

The project: In this project, students will learn about the connections between our food system and food choices, and the health of our planet and stability of our climate. They will **research and critically examine** the impact our individual and collective diets have on the planet and climate, and create **individual photo stories** to highlight the factors and choices they believe are most important in making sustainable food choices. Students will then learn about the upcoming **Moananuiākea Voyage** - a 4-year, traditional Polynesian voyaging canoe expedition around the Pacific Ocean - and work in small voyaging crews to apply their insights into making sustainable food choices to **develop a meal plan** for a selected leg of the voyage. Finally, students will consider the concept and meaning of *He wa'a he moku, he moku he wa'a*, or "the canoe is the island, the island is the canoe" and apply lessons from meal planning for a voyage back to their individual lives and communities.

TEACHER TIP || Questions to ask when planning to roll-out this project*:

	<p>Prior Knowledge: <i>What prior knowledge (if any) do my students have about climate change, carbon and ecological footprints, Polynesian voyaging, health and nutrition, and sustainable food systems ?</i></p>
<p>Authentic Audience: <i>Who is the authentic audience for your students? Is it the Polynesian Voyaging Society? Is it family members? Is it the school leadership or school cafeteria? What type of planning do you need to do to ensure that those audience members can have a role in your students' projects?</i></p>	
	<p>Context in Place: <i>What foods are produced locally in my community? Where is the food that I consume coming from? Where will the Moananuiākea voyage go? How do conditions on a wa'a kaulua (voyaging canoe) impact food choices? What impacts is climate change having on our local and global food system?</i></p>
<p>Project Management: <i>Do students have access to the technology and community they need to be successful? When will students work alone and when will they work in teams? When students work in teams, how will they be created? How will they be assessed individually vs. in a team?</i></p>	

***Project-based learning vs. traditional lesson planning:** *In the midst of project-based learning, students are actively doing the work, learning, creating, and inquiring - eventually heading towards their end goal or product. Often misunderstood is that the organized chaos of what you might see in a PBL environment is carefully and intentionally designed by the teacher well before the project begins. The questions above should allow you to set the stage for student learning to unfold in the following project. Anticipating student questions and areas of need will help you to feel planned and ready in advance of a project.*

Essential Question:	How can individuals and communities reduce the ecological and carbon footprint of their diets (“ foodprint ”) while balancing wants, needs and a community’s parameters?
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Skills and content needed to answer the Driving Question: *Refine these skills and content standards to the scope and need of your project. This project is designed to be interdisciplinary - but if you don't teach a subject, it doesn't mean that that skill or standard can't still play a role in the experience! - These selected skills and content will be supported throughout the project with activities, formative assessments and additional resources.*

Skills	Content/Standards
<ul style="list-style-type: none"> ● Systems Thinking ● Planning ● Budgeting ● Inquiry ● Geographical Awareness ● Collaboration ● Reflection ● <i>*Add other skills to practice in this project</i> 	<p>NGSS MS-ESS3-4 Earth and Human Activity Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p> <p>CCSS.ELA- LITERACY.SL.6-8.4 Present ideas in various contexts.</p> <p>CCSS.ELA-LITERACY.SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.</p> <p>CCSS.ELA-LITERACY.W.8.7 Research to Build and Present Knowledge Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.</p> <p>C3 Framework D2.Geo.4.6-8 Explain impact of human patterns and decisions on the environment.</p> <p>CCSS.MATH.CONTENT.6/7.RP.A.3/1 Use ratio and rate reasoning, and/or analyze proportional relationships, to solve real-world and mathematical problems.</p> <p><i>*Add or remove standards to practice and assess in this project</i></p>

Activities, Products and Assessments: *Below you will find the proposed activities, student products and assessments for this project. Refine them to match the scope and need of your project, making sure that they align with the skills and content you chose to drive from in the previous section.*

Final project & summative assessments:

Students create a *My “Foodprint”* Photo Story (Individual)

Student teams create a multimedia Voyage Meal Plan on Google Earth for a leg of Hōkūle’ā’s upcoming Moananuiākea Voyage (Teams)

Teacher Tip: Present the project calendar early on to show students where they are headed. *Students should know what is expected at the end from the beginning of the project. Use the templates provided to plan out the scope and sequence of the project. Include students in this process.*

Ecological “Foodprint”

What are the environmental impacts of our individual and collective food choices?

