CODING

STEM works THINKit

Mele Mapping Activity

Grades
K-12

Career Pathways
Computer Scientist
Programmer
New Media Artist
Cultural Historian
Song Writer

Academics
Math: Scale, Measurement
Social Studies: Geography, Culture
Science: Geology, Systems
Language Arts: Storytelling
Computer Science: Patterns, Code

Professional Career Skills
Communication
Creativity
Problem Solving
Inference

Materials
Ozobot
Map of the Hawaiian Islands
Hawaiian Mele
Markers: Red, Green, Black, Blue
Ruler (optional)

Team Goal

Level 1
Map each verse of a mele (Hawaiian for chants, songs or poems) on the island map. Add drawings to visualize the verses. Through code, help your Ozobot experience the mele as it navigates across the island.

Level 2
Research to find a mele. Map each verse and add drawings to visualize the meaning. Using code, help your Ozobot experience the mele as it navigates across the island.

Level 3
Write a mele and map it; create drawings to visualize the verses. Code the Ozobot to experience your mele as it navigates across the island.

STEM works
Download Knowledge. Upload Service.

Think like a computer scientist with Ozobot

Algorithm

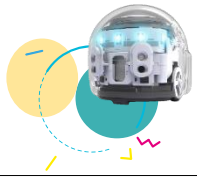
As you draw, you are giving the Ozobot a list of steps to complete in a specific order.

Cloud Computing

You can access Ozoblocky on the internet and program with internet-based information like algorithms and data not stored on your computer.

Computer Program

Your code is a set of directions that tells the Ozobot what to do.



Computational Thinking

There are many different ways to solve a problem with Ozobots; you need to recognize patterns, think abstractly, and write visual algorithms.

Debugging

When you test your code, you might encounter a problem that needs to be fixed and optimized.

Database

As you discover new visual code patterns, create a table to help organize the data into categories to help you find which code works best depending on the situation.

Binary

A computer's brain reads only two options, like 1 or 0. All algorithms, or lists of steps, are made up of these two options. Code is translated into this binary "machine language."

Machine Language

Inside the Ozobot is a tiny computer brain (CPU - central processing unit) that translates all the code you write into a machine language, written in numbers, that the Ozobot can understand.

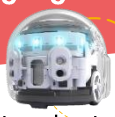
Artificial Intelligence

Ozobots can't hear your speech, but they do have a basic image recognition of colors using a sensor at the bottom.

SQL: Structured Query Language

This was the most popular coding language in 2018. Your Ozobot doesn't read this language; instead it reads visual color and Ozoblockly languages.

Natural Language Processing



Your Ozobot can't understand (process, respond or manipulate) the words you say. Can you imagine using an Ozobot with natural language processing in the future?

Parallel and Distributed Computing

Your Ozobot can't do this yet, but imagine if they could communicate with multiple Ozobots, share messages and solve a problem together!

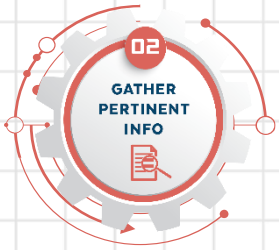
Source:Refractionmedia. "Careers with Code US 2018." Issuu, 2018, issuu.com/refractionmedia/docs/careers_with_code_us_2018.

Engineering Design Process Directions:

Explore Mele:
Nā mele o Hawai'i Nei:
101 Hawaiian Songs

Define the Problem

Choose a goal to tackle with your team!



Gather Pertinent Information

Learn about writing code for Ozobots:

https://ozobot.com/stem-education/stem-lessons

https://ozobot.com/stem-education/education-getting-started

Use the Hawaiian mele provided (for Level 2 and 3, explore mele).
Research the location that each verse may take place on each island.

Generate Multiple Solutions

Number each verse in the Hawaiian mele and decide how you can use art to visualize that verse. Explore Ozobot code that would help the robot experience each verse. Sketch out possible paths for your code.
(See Calibrate Ozobot Tips sheet)

Choose a Solution

From all of your options, choose the algorithm (the sequential coded path) that will best represent the mele. Create a visual model that works best.
Bring team ideas together into one solution.

Design a Culturally Responsive Solution

As you design your model to work with algorithms, think about how the model will share accurate information. How does your model express the mele? What knowledge are you sharing with this visual way of storytelling?

