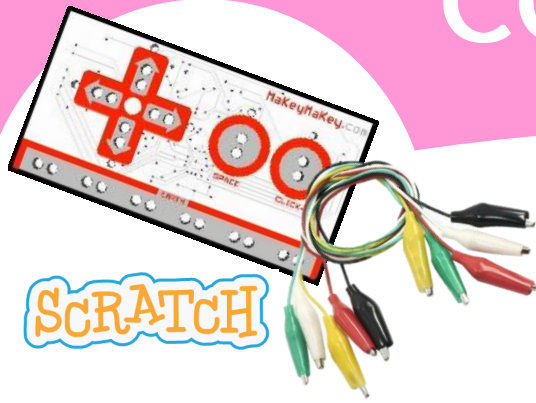


CODING



STEM
WORKS
THINKit

Grades
K-12

Career Pathways

Computer Scientist
Programmer
Inventor
Graphic Novelist/Artist
Engineer

Academics

Math: Operations, Algorithms, Angles,
Speed, Patterns
Computer Science: Block Code
Social Studies: Maps, Myths, Culture
Language Arts: Storytelling

Professional Career Skills

Communication
Collaboration
Problem Solving
Interpretation
Perseverance

Materials

Computer with Speakers
Mele
Makey Makey kit
Conductive tape or foil
Craft Materials (markers, etc.)

Mo'olelo Story Activity



Team Goal

Level 1

Communicate the meaning of verse(s) in a Hawaiian mele by constructing a model (map) or a graphic story (comic). Use coding to design algorithms that share information.

Level 2

Construct a model (map) or comic that uses multiple algorithms to share knowledge that communicates a story with a sense of place and meaning from Hawaiian mele.

Level 3

Construct a model or comic that uses multiple algorithms to sequentially guide your audience through a story that is inspired by traditional Hawaiian mele. Be sure to communicate a sense of place and purpose.

STEM
WORKS

Download Knowledge. Upload Service.

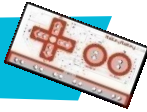
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Think like a computer scientist with Makey Makey

Algorithm

As you drag and drop block code in Scratch, you are creating a list of specific steps. Your algorithm can be interfaced with through Makey Makey, which can also be coded to read different key strokes.



Cloud Computing

Scratch is internet-based, so information from the cloud is needed to run a program. But if you find ways to download code, cloud computing isn't always needed to run programs with Makey Makey.



Computer Program

You write sets of algorithms, or directions, which interface with Makey Makey and your model.



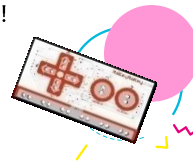
Computational Thinking

There are many different ways to solve a problem with Makey Makey and Scratch. You need to use patterns, think abstractly, and write algorithms.



Debugging

When you test your code with your Makey Makey hardware, you might find a glitch that needs to be redesigned!



Database

Scratch has organized database of block code into categories like sound, events, control, looks, etc. Block code in "events" can be activated by the Makey Makey board.



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."



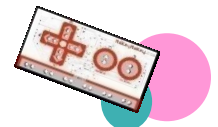
Machine Language

Inside Makey Makey is a tiny processor that works with a computer's USB port so it can emulate a regular keyboard. The code you write in Scratch is translated into machine language, written in numbers.



Artificial Intelligence

Makey Makey can't hear your speech or recognize images. They only sense when a complete circuit is made.



Programming Language

Your Makey Makey is a keyboard with a processor that can interpret Scratch language. The keyboard can be rekeyed, by being recoded using Arduino, which compiles code into C/C++.



Natural Language Processing

You can record your voice on Scratch, in an algorithm that responds to inputs from the Makey Makey. However, these tools can't understand (process, respond or manipulate) your words.



Parallel and Distributed Computing

You can code keys to use multiple Makey Makey's from one computer, but they won't communicate, share messages or solve problems together.



Engineering Design Process Directions:

Explore Mele:

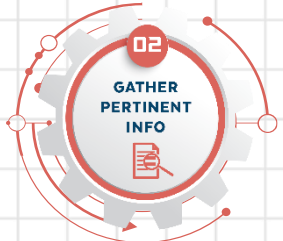
Nā mele o Hawai'i Nei:

101 Hawaiian Songs



Define the Problem

Choose a goal to tackle with your team!



Gather Pertinent Information

Install the Makey Makey Board using either resource below:

<https://makeymakey.com/pages/how-to>

<https://learn.sparkfun.com/tutorials/makey-makey-quickstart-guide>

Make a Scratch account: <https://scratch.mit.edu>

You may use the Hawaiian mele provided or explore your own.

Research the location that each verse may take place on each island.



Generate Multiple Solutions

Write your own algorithms or remix existing Scratch block code using:

<https://scratch.mit.edu/projects/182263358>

Design a model (map or comic).

Use circuitry so the model works with the program!

SCRATCH



Choose a Solution

Choose the algorithms and model that works best.

Bring team ideas together into one solution.



Design a Culturally Responsive Solution

Does your model work with algorithms so you are sharing accurate information? Does your model tell a story that makes sense?

What knowledge about the island or culture are you sharing with storytelling?