Favorite Food Photos Activity and Discussion

Have students bring in and share photos and stories of their favorite foods, preferably photos they’ve taken themselves of an entire meal (rather than a single food item).

- *Brainstorm a list:* what do we want and need to know about our favorite food to understand its impact on our community and ecosystems?
 - Example questions might include:
 - What makes it your favorite?
 - What are the ingredients?
 - Where is it grown/processed?
 - What kind of packaging does it come in?
 - How much water to produce?
 - Who is selling it?
 - How much does it cost?

Introduction to Ecological and Carbon Footprints, Earth Overshoot Day, and Food

Introduce students to the concept of Ecological Footprint using the Global Footprint Network’s [“Footprint Calculator”](#). Each student should complete the calculator as best they can, taking notice of what factors have an affect on their footprint. Have them pay attention to the data and solutions tabs on their results page, and give them time to explore and share their results and reactions. Students should keep their results open and available, or capture the information in their notes, as they learn more about Earth Overshoot Day.

Introduce students to Earth Overshoot Day, and how it is calculated, using [this lesson \(120 minutes\) from EarthOvershoot Day.org](#)

What to collect from students:

- Individual “Footprint Calculator” results
- Group Systems Maps

Type of assessment:

- Formative

Skills and content:

- Systems Thinking
- Inquiry
- Collaboration
- Quantitative Reasoning

Follow Up Discussion

Ask students to share and compare their individual “personal” Overshoot Day (from their Footprint Calculator results) with the defined Earth Overshoot Day for this year, and share reasons why they think they might be similar or different.

Invite students to observe how Earth Overshoot Day has changed since 1970, when it was first calculated. What do they notice about the trend and data, and how would they explain it?

See - Think - Wonder

Present the class with the [“How Much Does Food Contribute to our Ecological Footprint?” infographic](#) and guide the students through the [See - Think - Wonder thinking routine](#) to identify key observations, insights and questions about the sustainability of our food choices.

Think - Pair - Share

Have students reflect individually on the lesson, and write down their own answers to the following question: *“How sustainable are our food choices, and what can we do to make them more sustainable?”*

Have the students form pairs to discuss the similarities and differences in their answers to that question.

Invite each pair to share 1 factor they both agree affects the sustainability of our food choices until you have a list of 10-15 factors, and then invite students to add any factors they think are still missing.

Introduction to ‘Food as a System’

Optional: Before moving on to the system mapping exercise, watch one or more of the two selected clips from [Episode 3 of a Climate for Change](#) and ask students to identify any important factors affecting the sustainability of our food choices that may not have been identified yet.

Clip 1 - Community, Food and Health - 37:06 - 1:17:27

Clip 2 - Farm Solutions - 1:17:28 - End

Place the students in teams of 3 or 4. Using all of the sustainability factors the students have identified so far, have each team create a [“Cluster” Map](#) following the steps outlined in the Tools for Systems Thinkers article.

