



Halala, Watch Your 'Opala (Rubbish)

BACKGROUND:

Lesson Background:

“To leave the world better than you found it, sometimes you have to pick up other people’s trash.”

Bill Nye, Undeniable: Evolution and the Science of Creation

While the following advice from Bill Nye may not be a quick fix to making the world a better place, it is definitely a start. The following unit has been designed to allow grade 5 students to recognize how small actions can lead to big impacts to their environment. More specifically, to recognize their actions in relation to the effects of trash to the environment in Hawai'i. Hawai'i is known as the most remote island chain in the world, being the furthest away from any landmass based on either side you look at Hawai'i on a globe ("Hawaii geography - where are the Hawaiian Islands?", 1999). Since our islands are so isolated, anything that is produced, imported and/or consumed within the state can only go so far. On O'ahu island alone, more than 2.2 million tons of waste is collected annually from residential, commercial and industrial sources (City & County of Honolulu's Department of Environmental Services, 2005). Since 1990, the majority of Oahu's waste has been brought to the City's H-POWER waste-to-energy plant in Campbell Industrial Park where waste is incinerated and turned into electricity. As for the rest of the state, waste produced on the other islands in Hawai'i are transported to each individual island's landfills, where a major concern lies on what the alternative solution will be to dispose of the waste once there is no more land to put the waste in. While recycling and waste-to-energy programs are enough to support our current waste accumulation for the time being, eventually how we manage Hawai'i's waste will result in the impact of waste to our future generation.

Trash shows up in various ways amongst the islands, whether it be the litter that can be found on the side of roads or the thousands of microplastics that wash up on our beaches yearly (Caulfield, 2019). If we want to save the future of our environment, we need to start doing something now. The following unit begins with students reflecting on how much trash they accumulate themselves in their homes as well as how much trash they tend to see around their place/school/area. The students will then come back to this information later within the unit to see if there is a way to reduce the amount of trash in their community. As the unit progresses, students will follow the journey of trash from production to collection, seeing how trash is impacting the world around them. This unit is designed to encourage students to think of alternative ways to reduce trash as well as refurbish trash into possible sustainable and innovative resources for the environment. All in all, the unit is meant to inspire students to recognize their kuleana to their place---starting with the trash they create. In the end, students will design a solution to reducing the amount of trash found laying around campus. Background information required to implement this unit would be the ability to read and analyze data as students will be collecting data of the amount of trash that is accumulated within various grade levels. Likewise, students will need to know the meaning of: trash, sustainability, reduce, reuse, and recycle. Furthermore, students should have a general understanding of the importance of *malama' the 'aina* (taking care of the land) and *aloha 'aina* (love of the land).

The community partners for this project were selected based on who will benefit the most in hearing this information the 5th graders will collect and share, with community partners such as Mayor



Blangiardi, Honolulu City and Council, and the staff and students of Kauluwela Elementary. The students will begin by sharing their information with their classmates at the school to help advocate the significance of waste awareness and lessen the waste found around the school. Future plans for this unit are to further take the issue to the city and council to better help see active changes in the community. Community guest speaker(s) in STEM fields related to the unit topic have also been invited to speak to the students so as to encourage them to see role models of similar backgrounds pursuing STEM and being an inspiring voice to the issue. For this unit, [Ms. Nicole Yamase](#), the first Pacific Islander/Micronesian to reach the ocean's deepest point, was [invited to speak to the 5th graders](#) for this unit.

Resources:

Caulfield, C. (2019). What Are The Long-Term Impacts of Microplastic Pollution in Hawaii?. Retrieved 29 March 2021, from <https://www.civilbeat.org/2019/12/what-are-the-long-term-impacts-of-microplastic-pollution-in-hawaii/>

Hawaii geography - where are the Hawaiian Islands?. (1999). Retrieved 29 March 2021, from <https://www.to-hawaii.com/geography.php>

How the City Manages Our Waste : City & County of Honolulu, Department of Environmental Services. (2005). Retrieved 29 March 2021, from https://www.opala.org/solid_waste/archive/How_our_City_manages_our_waste.html#:~:text=O

Unit Overview:

The purpose of this unit is to show students how small actions can lead to big positive impacts--and in this case, how monitoring their trash can teach them to *malama the 'aina* (to care for the land). No matter where a student goes, they hold a responsibility to the place they are in by doing their civic duty to take care of a place and leave it better than they found it. By the end of this unit, students will engineer alternative solutions to reducing the amount of trash in their communities.

STAGE 1:

Students are curious about ways they can be helpful to their community and environment. Prior to this unit, students should already be aware of what trash is, where trash goes, and should be familiar with the engineering design process. It is important for students to understand how our actions are connected to what happens around us, as well as understand that while they may not find a solution to solving the influx of trash in the world in a day, they can start small to reduce the amount one day at a time. Likewise, students should be able to gather data on how much trash is prevalent in their current communities/campus, so as to suggest ways to reduce the amount for the future.

Unit Plan Title: "Halala, watch Your 'Opala (Rubbish)"



Essential Question: How does our trash impact where we live [in Hawai'i]?

Enduring Understanding(s):

Students will understand that:

- o Hawaii's past helps us understand the present and make decisions about the future.
- o The location of the Hawaiian Islands influences our access to resources, needs, culture, opportunities, and choices.
- o Our actions are connected to people and places around us, so we have a responsibility to think about what our actions can do.

Standard Benchmarks and Values

Science	Technology	Engineering	Mathematics	Social Science
<p>Standards Introduced...</p> <p style="text-align: center;">SCIENCE</p> <p style="text-align: center;"><u>Next Generation Science Standards (NGSS):</u></p> <ul style="list-style-type: none">● 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.● 5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.● 5-PS1-3. Make observations and measurements to identify materials based on their properties.● 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. <p style="text-align: center;">TECHNOLOGY</p> <p style="text-align: center;"><u>International Society for Technology in Education (ISTE):</u></p> <ul style="list-style-type: none">● 3. Knowledge Constructor<ul style="list-style-type: none">○ 3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.○ 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.○ 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.● 6. Creative Communicator<ul style="list-style-type: none">○ 6d Students publish or present content that customizes the message and medium for their intended audiences				

ENGINEERING

Next Generation Science Standards (NGSS):

- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MATHEMATICS

Hawai'i Content & Performance Standards III Database (HCPS):

- Numbers and Operations
 - Standard 1: Numbers and Operations: NUMBER SENSE: Understand numbers, ways of representing numbers, relationships among numbers, and number systems
 - MA.5.1.1. Represent percent and ratio using pictures or objects
- Patterns, Functions, and Algebra
 - Standard 9: Patterns, Functions, and Algebra: PATTERNS AND FUNCTIONAL RELATIONSHIPS: Understand various types of patterns and functional relationships
 - MA. 5.9.1 Analyze patterns and functions and use generalizations to make reasonable predictions
- Data Analysis, Statistics, and Probability
 - Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize and represent data to answer those questions
 - MA. 5.11.2 Recognize the difference in representing numeric data and categorical data and select appropriate representations to display each type of data
 - Standard 13: Data Analysis, Statistics, and Probability: DATA ANALYSIS: Develop and evaluate inferences, predictions and arguments that are based on data
 - MA.5.13.1 Design studies to further investigate the conclusion/predictions made based on data