Test and Optimize

Run your programs with the model.

Does it work? Is it easy to use?

Recheck circuits and connections. Recheck your lines of code.

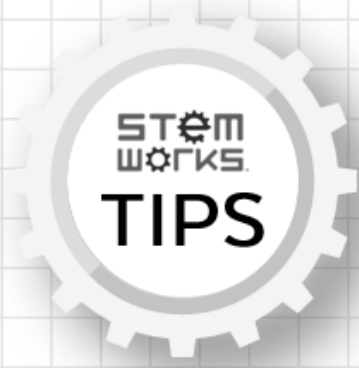
Use what you learned to improve your interactive solution.



Share & Reflect

How did your team find solutions and practice perseverance?

Talk to your team: What went well? What could have gone better?




Makey Makey Quick Start

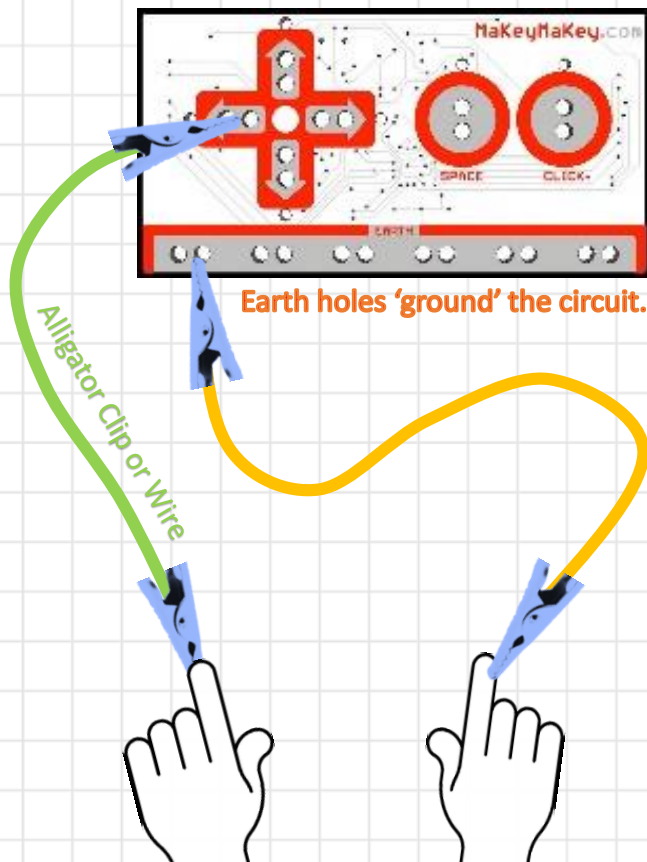
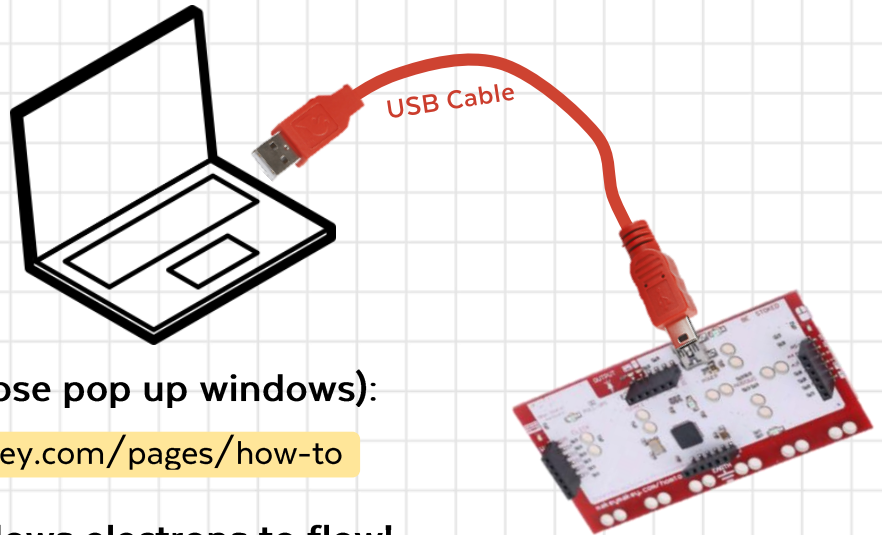
<https://makeymakey.com>

Connect!

- A) Connect board using the USB port.
- B) Follow directions (close pop up windows):

 <https://makeymakey.com/pages/how-to>

- C) Build a circuit that allows electrons to flow!



Earth holes 'ground' the circuit.

Connect alligator clips to one or more of the attachments.

Up Arrow
Down Arrow
Left Arrow


Right Arrow
Space
Click

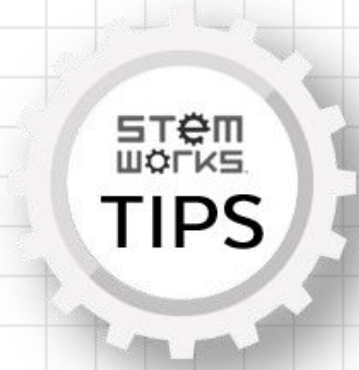
Connect alligator clips to form the other part of the circuit.