The goals of this system mapping exercise are to:

- Identify any ‘missing’ factors that haven’t been considered yet;
- Gain a deeper understanding of each individual factor;
- Describe relationships between the sustainability factors, and how they might affect one another (for example, local or organic foods are often more expensive, making more sustainable food choices more difficult for individuals and families on tighter budgets)

<ul style="list-style-type: none"> • Share 3 key insights into food sustainability learned from the team Cluster Map activity <p>Now, in the same teams, ask each group to create an “Interconnected Circles Map” following the guidelines in the Tools for Systems Thinkers article.</p> <p>The goals of this system mapping exercise are to:</p> <ul style="list-style-type: none"> • Select 3-5 factors that seem to be highly interconnected and impactful on the sustainability of an individual or community’s food choices • See connections between multiple factors affecting food sustainability, our ecological footprint, and our own food choices <p>Guide the students through using their maps to identify parameters that determine how we can make the most sustainable food choices. Explain that the maps and parameters will evolve and act as reference throughout the project, and especially during our Voyaging Meal Plan learning moment.</p>	
<h2>My “Foodprint” Photo Story</h2> <p>What are the most significant factors we should consider when making food choices in Hawai’i?</p> <h3>Favorite Food Photos Research and Discussion</h3> <p>Invite students to return to their photos and stories of their favorite foods. Explain that they will create a short photo story about the ecological and community impacts of one of their favorite foods. To do this, students will work individually to identify 3-5 factors (<i>examples: how locally it was produced; how much water it took to produce; how much it costs</i>) that affect the sustainability of our food choices and research.</p> <p>For each factor, students will research how their favorite meal impacts the climate, and the health of the ecosystems and communities that are connected to it. They should identify at least one key piece of data for each factor. For each factor, they will also want to find (<i>be sure students credit the photographer/source</i>) or take (<i>bonus points for using their own images</i>) a photograph that represents the relationship between their favorite meal and the chosen factor (for example, if a student loves to eat seafood, they may find a photograph highlighting sustainable or unsustainable fishing practices).</p> <p>Once the students have conducted their research and have 3-5 key data points, and 3-5 images, ask them to rank the factors they chose by how easy/difficult it was to find relevant data, information and images. Have a discussion where students share their rankings, and offer their thoughts on data that was easy or difficult to find. Pose the question: if you had easy access to this information about your food choices, how might it change the decisions that you or your family make?</p> <h3>Create the ‘My Foodprint’ Photo Stories</h3>	<p>What to collect from students: -My “Foodprint” Photo Stories</p> <p>Type of assessment: -Formative</p> <p>Skills and content: -Inquiry</p> <p>-Integrate multimedia and visual displays (CCSS.ELA-LITERACY.SL.8.5)</p> <p>-Explain impact of human patterns and decisions on the environment. (C3 Framework D2.Geo.4.6-8.)</p>

<p>Guide the students through filling in the My Foodprint Photo Story Google Slides template, which includes their photographs, 3-5 key pieces of data related to the sustainability of their food choice, and brief narrative captions describing their favorite food, summarizing their findings, and highlighting opportunities for greater sustainability. There are also 3 slides at the end of the template that will be used for gathering peer and teacher encouragement and feedback.</p> <p><i>Optional:</i> to foster a more global perspective on the issue of food sustainability and the connection between food choices and climate change, and to reinforce and expand upon lesson learned in the opening learning moment above, have the students read, watch and interact with the BBC Future “Follow the Food” article, including trying out the ‘Foodprint Calculator’.</p> <p>Share ‘My Foodprint’ Photo Stories and Get Peer Encouragement and Feedback Once students have completed their ‘My Foodprint’ photo stories, share a copy of each of their Google Slides stories with other students in the class (3-4 photo stories for each student to review is recommended) so that all students will get feedback from at least a few of their peers..</p> <p>After modeling a review of one of the students photo stories, and use of the feedback slides, have students spend 3-5 minutes individually viewing each photo story shared with them, and then 3-5 minutes offering their reactions, encouragement and feedback using the final 3 slides on the template: a See-Think-Wonder slide, a “1 thing I loved was ...” slide, and a “1 thing I wished was ...” slide. This should take about 6-10 minutes per photo story. Ask every student to come up with one interesting “take away” from the photo stories they reviewed.</p> <p>Once all students have finished reviewing their set of photo stories, give each student time to review the final 3 slides of their own photo story template with reactions, encouragement and feedback from their peers. Ask every student to come up with one interesting “take away” from the feedback they received.</p> <p>Invite students to share their “takeaways” and offer the chance for any interested students to briefly present their photo story with the whole class.</p>	
<p>Moananuiākea How have Polynesian wayfinders and voyagers, from a thousand years ago to modern day, made food choices that allowed them to survive and thrive in their unique canoe, island and ocean environments?</p> <p>Moananuiākea: the Hawaiian name for the vast ocean that surrounds the islands, also known as the Pacific Ocean.</p> <p>Research Question Brainstorm Brainstorm questions to research about the upcoming Moananuiākea Voyage for Hōkūle’a and Polynesian voyaging generally, and how they survive and thrive in</p>	<p>What to collect from students: -Voyaging Research Notetaker</p> <p>Type of assessment: -Formative</p> <p>Skills and content: -Systems Thinking -Inquiry</p>

