

Ne'epapa Ka Hana 2.0
Seventh-Grade Mathematics Resources
STEMD² Book Series

STUDENT ACTIVITIES

LET'S

TAKE CARE OF THE LO'I

STEMD² Research & Development Group
University of Hawai'i at Manoa



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<http://stemd2.com/>

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ISBN: 978-0-9983142-8-0

First release, 2019

Ne'epapa Ka Hana Seventh-Grade Mathematics Resources

Let's Take Care of the Lo'i
Student Activities

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Acknowledgments

We would like to thank Kelli Ching, Crystal Yoo, Katy Parsons, and Robyn Rice for advising on middle school mathematics. Thank you Moea Viebke, Nohea Behler, and Robyn Rice for significant help reviewing and editing. Mahalo nui to Moea Viebke and Nohea Behler for major contributions in writing the introductions.

Unit 1: The Number System

In this unit, we'll learn how to use positive and negative integers, fractions, and decimals to solve problems through exploration of traditional Hawaiian foods and the range of elevation on the Big Island. There are four activities in this unit. *Module 1* involves the use of adding and subtracting integers to help climb a cliff to pick limu. *Module 2* explores temperature changes with different altitudes by multiplying and dividing integers. *Module 3* supports the harvesting of kalo with the help of rational numbers. The final activity is cumulative and incorporates concepts from each of the previous activities in this unit.



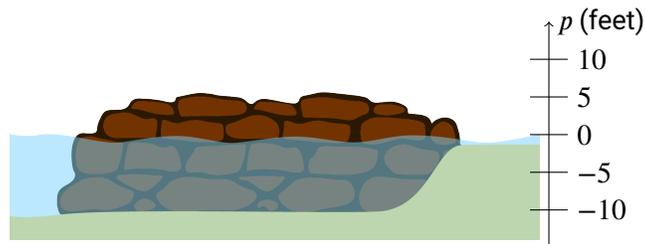
Module 1: Adding and Subtracting Integers Activity

Limu (seaweed) is a very important part of Hawaiian life. It is often used for food, decoration, and important ceremonies. Kohu, 'ele'ele, and līpoa are some of the most delicious types of limu to eat. Limu huluhuluwaena was Queen Lili'oukalani favorite limu. She loved it so much that she had it brought in from Maui to plant in O'ahu.



Poke bowls are more delicious with limu!

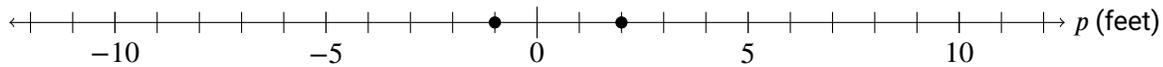
In this activity, we will carefully climb up and down a rock wall to collect some limu.



1. You are starting at a position of $p = 0$ feet. Below are some descriptions of where you should climb to find limu. Write your position, p , after each description. The first two are done for you.
 - (a) Climb up 2 feet from where you started to get the first limu.
 $p = 0 + 2 = 2$
 - (b) Now climb down 3 feet to get to the next piece of limu.
 $p = 2 - 3 = -1$
 - (c) The next piece of limu can be found if you decrease your position by 6 feet. Where is it located?
 - (d) Add 2 feet to your position to get the next limu. What is your position now?
 - (e) You are too deep in the water to get the next limu so let's go to a position that is "less deep" by subtracting -3 feet. What is your new position?
 - (f) The final limu requires you to go deeper. So let's go "more deep" by adding -8.5 feet to get to the last limu. What is your final position?

2. Were there any positions that were opposite numbers? If so, what were these numbers?

3. Plot and label the positions where you found the six pieces of limu. Label the limu **a-f** based on your answers above. The first two are done for you.



4. Use the number line to help you answer the following questions.

(a) How many feet apart are the first limu and the last limu?

(b) How many feet apart are the first limu, and the limu in part 1e?

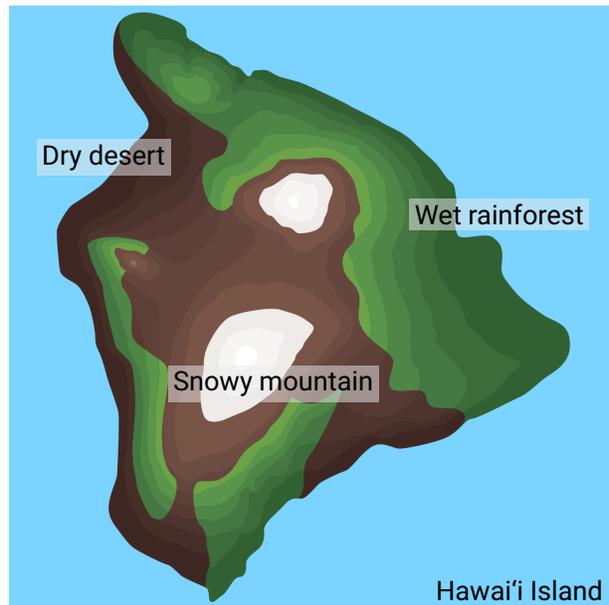
(c) What if you wanted to return to where you started $p = 0$ after grabbing the last limu? What number do you need to add to get to $p = 0$?

