Key Hawaiian Values:
MALAMA – cares for the environment
General Learner Outcomes: 5, 1 & 5
Listens, interprets & observes information effectively

Key Science Content Standards:
Domain 2, Historical Perspectives
Standard 3: Mālama i ka Āina
Domain 2, Organisms & Development
Standard 5: Interdependence

Water Resource Activity: Site #1

1. LISTEN TO THE SPEAKER & WRITE DOWN ANY WORDS YOU DON’T KNOW IN YOUR SCIENCE WORD BANK.

2. NEXT, ANSWER THESE QUESTIONS:

A. WHO is your Mākua Valley Regional Water Resources speaker?

_________________________________________

B. WHAT is his/her job?

_________________________________________

_________________________________________

C. HOW does he/she test the water at Mākua?

_________________________________________

_________________________________________

_________________________________________

D. WHEN did people discover this spring?

_________________________________________

_________________________________________

MY SCIENCE WORD BANK

1. New word:

Meaning:

2. New word:

Meaning:

3. New word:

Meaning:
3. WATCH & HELP THE pH DEMONSTRATION

E. WHAT are the results of the tests you saw?

_________________________________________________

F. WHY is it so important for scientists & others test the water at places like this spring in Mākua?

_________________________________________________

4. IMAGINE - Now or when you return to school, draw a picture or write a poem, short story or your opinion below on one of these topics:
   a) What I think about this spring & other Mākua water sources
   b) What Mākua will be like to visit 20 years in the future.
   c) What science job I would like to do at Mākua.
NAME: ______________________________________________

Science in Hawai‘i: Nā Hana Ma Ka Ahupua‘a – A Culturally Responsive Curriculum Project

Key Hawaiian Values:
LAULIMA – volunteer to help others
PONO – reflect on the right thing to do

General Learner Outcomes: 1, 4
Set challenging goals & personal plans

Key Science Content Standards:
Domain II, Historical Perspectives
Standard 3: Mālama i ka ‘Āina: Sustainability
Domain II, Organisms & Development
Standard 9: Structure & function of living cells

Mālama i ka ‘Āina Activity: Site #2

1. LISTEN TO THE SPEAKER & WRITE DOWN ANY WORDS YOU DON’T KNOW HERE

2. NEXT, ANSWER THESE QUESTIONS:

A. WHO is your Mākuʻa Valley Army Scientist speaker?

B. WHAT is his/her job?

C. WHICH native plant can you help conserve today?

Draw it here & write its name:

D. WHAT are important things scientists consider when propagating this native species?

E. HOW can you help protect Mākuʻa in the future?

MY SCIENCE WORD BANK

1. New word:

   Meaning:

2. New word:

   Meaning:

3. New word:

   Meaning:

   Silversword
Archeology as Mirror of the Environment Activity: Site #4

1. **LEARN TO BE AN ARCHEOLOGIST!**
   AS YOU LISTEN TO THE SPEAKER WRITE DOWN ANY WORDS YOU DON'T KNOW HERE.

   A. WHO is your Mākuʻa Valley Cultural Resources speaker?

   ______________________________________________________

   B. WHAT is his/her job?

   ______________________________________________________

   ______________________________________________________

2. **ANSWER THESE QUESTIONS WHEN HE/SHE ASKS:**

   C. Name 3 ways prehistoric Native Hawaiians got their fresh water.

   ______________________________________________________

   ______________________________________________________

   ______________________________________________________

   Now we know how environmental resources reveal clues about how people lived. This will help us understand what we find at this “dig”.

---

**MY SCIENCE WORD BANK**

1. New word:

   ______________________

   Meaning:

   ______________________

   ______________________

2. New word:

   ______________________

   Meaning:

   ______________________

   ______________________

3. New word:

   ______________________

   Meaning:

   ______________________

   ______________________
D. WHY would wetland kalo not have been a common food source at Mākua? EXPLAIN!

3. NOW YOU CAN BE A RESEARCHER!

This picture shows layers of ground below the surface at an excavation unit in Mākua. This map is called a Cross-Section Map.

Archeologists did test excavations & found 42.5 grams (about 1½ ounces) of fish bone from 10 different sites at Mākua. They only found 0.2 grams (less than 1/10th of an ounce) of bird bone from the same places.

THINK!

E. What can you say about the environmental resources here?
Resource Diversity Petroglyph Activity: Site #4

1. LISTEN TO THE SPECIALIST SPEAK & WRITE DOWN ANY WORDS YOU DON'T KNOW HERE.

A. WHO is your Mākua Valley Cultural Resources speaker?

________________________________________

B. WHAT is his/her job?

________________________________________

________________________________________

2. FIND OUT WHAT “LITHIC EXPRESSION” IS!

C. Look at the sandstone slab in front of you. HOW MANY petroglyphs can you pick out?

________________________________________

________________________________________

D. Examine the slab from different angles. Can you see other petroglyphs that you couldn't before?

(Circle One) YES, I see ___ NO, I see none.

MY SCIENCE WORD BANK

1. New word:

Meaning:

________________________________________

2. New word:

Meaning:

________________________________________

3. New word:

Meaning:

________________________________________
E. Pick 1 petroglyph and draw it below:

3. EXPLORE the “SPECTRUM OF INTERPRETATION”
The person who created the petroglyph you drew is no longer alive. Since then, different people have interpreted the image in many ways. How do YOU interpret what this artist carved?