their unique canoe, island and ocean environments. As a class, select 1 compelling question from the brainstorm that every student will investigate. Individually, each student should then develop or choose 3 additional and unique compelling questions for their own investigation. All of these questions can be entered into the [Voyaging Research Notetaker document](#), or whatever format works best for you and your students.

Research

Using the Voyaging Research Notetaker document, have the students begin gathering their research by using some of the following links from the Polynesian Voyaging Society and local media in Hawai'i.

Research links to get started

- <http://www.hokulea.com/waamoana/>
- <http://www.hokulea.com/hoomakaukau/>
- <http://www.hokulea.com/ask-crew-kealoha-hoe-will-eating-dried-foods/>
- <http://www.hokulea.com/balanced-meal/>
- <http://www.hokulea.com/cooking-hawaiian-style-hikianalia/>
- <https://www.staradvertiser.com/2014/05/14/features/for-hokulea-meals-a-t-sea-maintain-good-health-and-morale/>
- http://archive.hokulea.com/ike/canoe_living/modern_provisions.html
- http://archive.hokulea.com/ike/canoe_living/traditional_foods.html

Once students have attempted answering their research questions using these links, invite them to explore other resources at www.hokulea.com and then to branch out looking for other sources of knowledge. Remind them to keep track of their sources in their Voyaging Research Notetaker.

You should also be encouraged to reach out directly to **Polynesian Voyaging Society at education@pvshawaii.org** to schedule possible classroom visits from voyaging crew members, receive voyaging updates and track the Moananuiākea Voyage, or get additional information.

Voyaging Food Choices

Have the students get back into their systems mapping teams to revisit their "Cluster" Maps and "Interconnected Circles" Maps from the opening learning moment. Ask them to create a new "Cluster" map given their new insights and research specific to the food choices and parameters that faced Polynesian Voyagers and the island communities in Hawai'i and across the Pacific. If it's helpful, students can follow up and create another "Interconnected Circles" Map as well.

Based on their research and updated systems maps, ask the student teams to identify the most important parameters that affected voyagers and Hawaiians in making their own decisions about food and diet. Share these parameters out in a list visible to all student teams.

-Geographical Awareness

-Research to Build and Present Knowledge (CCSS.ELA-LITERACY.W.8.7)

Audience + Scope. As you move into the next stage of the project, start determining who the final audience of the project will/can be, and what the scope of the project will be.

Consider the following: (*use the [planning document](#)*):

A. Audience:

- a. **Who is a feasible audience? How can I set this up prior to rolling out the next stage with students?** (i.e. Can students present to crew members of the Polynesian Voyaging Society, or other local canoe crews? To their school community and/or families/friends? Will we host an exhibition night?)
- b. **How is the selected audience authentic to what students will be creating?** (ex: If students are developing plans that pertain to voyaging and the specifics of the Moananuiākea Voyage, who else should know about and benefit from this new knowledge?)