Make a switch! Use your hands, or design a wand to open and close the circuit!


Explore conductive materials to connect your model: pencil graphite, copper tape, clay, plants, and even fruits!

Write code in **Scratch** to program your model to share specific information!

 <https://scratch.mit.edu>



SCRATCH Programming

 <https://scratch.mit.edu>

Find each Block Code in the color coded menu to write algorithms. Be creative as you build multiple algorithms for a program that dramatizes your story with sound effects and voice.

Sample Scratch Block Code

<https://scratch.mit.edu/projects/182263358>



Description

The 'space key' runs this code.

This section repeats twice

Drum #10 plays quarter beat

Drum #10 plays half beat

Drum #9 plays quarter beat

Drum #1 plays quarter beat

Your pre-made recording plays.

Purpose

Your map or comic will interact with your code to dramatize a story.

Music helps to set the tone of the scene or setting in a story. Use code to write short music compositions.

Record your voice, and save the block of code into the algorithm to help tell the story.

Makey Makey: Building Circuits that Work with Scratch Code

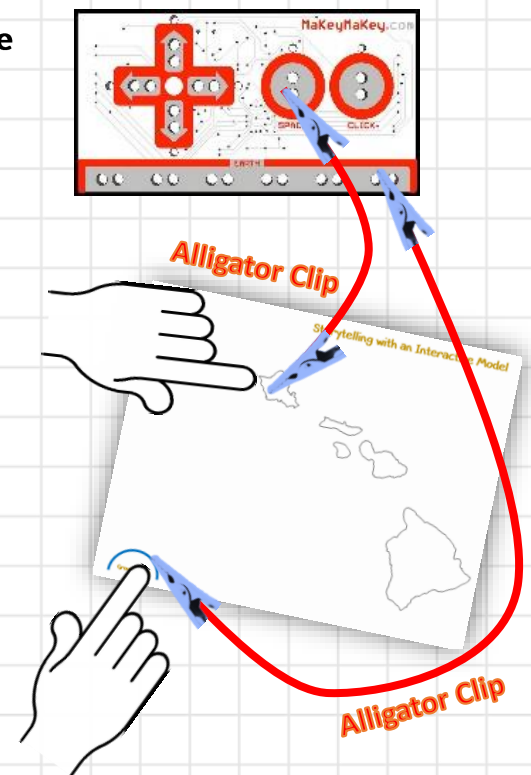
Design and Color your model, map or graphic comic based on the mele or myth that you read.

Code algorithms that help to tell a story. These algorithms will become a program that interacts with your map or comic!

Attach conductive material (tape, foil, or clay) to the places that will be brought to life by your code.

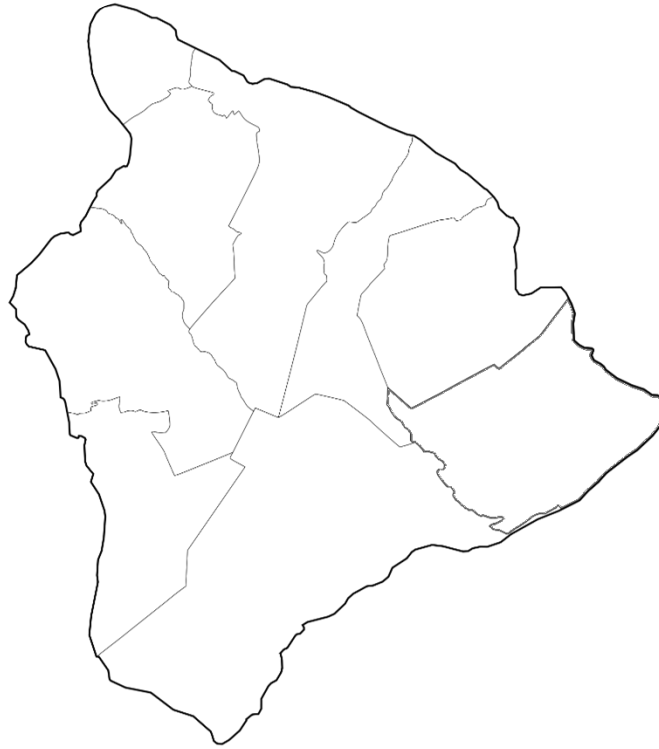
Connect the conductive material to the Makey Makey using alligator clips. Remember to ground each circuit!

Plug in the Makey Makey to the computer running Scratch code. Be sure to turn up the volume!