SOCIAL SCIENCES

Hawaii Core Standards for Social Studies (HCSSS):

- Anchor Standard 1: Developing Questions and Planning Inquiries
 - Inquiry Standard SS.3-5.1.1
 - Construct compelling questions and explain the importance of the questions to self and others
- Anchor Standard 2: Gathering and Evaluating Sources
 - Inquiry Standard SS.3-5.2.2

- Determine whether a source is primary or secondary
- Inquiry Standard SS.3-5.2.3
 - Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting questions
- Anchor Standard 4: Communicating Conclusions
 - Inquiry Standard SS.3-5.4.1
 - Construct arguments and explanations about classroom, school, or community issues and use relevant reasons to support the arguments
 - Inquiry Standard SS.3-5.4.3
 - Present arguments and explanations using a variety of print, oral, and digital technologies
- Anchor Standard 5: Taking Informed Action
 - Inquiry Standard SS.3-5.5.1
 - Identify local, regional, or global problems or issues in various times and places
 - Inquiry Standard SS.3-5.5.2
 - Explain different ways students could work individually or in collaboration with others (e.g., other students, teachers, community and/or global organizations) to address local, regional, or global problems or issues and predict possible results of their actions

Standards Addressed...

ENGINEERING

[Next Generation Science Standards \(NGSS\):](#)

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Hawaii Core Standards for Social Studies (HCSSS):

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 - Inquiry Standard SS.3-5.2.3
 - Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting questions
- Anchor Standard 4: Communicating Conclusions
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Standards Assessed...

ENGINEERING

Next Generation Science Standards (NGSS):

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes

specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MATHEMATICS

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Sense of Place ([Nā Hopena A‘o](#) and Beyond)

Standard #1: Strengthened Sense of Belonging

- (B) Know about the place I live and go to school
- (H) Actively participate in school and communities

Standard #2: Strengthened Sense of Responsibility

- (B) See self and others as active participants in the learning process
- (D) Ask for help and feedback when appropriate
- (H) Honor and make family, school and communities proud

Standard #4: Strengthened Sense of Aloha

- (A) Give generously of time and knowledge
- (E) Respond mindfully to what is needed
- (G) Share the responsibility for collective work
- (H) Spread happiness

Standard #5: Strengthened Sense of Total Well-Being

- (E) Utilize the resources available for wellness in everything and everywhere
- (G) Engage in positive, social interactions and has supportive relationships

Critical Skills and Concepts:

Students will be able to (SWBAT):

- o **Research** alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
- o **Apply** the engineering design process to build a solution for gathering trash in their neighborhood(s)
- o **Create** informational posters to post around campus/Flipgrid videos to share on Kauluwela website about the issue based on data collected

STAGE 2:

At this point of the unit, students have had multiple discussions about waste and have taken the time to really look at how much they build up on their own. Fifth grade students have taken surveys to gather this information as well as created their own surveys to gather similar information on waste accumulation from other grade levels in the school. To build on this data, the fifth graders continue to learn about how waste affects the islands from *Mauka* (towards the mountain) to *Makai* (towards the sea), as well as what Hawai'i and the rest of the world are doing currently to combat it the best way(s) they can.

Authentic Performance Tasks:

Students will demonstrate their understanding of the material by using their notes on what is currently being done to maintain waste within Hawai'i, the continental U.S., and the world to come up with their own solutions to lessening the amount of waste in the world. Students will go through the engineering



design process to plan, design, and create an invention that is meant to reduce the amount of trash seen on the land or in the ocean. Students will then be asked to use FlipGrid to record a video of themselves explaining their design and demonstrating how it can be used to reduce waste build up. This video will be shared to the following audience(s) to advocate for better waste management. Additionally, I would encourage students to participate/host a trash clean up in their community so that we all can take a share in the first step to bettering the cleanliness of the environment.

Authentic Audience:

The students will share their designs and videos to the following audience(s) with the following purposes:

- o Kauluwela Elementary School: students will create a culture at Kauluwela by informing the other students about the importance of trash clean up through informational posters, TikToks, and the sharing of school data collected throughout this unit on waste accumulation.
- o Home communities: students will advocate and exemplify to their home communities how to properly pick up waste seen around their homes as well as reduce the amount of trash accumulated.
- o Mayor, Honolulu City and Council: students will share what they've learned about trash build up and write testimony to help advocate for cleaner streets and battery waste management within their community.

Other Evidence:

- Lesson worksheets, data logs: Through the lessons, students will be gathering information and data to keep as notes to refer back to when it is time to start building.
- Student engineering design building packet: Towards the end of the unit, students will engineer an invention that aids in reducing the amount of 'opala seen in the streets/oceans
- Teachers' observations during class: Observations will be used throughout the implementation of the unit to gauge at students' comprehension and understanding through each lesson

STAGE 3:

The following unit is designed to incorporate engaging activities and discussion into students' learning so as to achieve the intended understanding necessary for a change in students' lifestyles. Students best learn when they can see the clear connections between the content and their personal lives. Information shared to my students that is relevant to them allows them to see where and how it can be applied to their own lives, so I make sure to question and point out familiarities within the content to my students so they can share their own experiences that relate. Likewise, my MLL students are visual and hands-on learners so the activities within this unit will best suit their learning and understanding.

Duration of Unit:

The unit is *ideally* set to take up and be completed in a total of **ten** 45-minute lessons, with some lessons being able to be combined based on time constraints (as noted in the learning plan below).

Learning Plan:

**The following unit has been made with the specific students' location and place [Honolulu, Hawai'i] in mind. As we looked through various information regarding WASTE and where waste goes on the island of O'ahu, think about where your own community sources are located in your area. Please modify the information shared if planning to implement. To make a copy of the slides used for this unit by clicking [HERE](#).*

Lesson	Lesson Breakdown:	Standards, Lesson Objective(s)/Goals:
1	<p>Title: “What do we know about Trash?”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 1-12) ● Students’ laptops <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “Aloha students! I have a challenge for you today. On your tables you will find a big jar full of water with a pile of plastic inside. Next to the jar you may see some chopsticks.” (Slides 1-3) d. “Your challenge is to see how long it takes you to use the chopsticks to pick out the pieces of plastic in the jar. Think you can do it?” e. “Ah, well here’s a twist. For every minute it takes you to empty out the jar, I will pour in a cup of more plastic.” f. “Ready?” g. Teacher sets the timer and students do their best to remove plastic pieces from the jar. Teacher to pour in more plastic per minute. Continue this activity for a while as students attempt to remove all the plastic from the jar. h. “Are you all finding it difficult to complete this challenge? Let’s talk about it for a little bit.” (Slides 4-7) i. “Is there something we could do to make this task easier? Have more hands and chopsticks? Let’s try it.” j. “Hmm that didn’t quite work. What is the problem here? Oh, is it because I keep pouring in the plastic and it makes it harder for you to take out what’s already in the jar? Interesting. Well, what if I told you that everything in this challenge represents something in real life. The jar 	<p>SCIENCE Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-3. Make observations and measurements to identify materials based on their properties. <p>TECHNOLOGY International Society for Technology in Education (ISTE):</p> <ul style="list-style-type: none"> ● 3. Knowledge Constructor <ul style="list-style-type: none"> ○ 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. ○ 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. <p>MATHEMATICS Hawai’i Content & Performance Standards III Database (HCPS):</p> <ul style="list-style-type: none"> ● Patterns, Functions, and Algebra <ul style="list-style-type: none"> ○ Standard 9: Patterns, Functions, and Algebra: PATTERNS AND FUNCTIONAL RELATIONSHIPS: Understand

represents the ocean. The plastic represents the trash that is actually in the ocean. And me pouring in more plastic represents how much plastic and trash continues to go into the ocean every day. Would you believe me?"