B. Scope:

- a. **What scope of the final product do you want to work towards with your students?**
 - i. **Individual scope:** Students individually produce a final product, their *one-day Voyaging Meal Plans*.
 - ii. **Group scope:** Students work in student teams to produce a final product, the Crew's *Voyaging Meal Plan*.
 - iii. **Whole class scope:** Students work together towards a whole class product, such as a community event, *such as a presentation of their Voyaging Meal Plans to the crew of the Polynesian Voyaging Society or other local voyaging canoes*.
 - iv. **Combination of the above**

Voyaging Meal Plan

How can we create the best possible meal plan for a leg of the upcoming Moananuiākea voyage?

Form Crews and Select Voyaging Leg

Place students into Crews (12-16 students) and Watch Crews (3-4 students, the same teams as during earlier systems mapping work, with one identified as Watch Captain)

Individual students take ownership over one day or 3 meals for the voyage for the full crew of 9-12 people (ex, 3 days of breakfast, lunch OR dinner; or 1 day of breakfast, lunch AND dinner), and work in collaboration to make sure the whole watch crew (responsible for 3-4 days), and the larger crew (responsible for the whole voyage leg of 12-16 days) are making optimal use of resources and creating a balanced, resilient and sustainable meal plan for the entire leg (12-16 days). Each full crew should be assigned a *Captain*, a *Quartermaster* and a *Cook*, who must each approve individual meals and the entire meal plan, and will be responsible for raising concerns about the food choices and related parameters, including cost and space. These roles should be researched and explained to the whole crew by those are given them.

Once Crews are formed, each Crew (12-16 students) will need to choose, be assigned, or draw from a hat/basket the leg of the voyage ([use the voyage map and](#)

What to collect from students:

- Voyaging Meal Planning Google [Document](#)
- Google Earth Voyaging Meal Plan

Type of assessment:

- Summative

Skills and content:

- Geographical Awareness
- Collaboration
- Planning
- Systems Thinking
- Integrate multimedia and visual displays (CCSS.ELA-LITERACY.SL.8.5)

[points here](#)) they will be going on (designing a meal plan for). Each crew will need to identify a starting and finishing port within the assigned leg that are roughly 12-16 days apart.

Outline Parameters

Using their crew systems maps as reference, and the list of parameters from their voyaging research, have the students outline the key parameters and factors they will consider to design the meal plan. They should also describe how factors affect one another. These might include:

- Cost,
- Local Availability,
- Calories/Nutrition/Portion Size,
- Carbon/Ecological Footprint,
- Psychological Well-being Impact
- Preparation Requirements
- Space/Storage/Preservation Requirements
- Weight
- Possible disruptions like no wind, heavy storms, rough seas
- Etc.

Next, student crews should work together to identify a starting point for their voyaging leg, and then use their knowledge of voyaging distances, speeds and meal times to estimate locations for each meal. Once they leave port on Day 1, they will only have whatever they take with them until they arrive at their final port!

Each meal will have the following:

- A location, identified as a pin on the map
- A meal overview with an image
- An ingredients list with images
- Preparation instructions with image
- 3-5 parameters with relevant data points and images supporting why you chose this meal

Research and Planning

Every Crew (12-16 students) should make one copy of a [Voyaging Meal Planning Google Document template](#). Each Watch Captain should make sure that everyone on their crew is assigned to 3 meals, including them, and that all required information is included in the Meal Planning Google Document.

Note: Other members of a watch crew, or crew, may have answers to questions that come up during the planning, so encourage the students to collaborate and share research notes. They'll need to work together to make sure they're creating a healthy and balanced diet that fits within all of the parameters of the canoe. Each Watch Captain should review all meal plans from their Watch Crew in consideration of parameters before passing along to the Cook, Quartermaster and Captain for final approval of the full meal plan. The Cook, Quartermaster, and/or Captain may send the meal plan back to the Watch Crews for revisions in consideration of specific parameters relevant to their role.