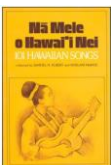
Big Island, Hawai'i

Map Scale
1 cm = 9.3 mi



HILO HANAKAHI

<input type="checkbox"/>	Hilo, Hanakahi, i ka ua Kani-lehua,	Hilo, Hanakahi, rain rustling lehua.
<input type="checkbox"/>	Puna, paia 'ala, i ka paia 'ala i ka hala.	Puna, fragrant bowers, bowers fragrant with hala.
<input type="checkbox"/>	Ka'ū, i ka makani, i ka makani kuehu lepo.	Ka'ū, the wind, the dirt scattering wind.
<input type="checkbox"/>	Kona, i ke kai, i ke kai mā'oki'oki.	Kona, the sea, the streaked sea.
<input type="checkbox"/>	Ka-wai-hae, i ke kai, i ke kai hāwanawana.	Ka-wai-hae, the sea, the whispering sea.
<input type="checkbox"/>	Wai-mea, i ka ua, i ka ua Kīpu'upu'u.	Wai-mea, the rain, the Kīpu'upu'u rain.
<input type="checkbox"/>	Kohala, i ka makani, i ka makani 'Āpa'apa'a.	Kohala, the wind, the Āpa'apa'a wind.
<input type="checkbox"/>	Hāmākua, i ka pali, i ka pali lele koa'e.	Hāmākua, the cliff, the tropic birds flying cliffs.
<input type="checkbox"/>	Ha'ina ka puana, i ka ua Kani-lehua.	Tell the refrain, rain rustling lehua.

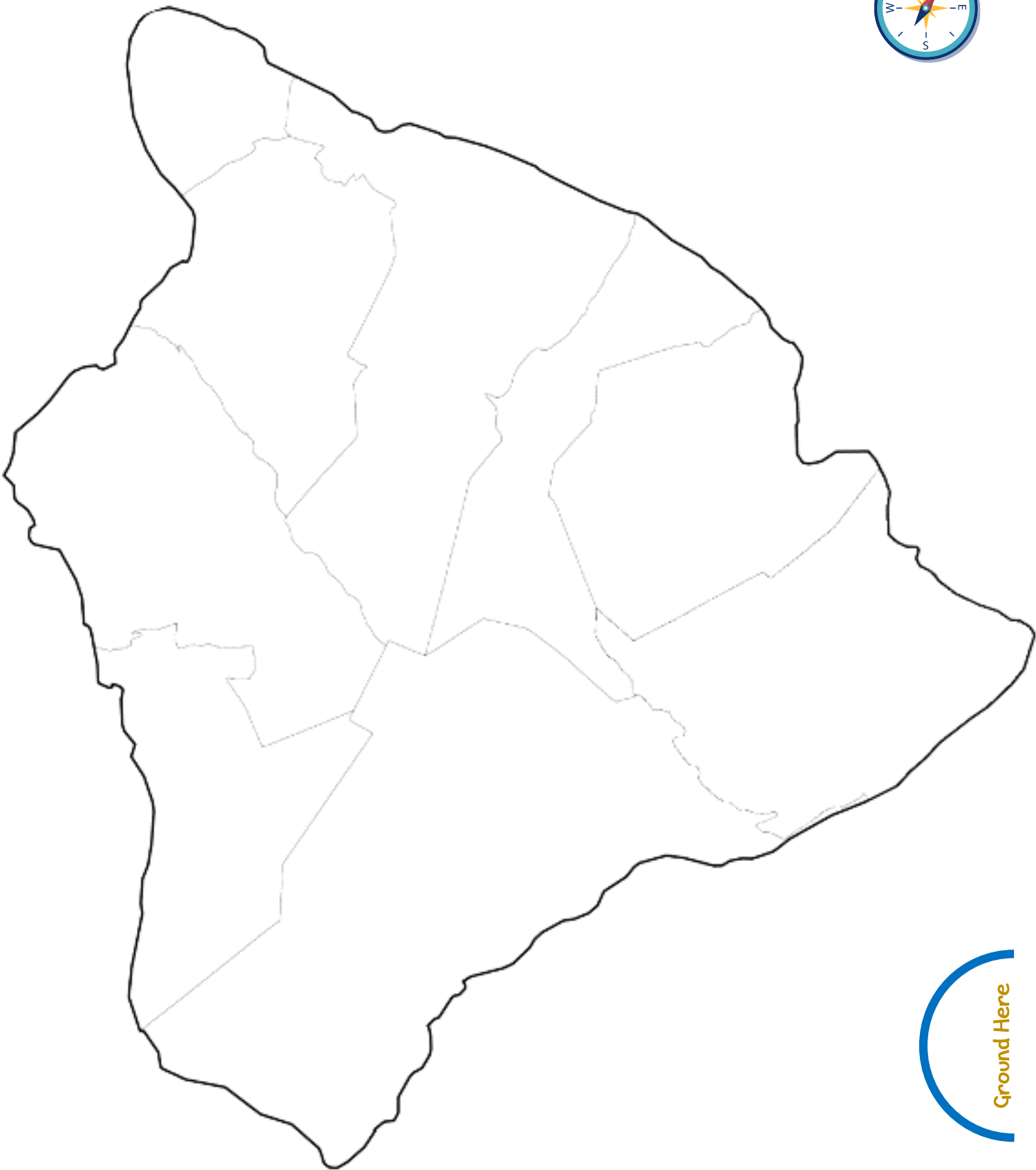


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Elbert, Samuel H, and Noelani Mahoe. Nā mele o Hawai'i Nei: 101 Hawaiian Songs. Kuleana kope, 1970. <http://www.uhpress.hawaii.edu/>