Test and Optimize

Run your Ozobot on the visual program in your model.
Does it accurately share information?
Use what you learned to improve your interactive solution.

Share & Reflect

How did your team find solutions and practice perseverance?
Talk to your team: What went well? What could have gone better?

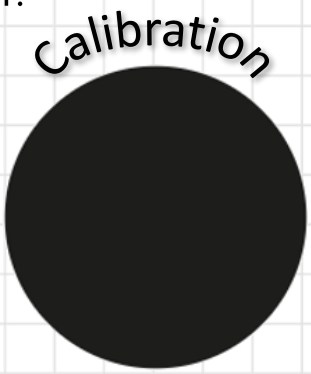
STEM WORKS TIPS

Calibrate Ozobot

https://ozobot.com/support/calibration

STEP 1: Hold the power button until it flashes WHITE (about 2 seconds).

STEP 2: Place it on the BLACK DOT.



STEP 3: If it blinks GREEN, it is ready! If not, repeat steps 1 and 2.

Practice Drawing Lines of Code

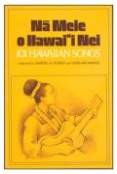
Tip #1 - Avoid breaks in your line. Avoid overlapping lines.
Tip #2 - Acute angles are hard for the Ozobot to follow.
Tip #3 – Draw lines that are not too fat and not too thin.

Big Island, Hawai'i

Map Scale
1 cm = 9.3 mi

HILO HANAKAHI

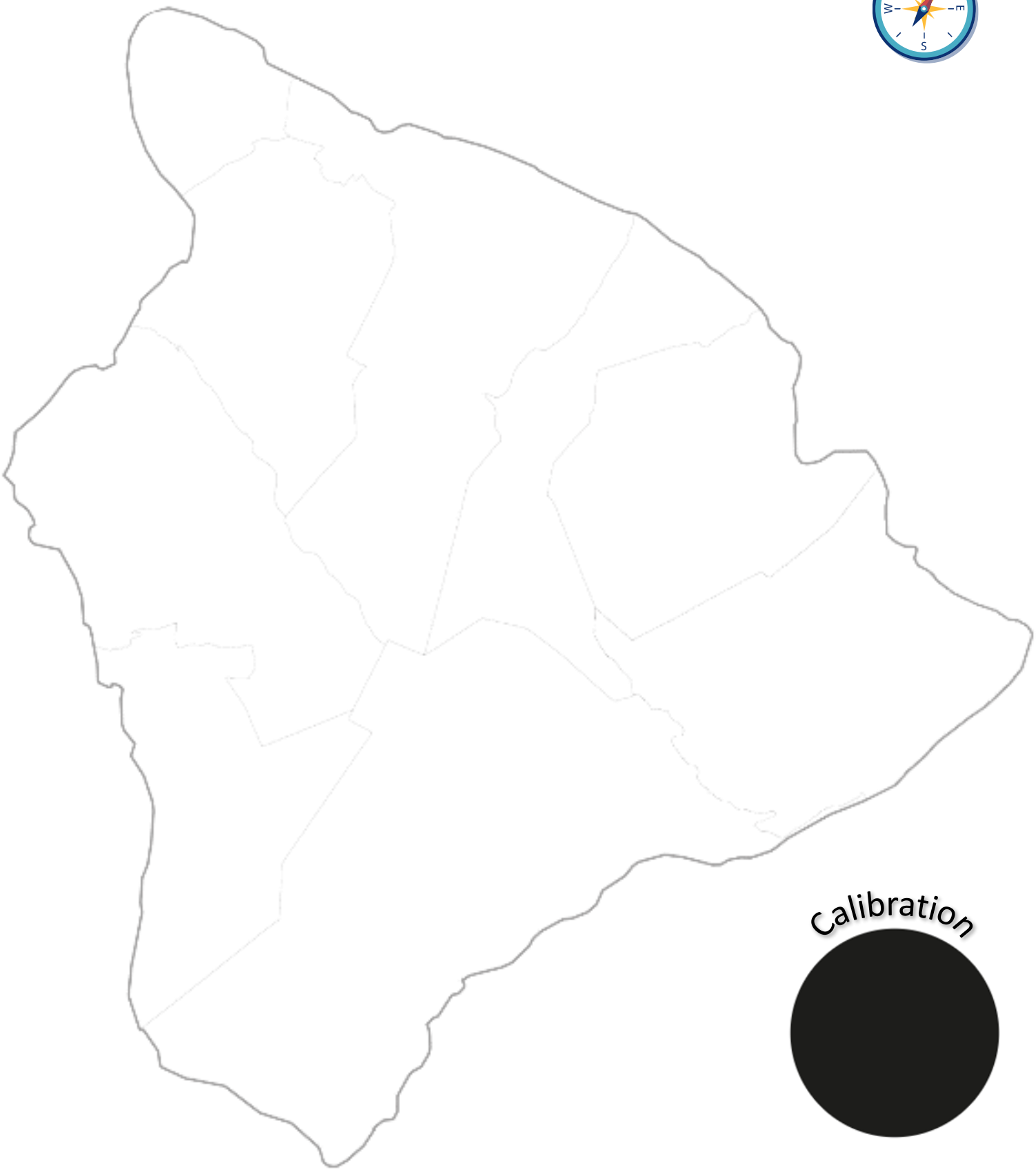
Hilo, Hanakahi, i ka ua Kani-lehua,	Hilo, Hanakahi, rain rustling lehua.
Puna, paia ʻala, i ka paia ʻala i ka hala.	Puna, fragrant bowers, bowers fragrant with hala.
Kaʻū, i ka makani, i ka makani kuehu lepo.	Kaʻū, the wind, the dirt scattering wind.
Kona, i ke kai, i ke kai māʻokiʻoki.	Kona, the sea, the streaked sea.
Ka-wai-hae, i ke kai, i ke kai hāwanawana.	Ka-wai-hae, the sea, the whispering sea.
Wai-mea, i ka ua, i ka ua Kīpuʻupuʻu.	Wai-mea, the rain, the Kīpuʻupuʻu rain.
Kohala, i ka makani, i ka makani ʻĀpaʻapaʻa.	Kohala, the wind, the Āpaʻapaʻa wind.
Hāmākua, i ka pali, i ka pali lele koaʻe.	Hāmākua, the cliff, the tropic birds flying cliffs.
Haʻina ka puana, i ka ua Kani-lehua.	Tell the refrain, rain rustling lehua.