(d) Maybe you could have saved time by starting at the bottom of the rock wall and collecting limu on the way up. Using the letters a-f, order the limu from lowest to highest.

5. Share a time when you have eaten something that you found outside. 

Module 2: Multiplying and Dividing Integers Activity

Hawai'i Island has 8 of the 13 possible climate zones. Ranging from tropical beaches to dry deserts to snow covered mountains, it is a truly beautiful and unique place. Mauna Kea is the tallest mountain in Hawai'i at 13,796 feet (ft) above the sea level.



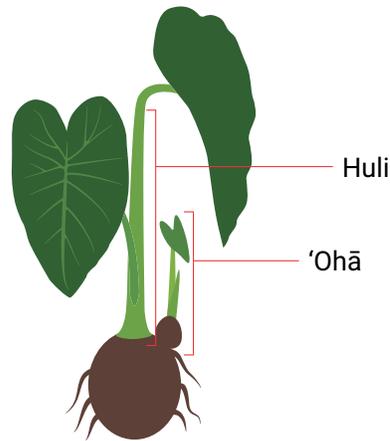
In an ahupua'a on Hawai'i, there is a temperature change of about -3°F for every 1,000 ft increase in elevation.

- If you went up 1 foot in elevation, what would be the temperature change? Make sure to include a negative sign if your answer is negative. Is your answer a rational number? How do you know?
- Imagine it is 84°F at 3,000 ft above sea level. Fill in the chart to help you answer the following questions. You do NOT need to use your previous answer to fill out this table.

Temperature	Elevation
	2,000 ft.
84°F	3,000 ft.
81°F	
	5,000 ft.
	6,000 ft.

Module 3: Rational Numbers Activity

The kalo plant has been very important to the people in Hawai'i for a long time. Whether it is for a graduation party, a family dinner, or a religious offering, the kalo is still a staple for Hawaiians. So why don't more people plant it? Well, kalo is difficult to grow and reproduce after it is harvested. Most plants will give you hundreds or thousands of seeds that might grow into new plants, but not kalo. Instead, to regrow kalo, you must start with a healthy plant. Next, you'll cut off and replant a small part of it. Usually, you have to cut off the huli, or the top part of the kalo where the leaves begin. Sometimes, if you are lucky, you also get a 'ohā, which is like a baby kalo that grows out of a bigger kalo. By planting a huli or a 'ohā and taking care of it for about a year, you might end up with a new kalo.



The parts of a kalo that can be replanted

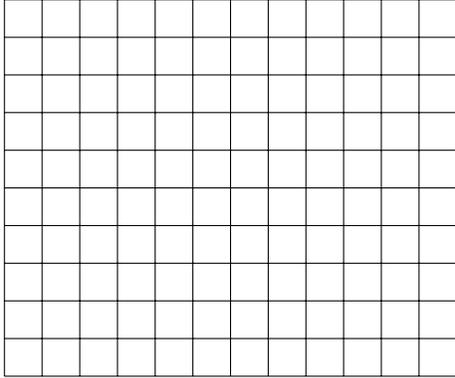
Uncle Ikaika has a large farm, but he is only using 0.5 acres of it to grow kalo. His nephew has a graduation party next year, and he wants to grow more kalo for the party.

1. Uncle Ikaika needs to plant more kalo, so he uses all the huli that he has saved to grow $\frac{1}{10}$ acres of more kalo. How many acres of kalo does Uncle Ikaika have now?

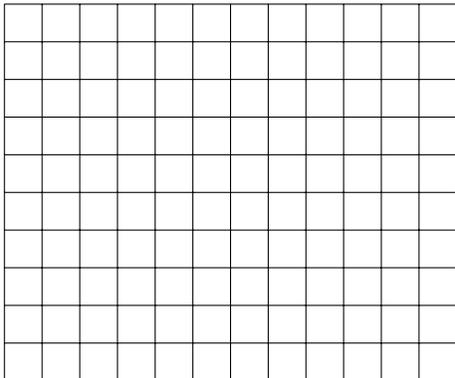
Unit 1: Cumulative Activity

We want to take care of a 120 thousand square feet lo'i in Kanē'ohe, a rainy part of O'ahu. Unfortunately, two major floods have damaged the lo'i.

1. The first flood destroyed $\frac{5}{16}$ th of the lo'i. Below is a grid of 120 squares representing 120 thousand square feet of the lo'i. Color/fill in the squares to represent how many thousand square feet of the lo'i was destroyed after the first flood.



2. The second flood destroyed another **22.5 thousand square feet** of the lo'i. Below is a grid of 120 squares representing 120 thousand square feet of the lo'i. Color/fill in the squares to represent how many thousand square feet of lo'i was destroyed after both floods.



3. What is the size of the lo'i after the two floods? Give your answer in thousands of square feet.