- k. "Is there anything we can do? Is there anything we should do about it?"
- l. Teacher has students discuss the following questions.
- m. "This is a serious problem and we are going to spend this quarter diving into what we just did. There is something that can be done even though it seems like there isn't. The essential question we will be diving into this quarter will be: HOW DOES OUR TRASH IMPACT WHERE WE LIVE [HAWAI'I]?" (slide 8)

2. Lesson/Student Work Time (25 minutes):

- a. "I am going to show you a picture and I want you to look at it without saying anything for about one minute. I want you to really think about what goes through your head when you look at it. After one minute, I'm going to ask you to raise your hand and list things you have observed in the picture. Ready?"
- b. Teacher shows students image of an over trashed beach in silence for one minute. (slide 9)
- c. After one minute, teacher opens the floor to students' sharing. "Alright, what did you observe?"
- d. SS begin to raise their hands to share what they've seen from image:
 - i. Trash (may begin to describe types of trash seen)
 - ii. Beach, Water, Ocean
 - iii. Goats, Chicken
 - iv. Boat
 - v. Etc.
- e. As SS answers, teacher writes their answers on board in list format.
- f. Teacher says, "Amazing! Look at how keen your observation skills are. Now that you've listed your observations--what are you WONDERING?"
 - i. Teacher to ask SS difference between WONDER and THINK. Clarification:
 - 1. Wonder = just a question/curious thought. *Hmm, I wonder...*
 - 2. Think = a guess or a reason. *I think ...because...*
- g. SS raise hands again to share their wonderings about the picture. Teacher to connect observations to wonderings out loud to share connections with SS.
- h. "What a great list of wonderings and thoughts you've had

various types of patterns and functional relationships

- MA. 5.9.1 Analyze patterns and functions and use generalizations to make reasonable predictions

SOCIAL SCIENCES
[Hawaii Core Standards for Social Studies \(HCSSS\):](#)

- Anchor Standard 4: Communicating Conclusions
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 - Construct arguments and explanations about classroom, school, or community issues and use relevant reasons to support the arguments

Sense of Place ([Nā Hopena A'ō](#) and Beyond)

Standard #1: Strengthened Sense of Belonging

(B) Know about the place I live and go to school

Students will be able to (SWBAT):

	<p>from just one picture! Now, one obvious thing to note is that there is a LOT of trash in this picture. Even with all of these other things you've listed in this picture, would you go to this beach? Why or why not?"</p> <ol style="list-style-type: none"> i. SS answer reasons. j. "Who do you think gets affected by this?" <ol style="list-style-type: none"> i. SS answers vary: animals, the sea creatures, people, us. k. "Yes! We get affected. Should we just ignore it?" SS say NO! (slide 10) l. "Well do YOU think you're doing good with how well you manage your trash?" m. SS either nod/shake head. n. "How about we take a survey to exactly see?" o. SS take out laptops and log onto their Specials Google Classroom to get to assignment with google form based on their homeroom class. p. "I will give you 15 minutes to finish this survey. When you are done, please comment underneath the assignment post your favorite color. If you still have time left over, please refer back to finishing any remaining work you did not get to finish from before we left for break." q. SS work on survey and catch up work for 15 minutes. <p>3. Closing (10 minutes):</p> <ol style="list-style-type: none"> a. Teacher calls for students' attention. <i>Waterfall waterfall, shhhhh...</i> b. "Okay boys and girls, we've got 10 minutes of class left. Next class we will be taking a look at your own class surveys to see how well you are all doing as a class. From there, we are going to have actual data to be able to refer to as we dive into our EQ." c. "With that being said, please start cleaning your area, shut down your laptops, push in your chairs, and begin lining up nicely at the door." d. SS clean up area, head to door to be escorted back to their homeroom class. <p>Assessment(s):</p> <ul style="list-style-type: none"> ❑ Google Form Survey on Trash 	<ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
2	<p>Title: "It Starts With Us"</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 13-19) 	<p style="text-align: center;">SCIENCE</p> <p style="text-align: center;">Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-1. Develop a model

- Students' laptops
- Blank paper (18)
- Pencils (18)

Teacher Instructions:

1. Opening (5 minutes):
 - a. Teacher greets SS as they enter. SS sit in designated chairs.
 - b. Teacher gathers SS attention.
 - c. "Hey boys and girls! Who remembers what we were talking about last class?"
 - d. SS share about picture of trash/survey.
 - e. "Yes! We took a survey as a class to see how well you all manage trash. Let us go over these answers and see how well this class is doing together." (slide 13)

2. Lesson/Student Work Time (25 minutes):
 - a. Teacher goes over class survey results going question by question and asking the SS to point out what the data presented means per question. (slide 14)
 - i. *Which answer had the most? Less? What does this tell us?*
 - b. "As you can see, there are some things we can work on together to get better. But again, this is only data from THIS class. What if we want to see how the rest of the school is doing?"
 - c. "Today you are going to be put into groups to create survey questions for your own trash survey that you will be making. The survey that you make today will be given to the 4th graders to take so your class can gather data for that grade level." (slide 15)
 - i. *Other 5th grade classes will be creating survey for other grade levels (2nd, 3rd)
 - d. "When you are in your group, decide who in the group will be partner A/B/C"
 - e. SS get split into groups of 3 and assign partner A/B/C
 - f. "Partner A: get a pencil for each member in your group. Partner B: grab one piece of paper for your group. Please put each person in your group's name on this paper. Partner C: make sure your team stays on task and you work together."
 - g. "Each team comes up with a survey with questions that they believe will gather the best and most accurate data on how well the 4th graders manage their trash as well. You have a maximum of 5 questions to come up with per group." (slide 16)
 - h. "Don't forget to think about your audience. Will they

to describe that matter is made of particles too small to be seen.

- 5-PS1-3. Make observations and measurements to identify materials based on their properties.