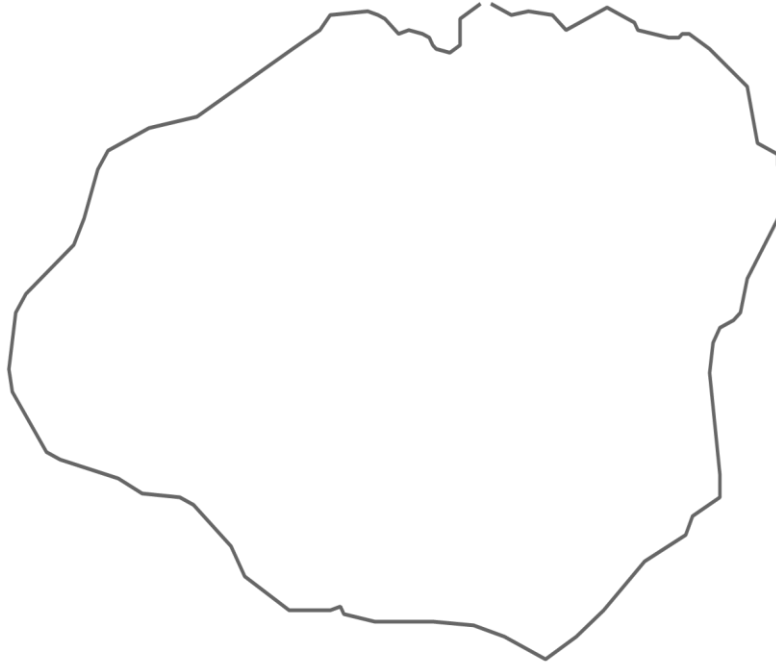
Big Island, Hawai'i

Map Scale
1 cm = 4 mi



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 mālīe.*

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 mālīe.*

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.