Elbert, Samuel H, and Noelani Mahoe. Nā mele o Hawai'i Nei: 101 Hawaiian Songs. Kuleana kope, 1970. http://www.uhpress.hawaii.edu/

Big Island, Hawai'i

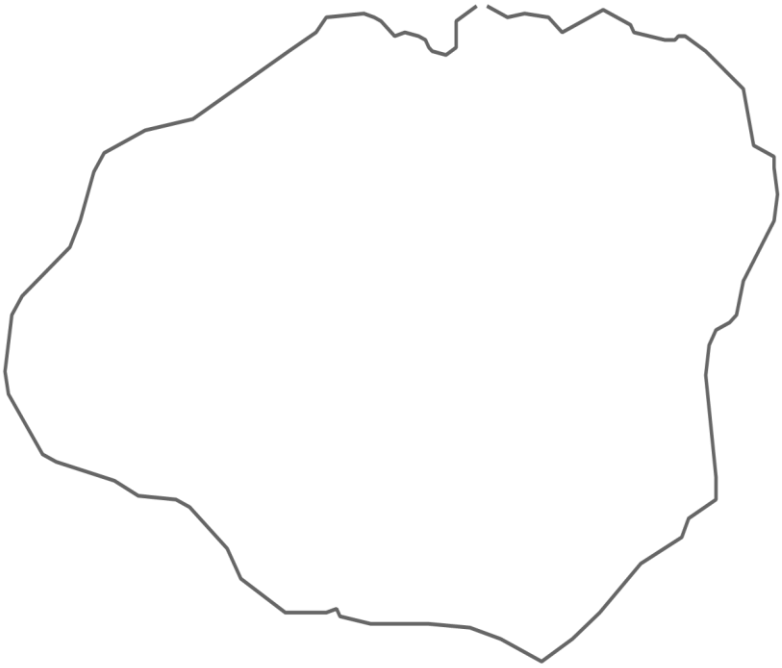
Map Scale
1 cm = 4 mi



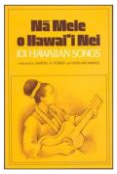
Calibration

Kaua'i, Hawai'i

Map Scale
1 cm = 3.1 mi



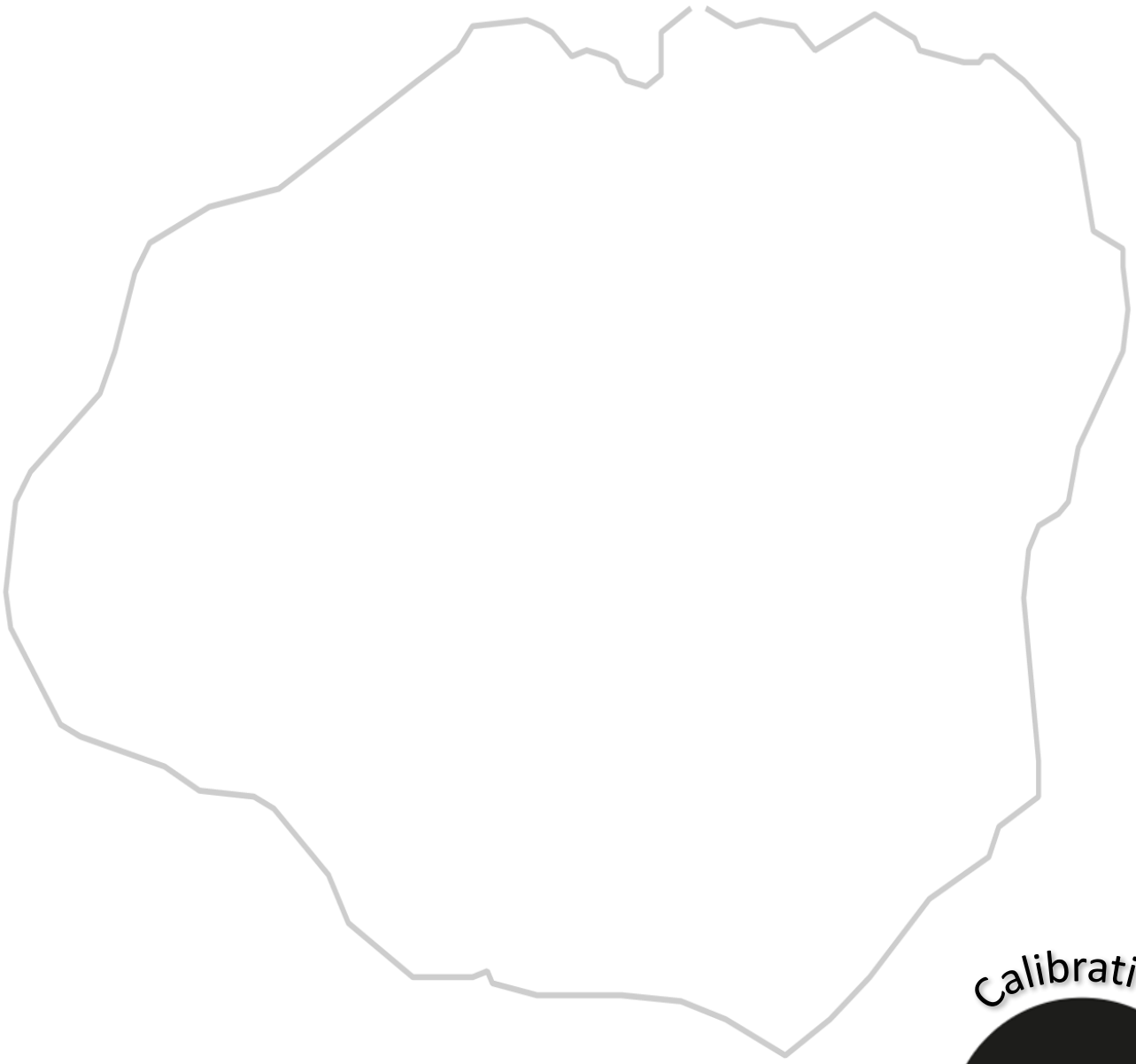
MAIKA'I KAUA'I	KAUAI BEAUTY
Maika'i wale nō Kaua'i *Hemolele wale i ka mālie.*	So very beautiful is Kaua'i So perfect in the calm.
Kuahiwi nani, Wai'ale'āle, *Lei ana i ka mokihana.*	Pretty mountain, Wai'ale'āle, Wears the mokihana lei.
Hanohano wale 'o Hanalei *I ka ua nui hō'eha 'ili*	So glorious is Hanalei With the great rain that pains the skin
I ka wai o 'u'inakolo *I ka poli o Namolokama.*	And the rustling water In the heart of Namolokama.
Maika'i nō Kaua'i, *Hemolele i ka mālie.*	So beautiful is Kaua'i, So perfect in the calm.
Kuahiwi Wai'ale'āle *Lei ana i ka mokihana.*	Mount Wai'ale'āle Wears the mokihana lei.