TECHNOLOGY

International Society for Technology in Education (ISTE):

- 3. Knowledge Constructor
 - 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
 - 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

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 - Standard 9: Patterns, Functions, and Algebra: PATTERNS AND FUNCTIONAL

- understand the questions?”
- i. “After 10 minutes, we will come back together to see each other's surveys and create THE survey that we will want to give to 4th grade.” (slide 17).
 - j. “I will be giving out these surveys to other grade level(s) to fill out as I see them at another time during the day. You have 10 minutes--begin!”
 - k. SS work in teams to come up with questions to put in survey.

3. Closing (10 minutes):

- a. At the end of 10 minutes, teacher gathers SS attention.
- b. “Alright class, let’s hear the questions your group come up with.” (slide 18)
- c. SS share questions created by each group and teacher types questions out into a new google form.
- d. “These are some great questions you’ve each came up with, but we definitely can’t ask all of them. Let’s go through them one more time to see if there are any questions that can be kept, deleted, or rewritten to make the perfect survey to give to the 4th grade. Remember, we are trying to see what questions will let us figure out how well 4th grade is managing waste, too.”
- e. Teacher goes over Qs again with SS to revise final survey.
- f. “Are we happy with this survey and the questions that we ended up with?”
 - i. SS nod.
- g. “Okay, in that case, I will print these and have the other grade level take it when I see them! Then, the next time we meet we will analyze and look over this data together. Clean up and line up!”
- h. Teacher collects papers from SS as students drop pencils off in pencil box.
- i. SS clean up area, head to door to be escorted back to their homeroom class.

Assessment(s):

- Paper with group names and work shown
- Observing how well SS work and communicate in their teams.

RELATIONSHIPS:
Understand various types of patterns and functional relationships

- MA. 5.9.1 Analyze patterns and functions and use generalizations to make reasonable predictions

SOCIAL SCIENCES

Hawaii Core Standards for Social Studies (HCSSS):

- Anchor Standard 1: Developing Questions and Planning Inquiries
 - Inquiry Standard SS.3-5.1.1
- Construct compelling questions and explain the importance of the questions to self and others
- Anchor Standard 4: Communicating Conclusions
 - Inquiry Standard SS.3-5.4.1
 - Construct arguments and explanations about classroom, school, or community issues and use relevant reasons to support the arguments

		<p>Sense of Place (Nā Hopena A‘o and Beyond)</p> <p>Standard #1: Strengthened Sense of Belonging (B) Know about the place I live and go to school</p> <p>Standard #2: Strengthened Sense of Responsibility (B) See self and others as active participants in the learning process</p> <p>Standard #4: Strengthened Sense of Aloha (A) Give generously of time and knowledge (E) Respond mindfully to what is needed</p> <p>Students will be able to (SWBAT):</p> <ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
<p>3</p>	<p>Title: “How Are We Doing?”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 20-24) ● Students’ laptops ● Google Classroom Google Sheets “Graph Survey Results” Assignment <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “Welcome back 5th graders! We’ve got something exciting in store today. Last time we met we worked in groups to create a survey for the 4th graders to take so we could see how well more of Kauluwela Elementary School students’ in general are doing with their waste management.” (slide 20) d. “Please get back into the groups you were in so that we can take a look at the results together. Then, in your groups we will be taking the data and creating graphs so that we have a better visual of what the data looks like.” (slide 21) 	<p>SCIENCE</p> <p>Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. ● 5-PS1-3. Make observations and measurements to identify materials based on their properties. <p>TECHNOLOGY</p> <p>International Society for Technology in Education (ISTE):</p> <ul style="list-style-type: none"> ● 3. Knowledge Constructor <ul style="list-style-type: none"> o 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. o 3d Students build knowledge by actively exploring real-world issues and problems,

	<p>2. Lesson/Student Work Time (25 minutes):</p> <ol style="list-style-type: none"> a. SS get into their groups and laptops remain closed until teacher says to open them. b. Teacher passes out other grade level surveys to each student. c. “Who knows what a graph is?” d. Teacher allows SS to raise hands/share answers. e. “Yes, well we know that a graph is a visual representation of data we’ve collected. It gives us a way to see the data in a picture format rather than just looking at it by numbers. I will show you how to put in data into a table on Google Sheets, then you will learn how to convert it into a graph of your choice! Please make sure you are following along and watching so that you are able to do it yourself as well.” f. Teacher plays tutorial video for SS. (slide 23) g. “Now that we’ve watched it, I’ll show you myself what it means. Please go to your google classroom and look for an assignment under classwork called, ‘Google Classroom Google Sheets “Graph Survey Results” Assignment” h. Teacher and class decides on 2-3 main Qs in the student-created survey to focus on that will best represent data on how well grade levels’ trash management is. i. Teacher will show SS how to make an individualized tab on Google Sheets for each survey question through the Google Classroom Google Sheets “Graph Survey Results” Assignment. j. Teacher to allow SS to open their laptops and work together to create first graph for first survey question. k. Teacher will ask SS to raise their hands to gather numerical data for each questions’ options. Teachers and SS to put these numbers into the table. l. Teacher then shows SS how to highlight completed data table to convert it into a graph/chart. m. “Now how was that? Wasn’t too bad right? You all did awesome for making your first graph through Google Sheets! Now in your groups, finish off the rest of the survey questions and make graphs for them.” n. SS to finish making graphs for rest of survey questions. Teacher works with SS to jot numerical data down so SS can refer to same data. <p>3. Closing (10 minutes):</p> <ol style="list-style-type: none"> a. Teacher grabs SS attention. b. “I’m very proud of all of you for working together today to complete your graphs. Now you have a wonderful tool 	<p>developing ideas and theories and pursuing answers and solutions.</p> <p>MATHEMATICS Hawai’i Content & Performance Standards III Database (HCPS):</p> <ul style="list-style-type: none"> ● Data Analysis, Statistics, and Probability <ul style="list-style-type: none"> ○ Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize and represent data to answer those questions <ul style="list-style-type: none"> ■ MA. 5.11.2 Recognize the difference in representing numeric data and categorical data and select appropriate representations to display each type of data <p>SOCIAL SCIENCES Hawaii Core Standards for Social Studies (HCSSS):</p> <ul style="list-style-type: none"> ● Anchor Standard 5: Taking Informed Action <ul style="list-style-type: none"> ○ Inquiry Standard SS.3-5.5.1 <ul style="list-style-type: none"> ■ Identify local, regional, or global problems or issues in various times
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- in your back pocket on how to use Google Sheets to make your data.”
- c. “Now that you’ve seen how 4th grade is doing with trash management, what are you thinking? Do you think we are doing a super fantastic job as a school to combat litter around us? Or do you think there’s more we need to find out?”
 - d. Teacher and SS have a discussion.
 - e. “That being said boys and girls, we shall be learning about where trash goes next class. Clean up and line up!”
 - f. SS clean up area, head to door to be escorted back to their homeroom class.

Assessment(s):

- Google Classroom Google Sheets [“Graph Survey Results” Assignment](#)
- Observing how well SS work and communicate in their teams.