F. Write 2 or 3 sentences about what the person who created this petroglyph wanted it to mean to others &/or why he or she made it.

_________________________________________________

_________________________________________________

_________________________________________________

Just as a single resource may can be used in different ways to accomplish the same goal, different techniques can be used, too.

G. Name some of the techniques Hawaiians used to carve these petroglyphs:

_________________________________________________

_________________________________________________

_________________________________________________
**Global Positioning System (GPS) Activity: Site #5**

1. **LISTEN TO THE SPECIALIST SPEAK & WRITE DOWN ANY WORDS YOU DON'T KNOW HERE.**

   **MY SCIENCE WORD BANK**

<table>
<thead>
<tr>
<th>New word:</th>
<th>Meaning:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

2. **START THE “GARMIN” RECEIVER**

   **Directions:**

   a) **Press and hold down the red light bulb button to turn on your receiver. **Release the button when the welcome screen appears.

   **Welcome Screen:**

   ![Welcome Screen Image]
b) Your receiver will automatically boot up to an “Acquiring EPE” screen. It will look like this: **You do not need to press any buttons at this point.**

*Acquiring EPE Screen:*

![Acquiring EPE Screen](image)

---

**c) After it gets enough satellite data, your receiver will then switch to a “Position Page,” which will look like this:**

*If for some reason, your receiver does not resemble the “Position Page,” please raise your hand and an instructor will assist you.*

*Position Page:*

![Position Page](image)

---

**d) With your “Position Page” on the screen, you are now ready to begin the activity.**
3. FIND & MARK YOUR LOCATION with a GPS RECEIVER

1. Look around your environment. With a partner, decide which native plant you will survey. Your possible sites to choose from are flagged and marked with a number. With your GPS receiver on, carefully walk to your chosen site.

2. At your site, look at your GPS receiver screen. You should still see the “Position Page” on your screen. **At this time, press the button that reads “Mark.”**
   *If your “Position Page” does not appear on your screen, raise your hand and an instructor will assist you.*

3. After pressing the “Mark” button, your GPS receiver screen will look like this:

   ![Mark Position Page]

   Notice these numbers here. These are your (x,y) – coordinates for the site you have chosen.

4. Look carefully at the “Mark Position Page” & read this:

5. Using your “Mark Position Page,” fill in the missing numbers to find your point location. **It will look like this:**

   04 Q 05 ___________ ← X-coordinate
   UTM 23 ___________ ← Y-coordinate

6. Now bring your GPS receiver to our known landmark where the activity began.
4. **PLOT YOUR TEAM LOCATIONS!**

7. Using the numbers you’ve found, **plot your point location on the lined graph paper** your instructor gives you.

8. Look around your environment for any other landmarks to draw onto your map to help someone else navigate back to your site.

9. Once you and your partner have both finished your maps, compare it with your neighbors’.

   WHERE are most of the sites located? ________________

   ________________________________________________

10. On your map, sketch in 2 other sites from your fellow students.

   HOW FAR are these sites from your own? ______________

   ________________________________________________

5. **THINK BEYOND THE ACTIVITY!**

Why is it important to have a good sketch map with landmarks?

_________________________________________________

_________________________________________________

How could the scientists use the information we gathered today? for natural resource management work?

_________________________________________________

_________________________________________________

Site #4: Global Positioning System (GPS) Field Activity

UTM Lined Graph Paper

Y-coordinates

X-coordinates

FARRINGTON HIGHWAY

Science in Hawai'i: Na Hana Ma Ka Anipua'a – A Culturally Responsive Curriculum Project
Fire Danger (Burn Index) Activity: Intro Site

**BONUS SHEET!**

1. **LISTEN TO THE SPEAKER & WRITE DOWN ANY WORDS YOU DON'T KNOW HERE**

2. **NEXT, ANSWER THESE QUESTIONS:**

   **A. WHO** is your Mākua Valley Army Specialist?
   
   _____________________________________________________________

   **B. WHAT** is his/her job?
   
   _____________________________________________________________

   Measuring the Burn Index (BI) tells the risk of fire. Many things in the environmental including humans cause fires Mākua.

   **C. WHICH 1** environmental factor causes more fires at Mākua and why?
   
   _____________________________________________________________
   __________________________

   **D. How** is tracking the Burn Index important for native/endangered plant species?
   
   _____________________________________________________________
   __________________________

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**Key Hawaiian Values:**
ALŌHA – express warmth when greeting
KELA – strives for excellence

**General Learner Outcomes:** 2, 1
Respects people’s cultural diversity

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**Key Science Content Standards:**
Domain I, Safety
Standard 4: Demonstrate safety in all activities

Domain II, Historical Perspectives
Standard 3: Mālama i ka Āina
3. LEARN ABOUT THE BURN INDEX KIT!  

The Burn Index is organized into one of three color categories. Each of these translates into a corresponding level of risk.

E. Draw lines to MATCH each of the categories to their meanings.

Yellow  Conditions indicate low probability for fire
Green   Average conditions; moderate possibility of fire
Red     Conditions highly favorable for fires

4. IMAGINE THAT YOU ARE THE RANGE SUPERVISOR

The troops are training. The BI is measured every fifteen minutes. At 11:00, the BI reads 42, at 11:15 the BI is 56, and at 11:30 it’s raining.

F. WHAT color category is the BI at 11:00?

___________________________

G. What action must the troops discontinue at 11:15?

_________________________________________________

_________________________________________________

H. What does the BI measure at 11:30 (numerical)?

_________________________________________________