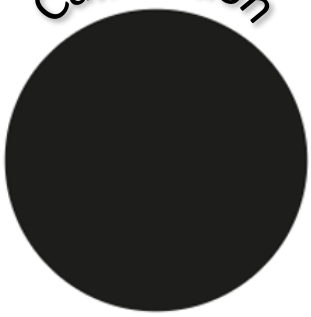
Elbert, Samuel H, and Noelani Mahoe. Nā mele o Hawai'i Nei: 101 Hawaiian Songs. Kuleana kope, 1970. http://www.uhpress.hawaii.edu/

Kaua'i, Hawai'i

Map Scale
1 cm = 1.8 mi

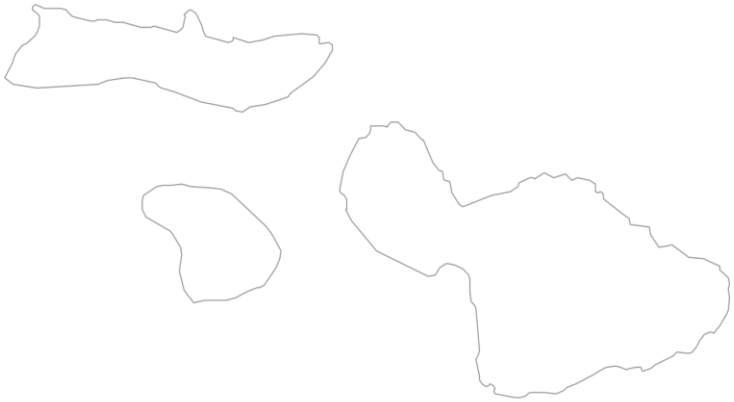


Calibration



Maui County, Hawai'i

Map Scale
1 cm = 21 mi



MOLOKA'I NUI A HINA

Ua nani nā hono a Pi'i-lani
I ke kū kilakila i ka 'ōpua.

'O ku'u pua kukui, aia I Lani-kāula,
'O ka hene wai 'olu lana mālie.

Hui

Ua like nō a like la — Me ku'u one hānau,
Ke po'okela i ka piko o nā kuahiwi,

Me Moloka'i nui a Hina, 'Āina i ka wehiwehi,
E ho'i nō au e pili.

E ka makani ē, e pā mai me ke aheahe,
'Auhea ku'u pua kalaunu.

E ka makani ē, e pā mai me ke aheahe,
'Auhea ku'u pua kalaunu.

Ki'eki'e Halawa i ke alo o nā pali,
Ka heke nō ia i ka'u 'ike.

Lupalupa lau lipo i ke oho o ka palai,
Ma ku'u poli mai 'oe e ho'oheno nei.

GREAT MOLOKA'I OF HINA

How beautiful are the bays of Pi'i-lani
That stand majestically by the billowy clouds.

My kukui flower is at Lani-kāula,
Where water flows with cool and soothing rustle.

Chorus

Alike — The sands of my birth,
The tops of all mountains,

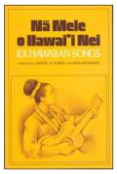
And Hina's great Moloka'i, Festive land,
May I return to stay.

O wind, blow gently,
Heed, my crown flower.

O wind, blow gently,
Heed, my crown flower.

Halawa is high amidst the cliffs,
Highest I have ever seen.

And here are lush leaves and green fern fronds,
So you are loved within my arms.



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Elbert, Samuel H, and Noelani Mahoe. Nā mele o Hawai'i Nei: 101 Hawaiian Songs. Kuleana kope, 1970. http://www.uhpress.hawaii.edu/

Maui County, Hawai'i

Map Scale
1 cm = 6.6 mi

Calibration