SUSTAINABLE FOOD SOURCES

MODERN DAY FOOD SYSTEMS, CLOSE TO THE SOURCE, AND FOOD MILES
(Modified from Kōkua Hawai‘i Foundation’s ‘ĀINA in Schools Curriculum)

BY MALULANI AFONG

How do sustainable food sources make a positive impact on the environment? How can we support sustainable food sources to help make a positive impact on the environment?

HIGH SCHOOL NINTH - TWELFTH GRADE SPED
Mild/Moderate Learning Disabilities

TIMEFRAME 2 - 3 (OPTIONAL) 60 MINUTE PERIODS

STANDARD BENCHMARKS AND VALUES

HCPS III:
- **HE.9-12.3 BM** - Evaluate personal behaviors within the risk areas (ex. nutrition, fitness, personal well being).
- **SC.ENV.5.6 BM** - Explain why recycling and conservation of resources are important.
- **SC.ES.2.3 BM** - Explain the impact of humans on Earth system.
- **MA.AI.4.1 BM** - Use formulas, functions, or conversion equations to solve problems dealing with determining a measurement based on another derived or given measurement.
- **MA.AI.10.2 BM** - Translate between verbal mathematical situations and algebraic expressions and equations.

NĀ HONUA MAULI OLA PATHWAYS:
- ‘Ike Ola Pono - Caring for the wellbeing of the spirit, na‘au, and body through culturally respectful ways that strengthen one’s mauli and build responsibility for healthy lifestyles.
- ‘Ike Honua - Demonstrating a strong sense of place, including a commitment to preserve the delicate balance of life and protect it for generations to come.

ENDURING UNDERSTANDINGS:
- Students will learn about the environmental impact of consuming food that comes from mainland.
- Students will learn about the environmental impact of consuming food that is produced locally.
- Students will learn about the health benefits of consuming local produce.
CRITICAL SKILLS AND CONCEPTS:
- Students will identify various modern day food systems.
- Students will compare various modern day food systems.
- Students will describe the how food travels in each modern day food system.
- Students will identify “close to the source.” (Close to the source refers to food that is grown in our local environments that are usually less processed and more nutritious.)
- Students will identify “food miles.” (Food miles refers to the distance that it has to travel to get to our homes.)
- Students will identify two different food systems (Ahupua'a and modern day) and their impact on the environment.
- Students will determine the distance of foods that are close to the source.

AUTHENTIC PERFORMANCE TASK:
- Students will compare the environmental impacts of our modern day food system and an Ahupua'a.
- Students will locate sustainable food sources around our campus. This will show students the idea of a part of an Ahupua'a system, which is something they can duplicate at their own homes.
- Students will determine the distances of each sustainable food source as measured from our classroom.

AUTHENTIC AUDIENCE:
- Students will be able to share their knowledge with family members and community members by growing their own food and making a business out of it if they decide to.

OTHER EVIDENCE:
- Students will become more familiar with the concept of farmer’s markets and buying locally from the supermarkets.
- Students will be able to recognize the value and goals of a farmer’s market.
LEARNING PLAN

PART 1: MODERN DAY FOOD SYSTEMS

Materials:
- Picture of Ahupua’a (old and current)
- Locally grown banana from Kailua High School
- Imported banana from Guatemala
- Map showing distance between Guatemala and Hawai‘i
- Food Systems Worksheet
- 3 packages of sort cards that describe the food system order
- Pen or pencil

1. Show students map of an Ahupua’a in the past and one now (He’eia).
2. Discuss how the traditional Ahupua’a system worked and compare if we could still do that nowadays (i.e. He’eia).
3. Show students example of locally grown banana from Kailua High School and imported banana from Guatemala.
4. Show students map of the distance between Guatemala and Hawai‘i and how many miles the banana had to travel.
5. Have students break up into 2-3 groups.
6. Hand out food systems worksheet and one package of sort cards per group.
7. Have students work together and use the sort cards to describe each food system.
8. Once they put their sort cards in the order they think it goes in, the teacher projects the answers on the white board.
9. Students correct their answers with the teachers.
10. Repeat the process for the next two food systems.
11. By the time the students get to #4 and #5, they should know the answer.
12. Reflection using 5 words chosen by the teacher.
PART 2: CLOSE TO THE SOURCE AND FOOD MILES

Materials:
- Picture of Ahupua'a (old and current)
- Locally grown banana from Kailua High School
- Imported banana from Guatemala
- Map showing distance between Guatemala and Hawai’i
- Food Systems Worksheet
- 3 packages of sort cards that describe the food system order
- Pen or pencil

1. Review the lesson from yesterday about various food systems.
2. Discuss how one is “closer to the source” and how one is not.
3. Take students walking around campus to see the banana patches, small dirt garden, and small aquaponics system.
4. As we stop at each place, point out examples of “closer to the source” and the impacts they could have on our environment and natural resources.
5. Discuss “food miles” and the impact that the imported banana might have on the environment and on our natural resources.
6. Go through math conversions (using the distance from Guatemala to Hawai’i) and fill out conversion chart with students. (Use pizza as the illustration for their circles).
7. Have students use the string and tape measure or ruler to determine the distance from our classroom to the various sustainable food sources around us.
8. Reflect on environmental impact of food miles.
9. Enjoy banana smoothie treat as we discuss its nutritional values and environmental impact.
FOOD MILES MEASUREMENT AND CONVERSION SHEET

OBJECTIVE:
- Students will use math to convert parts of a mile to inches.
- Students will use this conversion chart to measure a piece of string and use as a measurement tool.
- Students will use the measurement tool to determine the distance between the classroom and the three sustainable food sources on campus.

