

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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Ne'epapa Ka Hana Seventh-Grade Mathematics Resources

Let's Take Care of the Lo'i

Student Activities

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Unit 3: Expressions, Equations, and Inequalities

In this unit, we'll learn how to write and use algebraic equations and inequalities to solve problems through volunteering at the lo'i, planting sugar cane, and removing invasive fish species. There are four activities in this unit. *Module 6* involves evaluating lo'i volunteers' work hours through expressions and equations. *Module 7* focuses on using inequalities for planning a kō plantation. There are two cumulative activities in this unit. Each of the cumulative activities incorporate concepts from each of the previous activities in this unit.



Module 6: Expressions and Equations Activity

A high school on O'ahu requires their seniors to volunteer in the Hawaiian community. Four senior high school friends decide to volunteer at a lo'i in Kāne'ohe (O'ahu).

Hiapo is the leader of the volunteer group. First, she works 6 hours in the lo'i. She really likes it, and she decides to work 4 hours each day after that. **Kalua** always works half as many hours as Hiapo and **Kekolu** works a third as many hours as Hiapo. **Maka** works 9 hours on his first day, but he didn't like it as much. So, he decided to work just 2 hours every 3 days after that. This is equivalent to working $\frac{2}{3}$ of an hour per day.

- Complete the following table summarizing the four volunteers.

Volunteer	Starting hours	Hours per day	Total hours volunteered t days after the starting day
Hiapo	6	4	$6 + 4t$
Kalua		2	
Kekolu	2		
Maka			

- The school is asking this group to volunteer for a total of 100 hours together.
 - Find an algebraic expression showing the total number of hours worked by this group t days after the starting day.
 - Use your expression from part 2a to find how many days it takes for this group to reach a total of 100 volunteer hours.

3. To prevent students from slacking, the school also requires that each student volunteer for at least 20 hours. Using the answer for t that you found in 2b, check if all four students were able to complete over 20 hours each. Show your work below.

4. Do you do volunteer work or community service? If so, what is it and why do you do it? If you aren't already helping your community, what is a community project that you would be interested in and why? Share with a partner or in the online comment section. 

3. For each of the following statements, **write the equation or inequality** it describes, then **solve the equation or inequality**.

(a) The area of **weeds remaining** after t hours of removal is 3000 square feet.

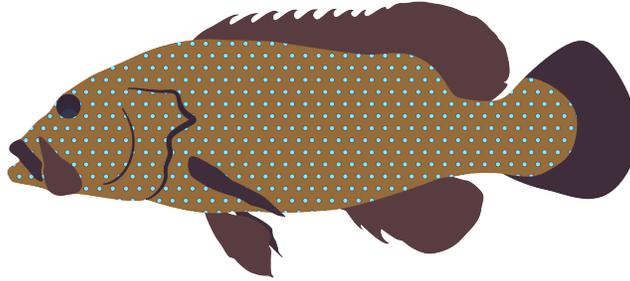
(b) The area of **weeds remaining** after t hours of removal is less than 1000 square feet.

(c) The amount of **kō planted** after t hours of planting is 1650 square feet.

(d) The amount of **kō planted** after t hours of planting is greater than or equal to 3300 square feet.

Unit 3: Cumulative Activity 1

The roi fish, also known as the peacock grouper, is a very invasive fish in Hawai'i. In fact, many scientists believe that it is now the top predator along Hawai'i's shorelines. It is estimated that in a three-square-mile area off the Kona Coast, the roi will eat about 8.2 million fish per year.



Roi fish

Many local fishermen despise the roi because they are a major threat to the local fish population. Fishermen are also afraid to eat roi because their meat has a reputation of making people sick. To diminish the population of the invasive roi, the State of Hawai'i has been arranging spearfishing events called the Roi Roundup.

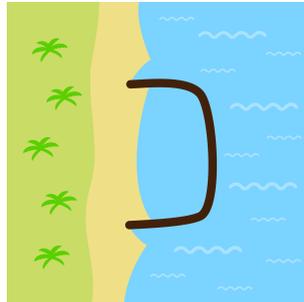
Keoni and his dad Kawika joined this year's Roi Roundup. They arrive early to the event because they want to do their part in helping the native environment recover.

1. At 4:00 AM, before the Roi Roundup started, Keoni catches 3 pounds of roi. Every hour after 4:00 AM, Keoni catches $\frac{5}{3}$ pounds of roi. Write an expression for the amount of fish caught by Keoni t hours after 4:00 AM.
2. At 4:00 AM, Kawika catches 5 pounds of roi. Every hour after 4:00 AM, Kawika catches $\frac{3}{2}$ pounds of roi. Write an expression for the amount of fish caught by Kawika t hours after 4:00 AM.
3. After how many hours will Keoni and Kawika have the same amount of roi?

Unit 3: Cumulative Activity 2

Many characters in traditional Hawaiian stories have super powers. For example, Kū'ulakai (also known as Kū'ula) was known to build large fishponds by himself and communicate with the fish in the sea. According to Hawaiian legend, he would often call fish in from the sea to help those in need of fish or call fish away from entire coastlines to punish evil doers.

Let's imagine that Kū'ula is planning to build a rectangular fishpond. One side of the fishpond will be part of the shoreline and the other three sides will be stone walls sticking out into the ocean. He could measure the three stone walls by swimming in the ocean.



Rectangular fishpond

1. Kū'ula measures the length of his first wall by swimming straight out into the ocean. He takes 8 strokes and then swims 3 more feet. If s is the length of his swim stroke (in feet), write the expression for length of the first wall.
2. Next, Kū'ula makes a sharp 90° turn and swims along the shoreline. He takes 10 strokes to measure his second wall. If s is the length of his swim stroke (in feet), write the expression for length of the second wall.
3. Finally, he swims straight back to shore, traveling the same distance that he swam out in the beginning. So, the measurement of his last wall is the same as his first. Write the expression for the total length of all three stone walls.
4. The three stone walls will have a total length of 240 feet. How long is Kū'ula's swim stroke, s , in feet?

Imagine that a young girl saw the fishpond and wanted to catch a fish. She didn't know how to fish, but after many hours of trying, she finally caught a big one. She's hungry and tired so she carried her fish home. On her way home, she passed by an old man who said that he was really hungry. Without hesitation, the young girl gave away her big fish and went back to the pond, hoping to catch another one before it gets dark.

5. Kū'ula sees this and is impressed by the girl's kindness. He knows the girl is tired and it took a long time for her to catch the fish, so he calls out for the fish to come to his pond so that the girl could easily catch a new fish. The amount of fish in the pond increases by 140% as a result. If f was the amount of fish that were in the pond earlier, in pounds, write an expression for the amount of fish that are in the pond now.

6. More than 240 pounds of fish are in this pond now and the young girl catches many fish with ease! Write this as an **inequality** with the expression from the part 5.

7. At least how many pounds of fish, f , used to be in the pond before Kū'ula called for more?

8. If you could talk to an animal, what kind of animal would it be and why? Share with a partner or in the online comment section. 