautiful, tourists will still visit.</p>
<p>Cons: Could be expensive, and construction trucks could ruin it by driving over it.</p>	<p>Cons: A lot of people would lose their jobs.</p>
<p>CHOOSE A SOLUTION & MAKE A PLAN: We choose Idea 1, it makes the most sense. Construction trucks could only drive in certain areas, and the construction company would have to pay for planting the grass. People who buy houses like to have a yard already in place. They should plant trees, bushes, and grass right away to help stop the erosion that can cause harmful run off.</p>	
<p>REASONS WHY YOU CHOSE YOUR SOLUTION: This seemed like the best solution, because it is the most practical, and it also is a beautification project. The other idea would be hard on families whose parents worked in the construction industry.</p>	



LESSON 5 Student Reading

Ancient Hawaiian Ahupua'a System From the Mountains to the Sea - Hawai'i's Natural Resources

Hawaiians had to live off the land and the sea for their food, clothing and shelter. Hawaiians used natural resources that came from each of these three regions: mountains, plains, and the sea. Hawaiians needed resources from all three regions on the islands.

Mountain: Steep area covered with trees and vegetation

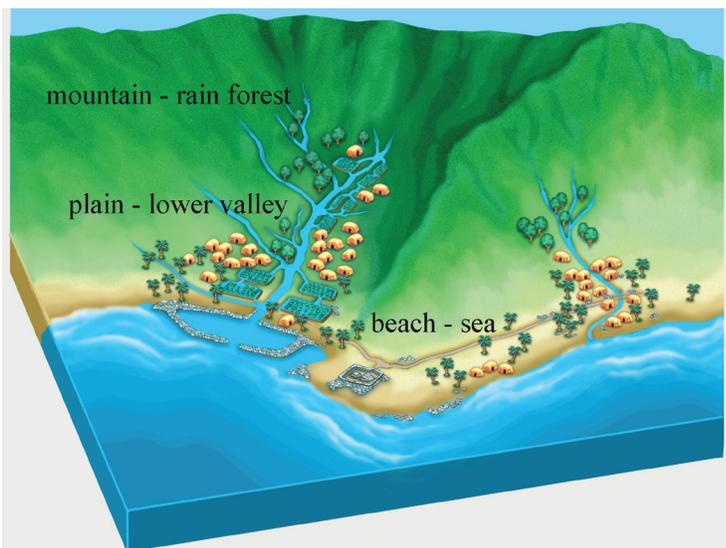
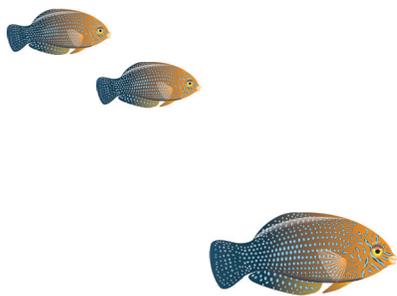
- Trees for canoe building
- Trees for house posts
- Kukui nuts for oil and lamps
- Wild banana trees
- Wild pigs and birds
- Other natural resources

Plains: Lower valleys, sloping fields and grass lands

- Freshwater streams for drinking, watering crops, and washing
- Farmland for taro, sweet potatoes, bananas, and other crops
- Grasslands for grass huts
- Ti leaf for wrapping food, making hula skirts, and more

Sea or Ocean: Beaches to the reefs and beyond

- Fishponds
- Shellfish, lobster, crab
- Gathering seaweed
- Shore fishing
- Deep ocean fishing



LESSON 5 Student Reading

The Hawaiian Ahupua'a (ah-who-pu-ah-ah)

The chiefs of old Hawai'i divided the land into sections generally running from the mountains to the sea. These sections were called *ahupua'a*. Hawaiians realized that within the *ahupua'a* there were three different areas that were important: the mountains, the plains and the sea. They knew that together these three areas contained the materials people needed every day for food, clothing and shelter. For example, the forests were used to make tools and crafts, and they grew and collected food from the land and sea.

Since there were no stores, people needed to catch fish, grow vegetables, and build houses and canoes for themselves. Food and other products were exchanged among the families within the *ahupua'a*. There were fishermen, farmers, craftsmen, foresters and others who would then share each others' products. Sometimes products were traded with people in other *ahupua'a*. An *ahupua'a* that grew a lot of *kalo* but caught only a small amount of fish might trade their *kalo* for fish.

Great care was taken not to pollute the fresh water in the streams which flowed down from the mountain waterfalls through the valley and out to the sea. People bathed only near the mouth of a stream. It was *kapu* or forbidden to bathe anywhere else. Farther up the stream was the place set aside for washing calabashes and utensils. Above that, dams were constructed for the *'auwai*, or ditches, carrying water to the taro fields. The cleanest water was above the dams. This water was reserved for drinking only and was carried in gourds to their homes.

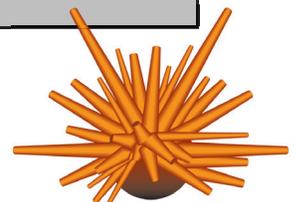
The people knew they couldn't over fish or hunt too many animals in their *ahupua'a* or future generations would have nothing. They needed to take care of the resources to survive. The *ahupua'a* system was used for many generations.



LESSON 5 Teacher Resource Checklist

Shorelines in Trouble

Name	<i>LA 3.6.1</i> Use oral language to obtain information, complete a task,... (partner reading)	<i>LA 3.6.3</i> Give verbal and non-verbal feedback to a speaker... (partner reading)	<i>LA 3.6.4</i> Clarify spoken messages by restating, questioning,... (partner reading)	<i>SS 3.2.2</i> Analyze varying perspectives of an experience or event... (Student worksheet)
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LESSON 5 Group and Self-Evaluation

Name: _____ Date: _____

Assignment: _____

J = Proficient

K = Partially Proficient

L = Novice

Your Name and Group members' Names:	Shown attentive listening during sharing/reading.	Stayed focused on task at hand.	Participated in discussion and problem solving.	Able to complete assignment/task in given time.	Encouraged other group members.
[your name]					