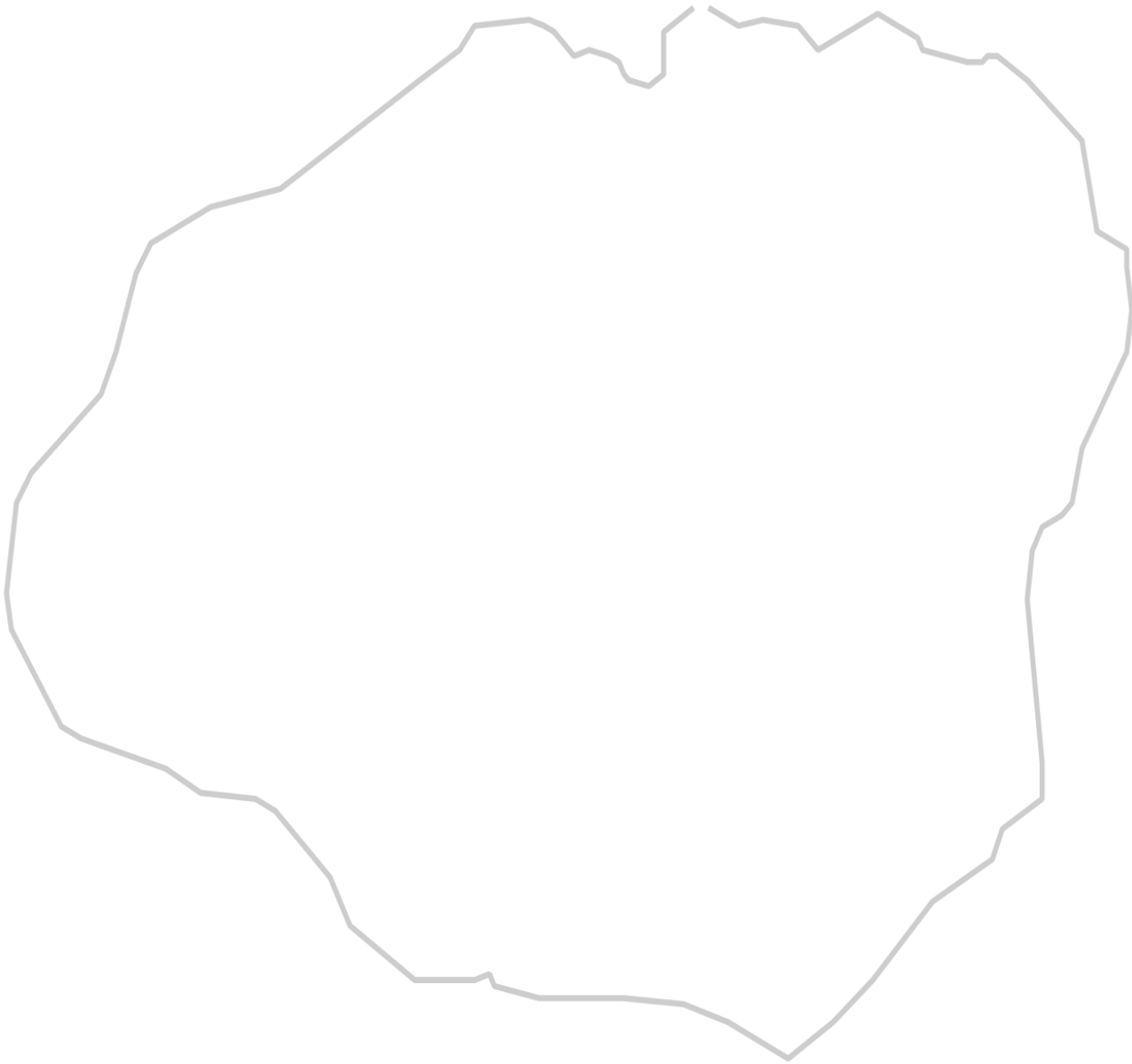


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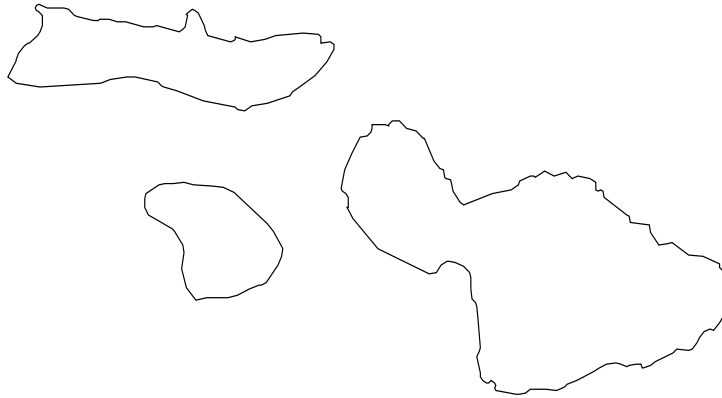
Kaua'i, Hawai'i

Map Scale
1 cm = 1.8 mi



Mau County, Hawai'i

Map Scale
1 cm = 21 mi



MOLOKA'I NUI A HINA

GREAT MOLOKA'I OF HINA

☐

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

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

☐

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

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

Hui

Chorus

☐

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

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

☐

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

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

☐

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

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

☐

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

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

☐

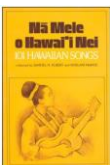
*Ki'eki'e Halawa i ke alo o nā pali,
Ka heke nō ia i ka'u 'ike.*

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

☐

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

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

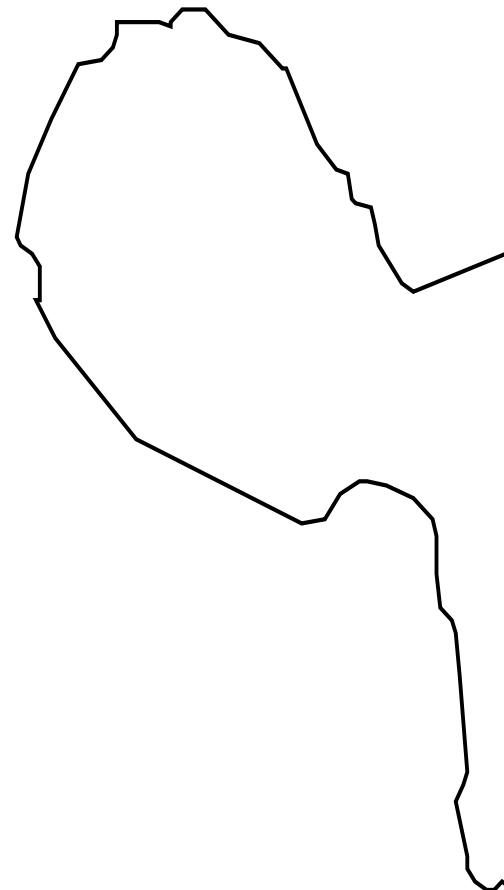
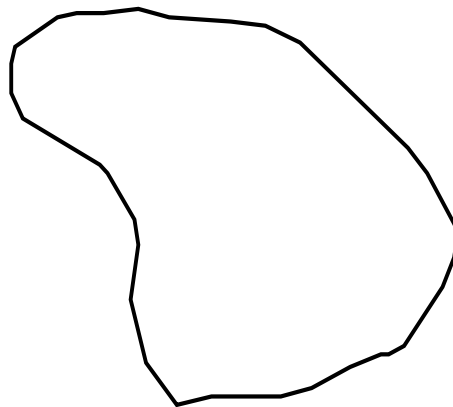
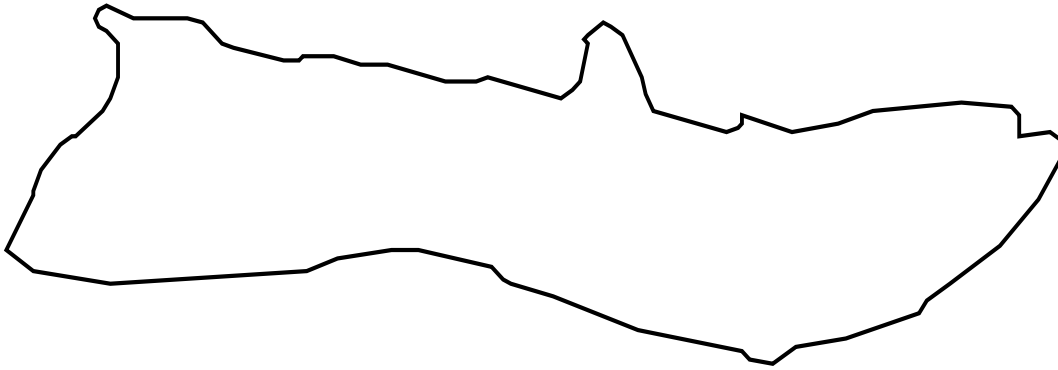