- and places
- Inquiry Standard SS.3-5.5.2
 - Explain different ways students could work individually or in collaboration with others (e.g., other students, teachers, community and/or global organizations) to address local, regional, or global problems or issues and predict possible results of their actions

Sense of Place ([Nā Hopena A’o](#) and Beyond)

Standard #1: Strengthened Sense of Belonging

(B) Know about the place I live and go to school

Standard #2: Strengthened Sense of Responsibility

(B) See self and others as active participants in the learning process

Standard #4: Strengthened Sense of Aloha

(A) Give generously of time and knowledge
 (E) Respond mindfully to what is needed

Students will be able to (SWBAT):

		<ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
<p>4</p>	<p>Title: “Trash: Mauka to Makai (Mauka)”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 25-38) ● “Trash: Mauka to Makai” Research Log (only working on Mauka side for this lesson) ● Post-it notes ● Pencils <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “Salutations 5th graders! Please come take a seat. You’ve all worked really hard last class to put together the data we collected, and today we will continue with learning about waste by researching what happens to waste on the island of O’ahu.” 2. Lesson/Student Work Time (25 minutes): <ol style="list-style-type: none"> a. “Today we will be looking at ‘where does our trash go?’ and we will be looking at it from the lens of <i>Mauka to Makai</i>. Has anyone heard that term before?” (slide 25). b. “Does anyone want to take a guess what both of those words might mean? What do you think it means based on the following image”: <div> </div> <ol style="list-style-type: none"> i. c. SS share their guesses/inferences. d. “These are very awesome inferences, 5th graders! Let’s dive a little deeper.” e. “As we go through today’s lesson, I will be giving out these “Trash: Mauka to Makai” Research Log’s which will be YOUR job to fill out as I share the information with you. We might not be able to cover the whole log today, so please start with the left side labeled, ‘Mauka’.” 	<p style="text-align: center;">SCIENCE</p> <p style="text-align: center;">Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. ● 5-PS1-3. Make observations and measurements to identify materials based on their properties. ● 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. <p style="text-align: center;">TECHNOLOGY</p> <p style="text-align: center;">International Society for Technology in Education (ISTE):</p> <ul style="list-style-type: none"> ● 3. Knowledge Constructor <ul style="list-style-type: none"> o 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. o 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. <p style="text-align: center;">MATHEMATICS</p> <p style="text-align: center;">Hawai’i Content & Performance Standards III Database (HCPS):</p> <ul style="list-style-type: none"> ● Data Analysis, Statistics, and Probability <ul style="list-style-type: none"> o Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize

	<p>(slide 26)</p> <p>f. “Now, what is Mauka? Well, the term <i>Mauka</i> (mow-ka) is Hawaiian for “toward the mountain, or inland”. An easy way to remember its’ meaning is to remember how the first part of the word “mau-ka” sounds like the word “mountain”. As for <i>Makai</i>, it is Hawaiian for “toward the ocean”. In the Hawaiian language, the word <i>-kai</i> stands for “sea/ocean”.”</p> <p>g. “You may often hear people use these two terms to indicate directions on the islands. You may hear someone say “Mauka side”, which just implies what you just learned--”towards the mountain/in land”. As we do our research on where waste goes today, we will be focusing on what happens to our waste after it leaves us, but in terms of MAUKA: on the land. What happens to waste on the land?” (slide 26)</p> <p>h. “Remember, as I go through the next couple of slides, I want you to be taking notes on your research log. It is important for engineers to gather as much knowledge as they can about a topic when they are being asked to create a solution for a problem regarding the topic. As engineers in STEM, let us gather more knowledge about our topic.”</p> <p>i. “If you have any questions as I share these facts with you, please write it down on these sticky notes that I will also be passing out. We will have time at the end to go over any questions that may/may not be answered throughout this.” (slide 28)</p> <p>j. Teacher passes out sticky notes per group of students.</p> <p>k. “Ready?”</p> <p>l. Teacher to share informational slides to students. Underlined words on slides are key information for students to write on their research logs:</p> <ol style="list-style-type: none"> i. Slide 29 - read off slide. Pictures are placed to define <i>residential, commercial, and industrial sources</i>. ii. Slide 30 - read off slide. iii. Slide 31 - slide is used to show SS distance from school to H-power, as well as show geographically where the H-Power is located. iv. Slide 32 - read off slide, then play video (3:33 min). Read off fun fact after video. v. Slide 33 - read off slide, then play video (2:48 min). vi. Slide 34 - slide is used to show SS distance from school to landfills on O’ahu. vii. Slide 35 - read off slide about waste distribution 	<p>and represent data to answer those questions</p> <ul style="list-style-type: none"> ■ MA. 5.11.2 Recognize the difference in representing numeric data and categorical data and select appropriate representations to display each type of data <p>SOCIAL SCIENCES <u>Hawaii Core Standards for Social Studies (HCSSS):</u></p> <ul style="list-style-type: none"> ● Anchor Standard 2: Gathering and Evaluating Sources <ul style="list-style-type: none"> ○ Inquiry Standard SS.3-5.2.2 <ul style="list-style-type: none"> ■ Determine whether a source is primary or secondary ○ Inquiry Standard SS.3-5.2.3 <ul style="list-style-type: none"> ■ Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting
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	<p>on other islands in Hawai'i.</p> <ol style="list-style-type: none"> 1. Kaua'i 2. Hawai'i (Big Island) 3. Mau'i, Lana'i, Moloka'i <p>viii. Slide 36 - read off slide and facts about U.S. waste distribution</p> <p>3. Closing (10 minutes):</p> <ol style="list-style-type: none"> a. "Now are there any left over questions boys and girls?" (slide 37) b. SS to raise hands and ask any leftover questions. Teacher to answer questions and/or search up specific answers using the internet. c. Teacher to finish up research facts and check in on SS to see if there are any missing notes they need. If so, go back to the appropriate slide with information. d. "Okay boys and girls, we learned a TON about how trash is handled on the <i>Mauka</i> side. Next class, we will take a look at the <i>Makai</i> side of your data logs." e. "Please pass those logs in and then you may push in your chairs and line up by the door. You may stick your sticky notes with your questions onto your papers, too." f. SS to turn in data logs, push in chairs, then line up by door to be escorted back to class. <p>Assessment(s):</p> <ul style="list-style-type: none"> <input type="checkbox"/> "Trash: Mauka to Makai" Research Log (only working on Mauka side for this lesson) <input type="checkbox"/> Post-it notes with questions on them <input type="checkbox"/> Observation on SS taking notes during lesson 	<p style="text-align: right;">questions</p> <p>Sense of Place (Nā Hopena A'o and Beyond)</p> <p>Standard #1: Strengthened Sense of Belonging (B) Know about the place I live and go to school</p> <p>Standard #2: Strengthened Sense of Responsibility (B) See self and others as active participants in the learning process</p> <p>Standard #4: Strengthened Sense of Aloha (A) Give generously of time and knowledge (E) Respond mindfully to what is needed</p> <p>Students will be able to (SWBAT):</p> <ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
<p>5</p>	<p>Title: "Trash: Mauka to Makai (Makai)"</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 39-48) ● "Trash: Mauka to Makai" Research Log (only working on Makai side for this lesson) ● Pencils <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. "Howdy 5th graders! We are back to finishing up our research on 'where does our trash go?' You did wonderful taking notes last class and I hope that learning 	<p style="text-align: center;">SCIENCE</p> <p style="text-align: center;">Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. ● 5-PS1-3. Make observations and measurements to identify materials based on their properties. ● 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. <p style="text-align: center;">TECHNOLOGY</p>

all this new information has been causing you to think a little more about how YOU handle your waste.” (slide 39)

- d. “Last class we focused on *Mauka*--what does that mean again?”
 - i. SS raise hands to answer Q.
- e. “Yes--towards the mountain/inland. Now we are going to be looking at what happens to our trash in terms of *Makai* = towards the ocean/sea.” (slide 40)
- f. “Can I have a volunteer pass out pencils?”
- g. “Can I have a volunteer pass out your research logs from last class? Remember, we are working on the Makai side today.” (slide 41).

2. Work Time (25 minutes):

- a. “This time it will be a little different. We are going to go on a WALK!”
 - i. If time permits, let SS go outside on an actual walk to observe any litter found around school campus.
 - ii. Due to time restraints, alternative solution was to take a ‘virtual walk’ using [Google Earth](#).
- b. “If you look on your papers, you will see there is a table. There are three pictures on the table. We’re going to leave Kauluwela Elementary and walk down A’ala Street. Your task is to count how many pieces of litter AND how many street gutters/storm drains you see.”
- c. Teacher to go over what **litter, street gutters/storm drains** look like based on pictures shown.
- d. Teacher to open up Google Earth and take a walk with SS. SS and Teacher to tally mark on research logs as they observe any of the following as they walk:
 - i. Litter
 - ii. Street gutters
 - iii. Storm drains
- e. Walk to only last until the end of the street.
- f. “Now remember boys and girls, what we saw on [Google Earth](#) was just what the street looked like on the day that the Google Team took a picture of the street. It may not look like that today--there might be more or less. Try to be mindful of it on your way home after school.”
- g. “Isn’t it interesting how much we don’t really notice in our daily lives when it comes to observing waste? Let’s keep going with our information today.”
- h. Teacher to share informational slides to students to help fill out their research logs:
 - i. Slide 43 - so where does the trash go? Play video

[International Society for Technology in Education \(ISTE\):](#)

- 3. Knowledge Constructor
 - 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
 - 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

MATHEMATICS

[Hawai’i Content & Performance Standards III Database \(HCPS\):](#)

- Data Analysis, Statistics, and Probability
 - Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize and represent data to answer those questions
 - MA. 5.11.2 Recognize the difference in representing numeric data and categorical data and select appropriate representations to display each type of data

	<p>(2:02 min) for SS.</p> <ul style="list-style-type: none"> ii. Slide 44 - why should I care? Teacher to read off statistical facts to SS. iii. Slide 45 - teacher to read off and share informational poster to SS. iv. Slide 46 - teacher to further share result of trash in ocean by playing video (2:40 min) v. Slide 47 - teacher to read off who's affected? <p>3. Closing (10 minutes):</p> <ul style="list-style-type: none"> a. "Are there any left over questions boys and girls?" (slide 47) b. SS to raise hands and ask any leftover questions. Teacher to answer questions and/or search up specific answers using the internet. c. Teacher to finish up research facts and check in on SS to see if there are any missing notes they need. If so, go back to the appropriate slide with information. d. "Okay boys and girls, I will give you a couple of minutes to finish answering the reflection questions on your research log: <ul style="list-style-type: none"> i. How does water play a role in what happens to waste? ii. Who gets affected? How? e. "Please pass those logs in and then you may push in your chairs and line up by the door. You may stick your sticky notes with your questions onto your papers, too." f. SS to turn in data logs, push in chairs, then line up by door to be escorted back to class. <p>Assessment(s):</p> <ul style="list-style-type: none"> <input type="checkbox"/> "Trash: Mauka to Makai" Research Log (only working on Makai side for this lesson) <input type="checkbox"/> Post-it notes with questions on them <input type="checkbox"/> Observation on SS taking notes during lesson 	<p>SOCIAL SCIENCES Hawaii Core Standards for Social Studies (HCSSS):</p> <ul style="list-style-type: none"> ● Anchor Standard 2: Gathering and Evaluating Sources <ul style="list-style-type: none"> ○ Inquiry Standard SS.3-5.2.2 <ul style="list-style-type: none"> ■ Determine whether a source is primary or secondary ○ Inquiry Standard SS.3-5.2.3 <ul style="list-style-type: none"> ■ Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting questions <p>Sense of Place (Nā Hopena A'o and Beyond)</p> <p>Standard #1: Strengthened Sense of Belonging (B) Know about the place I live and go to school</p> <p>Standard #2: Strengthened Sense of Responsibility (B) See self and others as active participants in the learning process</p> <p>Standard #4: Strengthened Sense of Aloha (A) Give generously of time and knowledge (E) Respond mindfully to what is needed</p>
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		<p>Students will be able to (SWBAT):</p> <ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them
<p>6</p>	<p>Title: “What’s Being Done?”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 49-55) ● “Waste Solutions” 3-Way Venn Diagram ● Students’ Laptops ● Pencils <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “What is up 5th grade! I hope you had an awesome weekend and I really hope all the information we’ve been learning together for the past couple of weeks hasn’t been scaring you. I mean let’s face it: we don’t live in a perfect world and we’re not perfect human beings. But it’s not too late for us to recognize where we’re headed and what we can do now to change the direction of it, right?” d. “With that being said boys and girls, please listen to the following directions as today we are going to be doing some research on a more hopeful note: Is there a solution to all this waste?” (slide 49) 2. Work Time (25 minutes): <ol style="list-style-type: none"> a. Teacher to ask SS: “Who knows what a Venn Diagram is?” <ol style="list-style-type: none"> i. SS to answer. b. Teacher says, “A Venn Diagram is a good organizational chart that helps us compare two different topics. Each side of the circle in a venn diagram is used for us to highlight the individual features of something, and then where they connect in the middle is where we talk about what is SIMILAR or the SAME about the two things.” c. “Today, we are going to take it a step further: here is what a 3-way venn diagram looks like.” Teacher to present slide 50. d. “Let us practice using a 3 way venn diagram by putting 	<p>SCIENCE Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. ● 5-PS1-3. Make observations and measurements to identify materials based on their properties. ● 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. <p>TECHNOLOGY International Society for Technology in Education (ISTE):</p> <ul style="list-style-type: none"> ● 3. Knowledge Constructor <ul style="list-style-type: none"> o 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. o 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. <p>ENGINEERING Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

SS names' into the circles. We are going to first see how each student is unique. Then, we will see how each two students are similar to each other, and finally, we are going to use the space in the middle of all 3 circles to see what ALL of them have in common.”