-Ratio and rate reasoning.
(CCSS.MATH.CONTENT.6/7.RP.A.3/1)

-Explain the impact of human patterns and decisions on the environment.
(C3 Framework D2.Geo.4.6-8.)

Create Google Earth Voyaging Meal Plan Project

In this Learning Moment, students build a draft of their Voyaging Meal Plan using Google Earth Story Maps. Begin by exploring exemplar maps on [Google Earth Voyager](#).

Create your own map: foster an environment for critique by allowing your work to receive feedback from the students.

Once the full meal Voyage Meal Plan has been approved by the Cook, Quartermaster and Captain then the captain should create a new Google Earth Project titled, "Our Voyaging Meal Plan: [Starting Port] to [Finishing Port]" and add all crew members and the teacher as collaborators.

The first feature will introduce the full leg (add a "line" feature from starting port to finishing port), the entire crew (with image), and the watch crews (each with their own image) with names and home locations for each crew member.

After that, using all of the information from the Voyage Meal Planning Google Doc template, each individual crew member will create one new "placemark" feature for each meal and add the relevant text and images. This means each individual crew member will create 3 "placemark" features. It is the Watch Captains and Captains responsibility to make sure they are in the right order in the presentation.

Presentation Practice and Meal Plan and Presentation Feedback

Once all Crews have completed their first draft of their Google Earth Voyaging Meal Plan, they will present it to the other Crew(s) in the class, the teacher and/or a small audience of their peers. The audience should offer feedback using the See - Think - Wonder thinking routine; "What I loved was ..." prompt; and the "What I wished was ..." prompt. Feedback should be focused on the quality of the meal plan itself, including the clarity of parameters, as well as on the quality of the presentation and public speaking.

Optional: the teacher may introduce a disruption or challenge to the voyage after this first draft is presented. A hurricane, no wind, man or food overboard, broken equipment - and ask the Crew to adjust their meal plan based only on what they have available to them in their original meal plan.

After the practice presentation and feedback, give each Crew time to identify key areas of improvement, and to edit/refine their Meal Plan and improve the quality of their presentation through practice.

Final Presentation

For the final presentation, the students should present their Final Draft of the Google Earth Voyaging Meal Plan to a larger audience of their peers, families, other educators and possibly guests from the voyaging community.

Future Navigators:

He wa'a he moku, he moku he wa'a

How does the meal plan you and your crew have created connect back to your own life and food choices at home and at school?.

Individual Reflection

Following their final presentation, share the Hawaiian proverb “He Wa'a He Moku, He Moku He Wa'a” with the students, and ask them to reflect on some or all of the following questions:

- *What was the favorite voyaging meal that you or one of your crewmates planned for the voyage? Why?*
- *What lessons about our food choices and food sustainability have we learned from the Voyage and the Voyagers throughout time?*
- *How can we improve the sustainability of our food choices at home, school and back in our community on land?*
- *What do you believe are the most important factors and parameters for making sustainable food choices?*
- *What do you commit to doing to improve the sustainability of your food choices and the health of your community and ecosystem?*

Voyaging Log Entry

For the final assignment, have each Crew Member create a fictional “Voyaging Log” entry marking the end of their leg. They can use the answers to the reflection questions and the [Voyaging Log Google Doc template](#) to help them focus on the role that food plays on the voyage, lessons they've learned from the voyage and voyaging, and to share their inspiration for making more sustainable food choices once they're back on land and at home.

He wa'a he moku, he moku he wa'a: the canoe is the island, the island is the canoe.

What to collect from students:

-Voyaging Log [entry](#)

Type of assessment:

-Formative

Skills and content:

-Systems Thinking

-Reflection

-Communication

Assessment Tip: *Determine before the final presentation day whether you will assess the final projects/presentations before or after the public presentation. If you decide to wait until after, students can be given a chance to reflect on how the public presentation went, make any final changes and then submit to you for assessment.*