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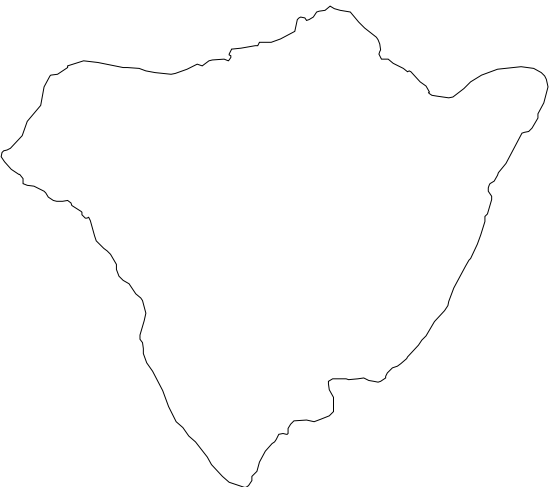
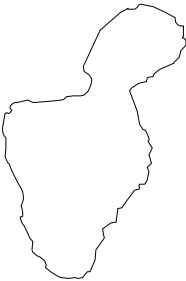
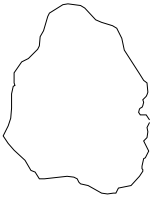
Elbert, Samuel H, and Noelani Mahoe. Nā mele o
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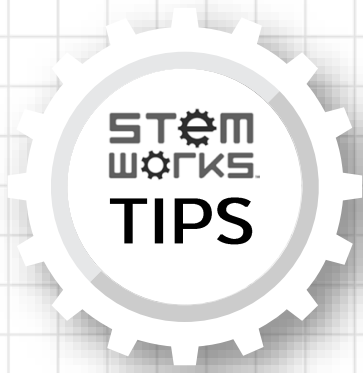
Mau County, Hawai'i

Map Scale
1 cm = 6.6 mi



Hawaiian Islands





Plot Events: Obstacle & Perseverance Cards

Explore these plot events for your story! Good stories have characters that encounter and persevere through struggle. Explore obstacles that an antagonist (enemy/rival) might throw at your lead character. Brainstorm ways your protagonist (lead character) will persevere through each obstacle!



OBSTACLE



Natural Disasters



OBSTACLE



**Unkind Words or
Lack of Support**



**PERSEVERE
WITH THIS
SOLUTION**



Make a Plan



**PERSEVERE
WITH THIS
SOLUTION**



**Friendship & Making
New Friends**



**PERSEVERE
WITH THIS
SOLUTION**



**Research &
Knowledge**



OBSTACLE



**Fell Apart or
Broke Down!**



OBSTACLE



WARNING
BATTERY LOW

**Not Enough
Resources**



**PRESEVRE
WITH THIS
SOLUTION**



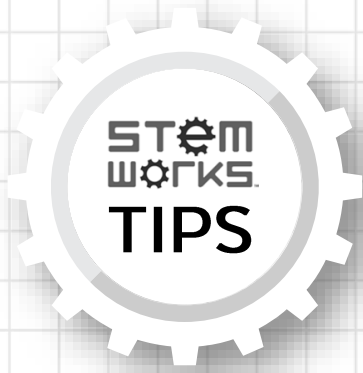
Asking for Help



**PRESEVRE
WITH THIS
SOLUTION**



**Practice &
Trying Again**



Plot Events: Obstacle & Perseverance Cards

Explore these plot events for your story! Good stories have characters that encounter and persevere through struggle. Explore obstacles that an antagonist (enemy/rival) might throw at your lead character. Brainstorm ways your protagonist (lead character) will persevere through each obstacle!



OBSTACLE



Running Late



OBSTACLE



**A Transformation,
Turning Mad or Crazy**



**PERSEVERE
WITH THIS
SOLUTION**



**Cleverness or
Magical Power**



OBSTACLE



**Lost Sense – Sight, Sound,
Smell, Taste, Touch**



**PERSEVERE
WITH THIS
SOLUTION**



**Support by Sacrificing
Something**



OBSTACLE



**Something/Someone is
Stolen, Lost or Missing**



OBSTACLE



**Rival Causes
a Setback**



**PERSEVERE
WITH THIS
SOLUTION**



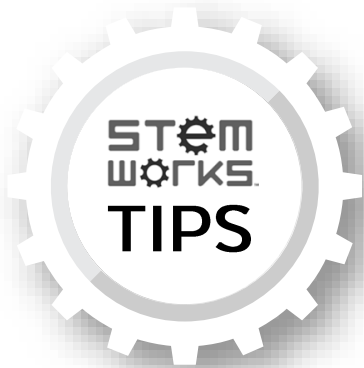
**Searching or
Gathering Resources**



OBSTACLE



**Moral Dilemma
or Bribery**



Storyboard

Use this guide to develop ideas for each key story element. Describe each block with words or depict each element in a drawing. You will later create a model that visualizes part or all of your story using stop motion animation.