Directions: Use the given circles and illustrate the conversions of $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{12}$, and $\frac{1}{32}$ miles to inches. (Hint: Think of a pizza). Work with a partner to complete the conversions for $\frac{1}{24}$ and $\frac{1}{32}$. You may draw two new circles or just fill in the boxes.

<table>
<thead>
<tr>
<th>MILES</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63,360</td>
</tr>
<tr>
<td>$\frac{1}{4}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{8}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{12}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{16}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{24}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{32}$</td>
<td></td>
</tr>
</tbody>
</table>
SUSTAINABLE FOOD SOURCES

OBJECTIVE:
- Students will use the pre-determined string measurement to calculate the distances between the classroom to Garden A, Garden B, and Garden C.
- Students will use information gathered to complete the mathematical proportions to find the approximate distances between all three gardens.

Directions: Using the information gathered, complete the proportions and solve for the approximate distances between the classroom and the gardens. Show all of your work and circle your answer.

<table>
<thead>
<tr>
<th>GARDEN A</th>
<th>GARDEN B</th>
<th>GARDEN C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 String</td>
<td>1980 inches</td>
<td>1 String</td>
</tr>
<tr>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>X (inches)</td>
<td>X (inches)</td>
<td>X (inches)</td>
</tr>
</tbody>
</table>

Teacher Background Info: We decided to use 1980 inches (\(\frac{1}{32}\)) because it was a small enough number that we could measure using the resources that we had. The inches could then be converted back into miles to show the significance in distance between the local produce vs foreign produce.
CLOSER TO THE FOOD SOURCE AND FOOD MILES

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>ANSWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What does “closest to the source” mean?</td>
<td></td>
</tr>
<tr>
<td>2. What does “Food Miles” mean?</td>
<td></td>
</tr>
<tr>
<td>3. How do both of those relate to natural resources?</td>
<td></td>
</tr>
<tr>
<td>4. Describe the food system that the Native Hawaiian used.</td>
<td></td>
</tr>
<tr>
<td>5. Did their system have a negative or positive impact on the environment? Explain.</td>
<td></td>
</tr>
<tr>
<td>6. Describe the modern day food system.</td>
<td></td>
</tr>
<tr>
<td>7. Does this system have a negative or positive impact on the environment? Explain.</td>
<td></td>
</tr>
</tbody>
</table>
FOOD SYSTEMS

**Directions:** Use the cards in the bag to describe each system.

<table>
<thead>
<tr>
<th>FS #1</th>
<th>FS #2</th>
<th>FS #3</th>
<th>FS #4</th>
<th>FS #5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported banana from Guatemala</td>
<td>Locally-grown banana sold at the Grocery Store</td>
<td>Locally-grown banana sold at the Farmer’s Market</td>
<td>Locally-grown banana grown in a Home Garden</td>
<td>Ahupua’a System</td>
</tr>
</tbody>
</table>

**Reflection:** Write a short paragraph about what you learned about these systems. You must use the words: pollution, environment, less waste, cheaper, healthy.
## FOOD MILES RUBRIC

<table>
<thead>
<tr>
<th>SCORING</th>
<th>CRITERIA</th>
</tr>
</thead>
</table>
| **4** Advanced | Student fully demonstrates understanding of:  
• What the modern day food system is  
• What the Ahupua’a system is and its purpose  
• Close to the source and how it relates to less environmental impact and healthier decisions  
• Food miles and the impact to the environment  
• The environmental impacts of each food system by providing at least 3 examples |
| **3** Proficient | Student for the most part demonstrates understanding of:  
• What the modern day food system is  
• What the Ahupua’a system is and its purpose  
• Close to the source and how it relates to less environmental impact and healthier decisions  
• Food miles and the impact to the environment  
• The environmental impacts of each food system by providing at least 2 examples |
| **2** Partially Proficient | Student somewhat demonstrates understanding of:  
• What the modern day food system is  
• What the Ahupua’a system is and its purpose  
• Close to the source and how it relates to less environmental impact and healthier decisions  
• Food miles and the impact to the environment  
• The environmental impacts of each food system by providing at least 1 example |
| **1** Novice | Student barely demonstrates understanding of:  
• What the modern day food system is  
• What the Ahupua’a system is and its purpose  
• Close to the source and how it relates to less environmental impact and healthier decisions  
• Food miles and the impact to the environment  
• Is not able to identify the environmental impacts of each food system |

***“Demonstrates” will be acknowledged by student’s way of expressing his/her understanding of the concepts learned (ex. verbal, written, or kinesthetic demonstration).***