- e. Teacher to pick 3 students or ask students who wants to voluntarily be talked about in 3-way Venn diagram.
- f. SS to work with teacher to find similarities and differences between SS chosen in this practice activity. Teacher to encourage SS to think deeply about what can go within these sections of the 3-way venn diagram.
 - i. This activity to take no longer than 10 minutes.
- g. “See? Using a 3-way Venn Diagram isn’t so bad. It is actually a very good way to organize information you learn and make connections between them, while also taking into consideration their differences.”
- h. “But we are no longer just going to be comparing our classmates. Instead, today we will be getting into our same groups as the previous classes to find more information about solutions to waste management.” (slide 51)
- i. “We will be looking at ‘what are ways we can reduce the impact of waste,’ and we will be using our laptops to look at the following links that I’ve provided. As we research how Hawai’i, the Continental U.S/Mainland, and other countries are combating waste, you and your group will be filling out your [“Waste Solutions” 3-Way Venn Diagram](#) and seeing the differences and similarities between these places.”
- j. Teacher to ask for a volunteer to pass out [“Waste Solutions” 3-Way Venn Diagram](#) papers.
- k. Teacher to ask for a volunteer to pass out pencils.
- l. “To access these links, you can find this assignment under your Google classroom classwork, under the name [“Waste Solutions” 3-Way Venn Diagram](#). You will be using your laptops to be able to click on the links that I’ve chosen and provided for you to read through, but you will be taking your notes in person on the paper.”
- m. Teacher to ask for any clarification in directions.
- n. “You will have 15 minutes to fill out this [“Waste Solutions” 3-Way Venn Diagram](#) with your group. I will set a timer. You may begin.”
- o. Teacher to set 15 minute timer as SS work on finding research to fill out sheet.
- p. Teacher to walk around assisting if necessary.

3. Closing (10 minutes):

- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MATHEMATICS

[Hawai’i Content & Performance Standards III Database \(HCPS\):](#)

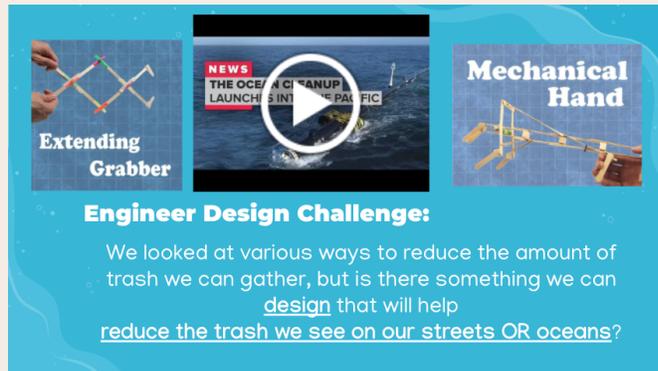
- Data Analysis, Statistics, and Probability
 - Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize and represent data to answer those questions
 - MA. 5.11.2 Recognize the difference in representing numeric data and categorical data and select appropriate representations to display each type of data

SOCIAL SCIENCES

[Hawaii Core Standards for Social Studies \(HCSSS\):](#)

- Anchor Standard 2: Gathering and Evaluating

- a. At the end of 15 minute timer, teacher grabs SS attention.
- b. “Okay 5th graders, timer is up. I hope you and your groups have learned a LOT about the many different and innovative ways Hawai’i, the mainland, and other countries in the world are trying to turn this waste problem around.”
- c. “You’re probably wondering why we’ve been doing so much research and learning about trash and waste. That is because your final engineering design challenge is:



- d. Teacher to clarify example designs shown on Slide 52 and video invention (5:35 min) and how they can be helpful to challenge.
- e. “We will work more on planning and using the engineering design process next class. From now until then, start thinking about ideas you may have. Next class we will be sketching out these ideas and you should at least have (2).” (slide 53)
- f. “Finally, a fun thing you can do that I will also share on Google classroom is this really cool resource called TRASH APP. You can fill out a form to let proper authorities know to come clean up/pick up trash that is overpacked/loaded wherever you may see it. You would just have to fill out a google form on this app telling them where to go and showing them a picture so they know how well to clean it up.” (slide 54).
- g. Teacher to ask any final questions from SS.
- h. “If there’s nothing else, please drop off your pencils in my box before you line up, stack your venn diagrams neatly on my desk, push in your chairs and let’s go!”
- i. SS to put away materials and stack their papers.
- j. SS to line up by the door and be escorted back to class.

Assessment(s):

- [“Waste Solutions” 3-Way Venn Diagram](#)

Sources

- Inquiry Standard SS.3-5.2.2
 - Determine whether a source is primary or secondary
- Inquiry Standard SS.3-5.2.3
 - Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting questions

Sense of Place ([Nā Hopena A’o](#) and Beyond)

Standard #1: Strengthened Sense of Belonging

(B) Know about the place I live and go to school

Standard #2: Strengthened Sense of Responsibility

(B) See self and others as active participants in the learning process

Standard #4: Strengthened Sense of Aloha

(A) Give generously of time and knowledge
(E) Respond mindfully to what is needed

Students will be able to (SWBAT):

- **Research** alternative ways to reduce, reuse, and recycle so as to

	<ul style="list-style-type: none"> ❑ Observation on SS taking notes during lesson 	<p>lessen the amount of waste around them</p> <ul style="list-style-type: none"> o Apply the engineering design process to build a solution for gathering trash in their neighborhood(s)
<p>7-8</p> <p>*May take additional classes/time as needed for SS</p>	<p>Title: “The Solution Part I/II”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 56-64) ● Engineering Design Process Log ● Pencils ● STEM MakerSpace Building Materials (scissors, cardboard, tape, etc.) <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “We’ve got an exciting day ahead of us 5th graders! You’ve put in all the work to learn about waste and how it is affecting our world around us. Today you are going to try to create something that will help make a change to that. You are going to use the engineering design process to design an invention that will help reduce the trash we see on the land OR in the ocean.” (slide 56) 2. Work Time (30 minutes): <ol style="list-style-type: none"> a. Teacher to go over Engineering Design Process Log with SS. b. “You will be given this design log to track your work before you start building:” <ol style="list-style-type: none"> i. Slide 57 - on page one you are going to define the problem using your own words. What are we building for? What have you learned about it? ii. Slide 58 - once you’ve finished writing about the problem, you are going to use the space in page two to draw 2 different invention ideas. I’m asking you to draw two so that you can get your ideas out and really think about which one you want to build. Don’t forget to label all the parts of your design! There’s a section at the bottom that will help you decide which idea you should go forward with. With both of the ideas you’ve drawn, I want you to think of the advantages and disadvantages of that design. 	<p>TECHNOLOGY International Society for Technology in Education (ISTE):</p> <ul style="list-style-type: none"> ● 3. Knowledge Constructor <ul style="list-style-type: none"> o 3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources. o 3d Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. <p>ENGINEERING Next Generation Science Standards (NGSS):</p> <ul style="list-style-type: none"> ● 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ● 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. <p>SOCIAL SCIENCES Hawaii Core Standards for Social</p>

	<p>iii. Slide 59 - After you've looked over your two ideas and decided which one you want to proceed with, show it to me. I will take a look one final time before I give you the green light to start building. You may want to change your idea as you build, and that is okay. But do not fill out page 3 UNTIL you are done with building your final product okay? Because I want you to draw and label what the final design will look like afterwards.</p> <p>iv. Slide 60 - Are there any questions boys and girls? You will be given 30 minutes to plan and build today doing as much as you can. We will also have one other class day to finish your inventions. Please make use of your time as you are expected to finish your invention design in (2) build days.</p> <p>c. Teacher to go over any last minute misunderstandings.</p> <p>d. SS to begin design log and building after getting teacher approval.</p> <p>e. Teacher to monitor and walk around during planning/building so as to assist when necessary.</p> <p>3. Closing (5 minutes):</p> <p>a. After 30 minute timer, Teacher uses attention getter to grab SS attention.</p> <p>b. "Alright boys and girls, thank you for the hard work you've put in today. Again, we will pick this back up next time as we finish your designs."</p> <p>c. Teacher to collect design logs and SS will return pencils.</p> <p>d. SS to line up by the door and be escorted back to class.</p> <p>Assessment(s):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engineering Design Process Log <input type="checkbox"/> Pencils <input type="checkbox"/> Teacher observations' of SS during building days 	<p>Studies (HCSSS):</p> <ul style="list-style-type: none"> ● Anchor Standard 2: Gathering and Evaluating Sources <ul style="list-style-type: none"> ○ Inquiry Standard SS.3-5.2.2 <ul style="list-style-type: none"> ■ Determine whether a source is primary or secondary ○ Inquiry Standard SS.3-5.2.3 <ul style="list-style-type: none"> ■ Gather relevant information from multiple sources that would be helpful in addressing compelling and supporting questions <p>Sense of Place (Nā Hopena A'ō and Beyond)</p> <p>Standard #1: Strengthened Sense of Belonging (B) Know about the place I live and go to school</p> <p>Standard #2: Strengthened Sense of Responsibility (B) See self and others as active participants in the learning process</p> <p>Standard #4: Strengthened Sense of Aloha (A) Give generously of time and knowledge (E) Respond mindfully to what is needed</p> <p>Students will be able to (SWBAT):</p>
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		<ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them o Apply the engineering design process to build a solution for gathering trash in their neighborhood(s)
<p>9-10</p>	<p>Title: “Waste Solution Show Off?”</p> <p>Materials/Resources Needed:</p> <ul style="list-style-type: none"> ● Google Slideshow (Slides 63-72) ● Students’ laptops ● Engineer Design Invention ● Design Show Off: “Waste Clean Up Design” Flip Grid Link <p>Teacher Instructions:</p> <ol style="list-style-type: none"> 1. Opening (5 minutes): <ol style="list-style-type: none"> a. Teacher greets SS as they enter. SS sit in designated chairs. b. Teacher gathers SS attention. c. “Look at all these innovative inventions 5th graders! I am so proud of you all for bringing your ideas to life. I can tell you put in a lot of hard work to your design and planning, so thank you again for giving it your best. However, it is time to let everyone see your best, too.” d. “Today we are going to use our laptops to do a DESIGN SHOW OFF.” (Slide 65) 2. Work Time (25 minutes): <ol style="list-style-type: none"> a. “A design show off is just what it sounds like: you showing off what you made! We are going to do this by using a website called FlipGrid. It is like a video recording website.” b. “First when I give you the link, a screen like this may pop up. Please click “join with google” then click on your name when it shows up.” (slide 66-67). c. “When you get to the official page, you will see this. Can someone read the directions on this page?” (Page 68). Teacher to call a SS to read directions to everyone. d. “Again, you are going to record yourself showing off your design and saying the following: <ol style="list-style-type: none"> i. The problem you are trying to solve ii. Your design and what you’re calling it iii. What does your design do? How does it help reduce waste on land or in the ocean?” e. “You’re kind of like making a commercial for it, so really 	<p style="text-align: center;">ENGINEERING <u>Next Generation Science Standards (NGSS):</u></p> <p>3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p> <p style="text-align: center;">MATHEMATICS <u>Hawai’i Content & Performance Standards III Database (HCPS):</u></p> <ul style="list-style-type: none"> ● Data Analysis, Statistics, and Probability <ul style="list-style-type: none"> o Standard 11: Data Analysis, Statistics, and Probability: FLUENCY WITH DATA: Pose questions and collect, organize and represent data to answer those questions <ul style="list-style-type: none"> ■ MA. 5.11.2 Recognize the difference in representing

	<p>try to SELL IT!”</p> <p>f. “In the end when everyone is finished uploading their videos, we are going to watch each others’ videos as a class and try to give CONSTRUCTIVE feedback on the following:</p> <ol style="list-style-type: none"> i. What can be improved? ii. What would you change? iii. What do you like/dislike about the design?” <p>g. “Remember, we are not trying to tear one another down. We are just trying to offer advice on how to make our designs better! You will be given 20 minutes to do so. Any questions?”</p> <p>h. SS have 20 minutes to upload their videos. Once everyone is done uploading their videos, videos will be shared individually to the class and SS will raise hands sharing appropriate feedback for the inventor.</p> <p>3. Closing (10 minutes):</p> <ol style="list-style-type: none"> a. “Amazing job you engineers! Look at what your minds can create to help save the world! Now, please do not bring your projects home just yet. I really believe that you have what it takes to make a difference and change where the world is heading with our waste management. Let’s take our research further and next time, we will come up with ways to get other people/SS involved and informed about what’s going on, too!” b. SS to clean up area, push in chairs, line up by the door and be escorted back to class <p>Assessment(s):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engineer Design Invention <ul style="list-style-type: none"> <input type="checkbox"/> To be graded using this Engineering Rubric <input type="checkbox"/> Design Show Off: “Waste Clean Up Design” Flip Grid Link 	<p>numeric data and categorical data and select appropriate representations to display each type of data</p> <p>SOCIAL SCIENCES Hawaii Core Standards for Social Studies (HCSSS):</p> <ul style="list-style-type: none"> ● Anchor Standard 4: Communicating Conclusions <ul style="list-style-type: none"> ○ Inquiry Standard SS.3-5.4.1 <ul style="list-style-type: none"> ■ Construct arguments and explanations about classroom, school, or community issues and use relevant reasons to support the arguments ○ Inquiry Standard SS.3-5.4.3 <ul style="list-style-type: none"> ■ Present arguments and explanations using a variety of print, oral, and digital technologies
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		<p>Responsibility (B) See self and others as active participants in the learning process</p> <p>Standard #4: Strengthened Sense of Aloha (A) Give generously of time and knowledge (E) Respond mindfully to what is needed</p> <p>Standard #5: Strengthened Sense of Total Well-Being (E) Utilize the resources available for wellness in everything and everywhere (G) Engage in positive, social interactions and has supportive relationships</p> <p>Students will be able to (SWBAT):</p> <ul style="list-style-type: none"> o Research alternative ways to reduce, reuse, and recycle so as to lessen the amount of waste around them o Apply the engineering design process to build a solution for gathering trash in their neighborhood(s) o Create informational posters to post around campus/Flipgrid videos to share on Kauluwela website about the issue based on data collected
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