Title:

Screen Writer(s):

Story's Setting – Choose one to three locations!

Plot Event #1

The Antagonist causes first obstacle.

Plot Event #2

The Antagonist causes second obstacle.

Plot Event #3

The Antagonist causes final obstacle.

Meet the Antagonist
(Enemy / Rival)

Meet the Protagonist
(Lead Character)

The Protagonist tries to solve 1st obstacle by doing this...

but fails and learns...

The Protagonist tries to solve 2nd obstacle by doing this...

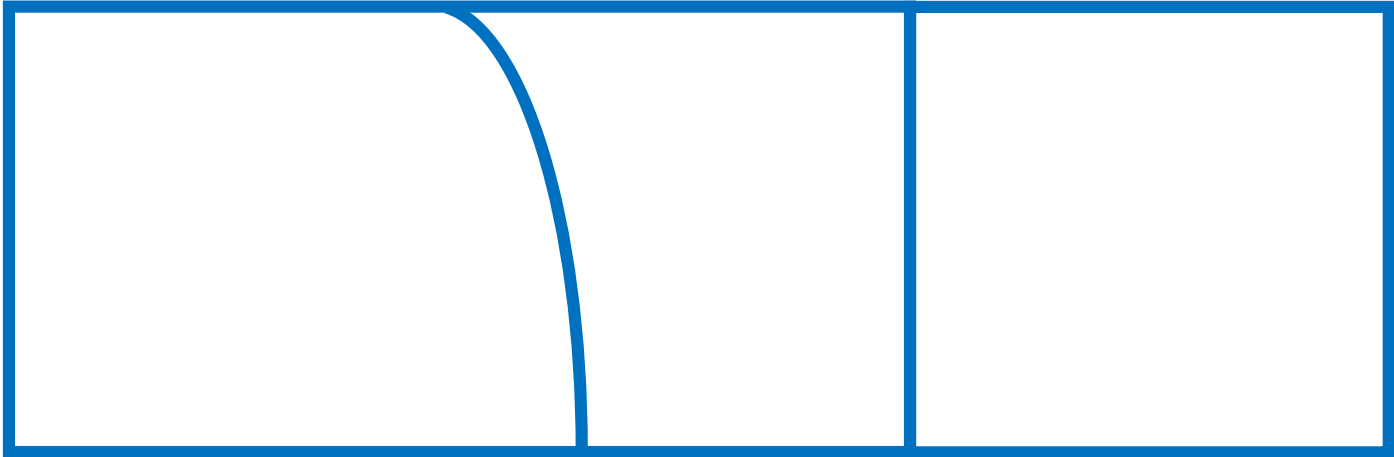
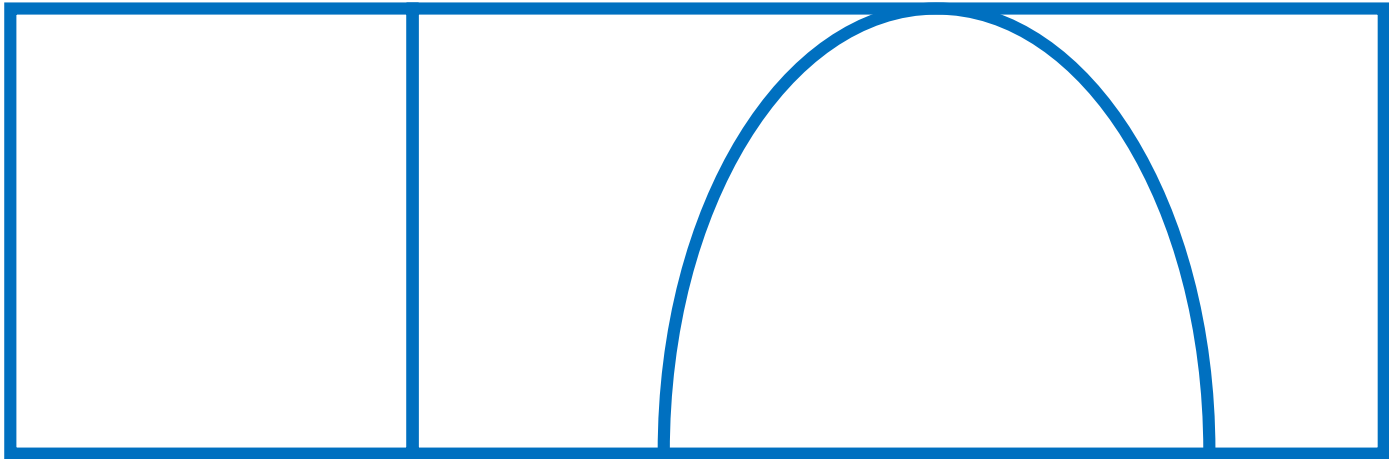
but fails and learns...

The Protagonist perseveres... and tries to solve final obstacle by doing this...

... and the Protagonist (hero) succeeds! The resolution or conclusion is...

Graphic Novel / Comic

Title:



Graphic Novel / Comic

Title:

