Sustainable Food Systems Field Research: Personal and Home Audit

Grades 9-12

Resources developed by San Mateo County Office of Education's (SMCOE)
Environmental Literacy and Sustainability Initiative (ELSI) • Designed in 2018, last updated October 2020

Purpose and Overview of Field Research Activity

Field Research is the collection of data and observations. In this type of field research, the purpose is to help students investigate what is going on with an environmental topic in their local context (home, school, or community). Parents and Educators, s*ee overview video to Field Research guides here*.

- **What materials do I need for doing field research?** The most important thing you will need is this document outlining the field research activities. Depending on the focus it might also be useful to have a clipboard, or pencil/pen, paper or journal, gloves, binoculars, etc.

- **How long will it take me to do this field research?** Field research tasks may range from 30 minutes → 3 hours depending on the topic and activities. Observations and data collection may also be done as a one-time collection, or pattern based data collection may take place over multiple days. It is recommended that you break the field research up into multiple activities based on each section.

Background information for this Field Research Task:

All living creatures need food in order to survive. However, the food that humans eat, and all the things that go into producing food, distributing food, and dealing with food waste have major impacts on our environmental, physical, and economic health. Unsustainable farming practices contribute to habitat loss, unsustainable water consumption, and the pollution of both our water and air. To gain a deeper understanding of the food system, visit the Sustainable Food System Webquest (optional).

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LOCAL OUTDOOR EXPLORATION

Overview

In Section II, you will complete three steps:

1. Research the Local Climate in Your Area
   - Research what edible plants might be growing in your neighborhood for background knowledge.
2. Local Food Walk-Through
   - Collect data on food growing near your home.
3. Reflection

Glossary

- Local Climate: The weather conditions in a small area
- Edible Plants: Plants that humans can use as food

Step 1: Research Local Climate in Your Area

Materials: Printed journal *or* field journal and pencil, and adult help if needed.

Directions:

1) Go online to UC Master Gardeners of San Francisco and San Mateo County: http://smsf-mastergardeners.ucanr.edu/Vegetable_Schedule_for_San_Francisco_-_San_Mateo_Counties/

➔ Pick if your climate is Hot, Sunny, or Foggy
➔ Read the list of Edible Plants that might grow in the current season and month

2) Go online to Old Farmers Almanac to learn about fruits and vegetables that grow in the San Francisco Bay Area: https://www.almanac.com/gardening/growing-guides

➔ Look through the Growing Guide to see photos of the Edible Plants that might be growing this time of year.

Examples: Beans

Lettuce

Tomatoes

A) What local climate do you have in your neighborhood? How do you know this is your local climate?

- ❏ HOT
- ❏ SUNNY
- ❏ FOGGY

B) List 3 edible plants that might be growing in your neighborhood based on your local climate:

-
-
-

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Step 2: Local Food Walk-Through

Materials: Printed journal *or* field journal and pencil, adult help if needed.

Directions: Students will conduct a survey of the nearby neighborhood to investigate what edible plants are growing in their local environment.

------> Use the Local Food Walk-Through chart (on the next page) to record if there are any edible plants growing nearby

-------> Tally the number of each kind of edible plant found

Adults can print the chart or students can copy into their journal or onto paper.

Students *should*:

- Take detailed notes.
- Be creative when looking around outside!
- Research any plants, animals, or insects that you find and haven't seen before.
- Be respectful of neighbors yards and traffic signs

Students *should not*:

- Collect or eat plants
- Record other types of edible organisms (animals, mushrooms)
- Disturb neighbors or go out of adult set boundaries

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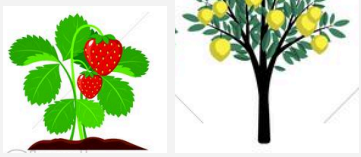
LOCAL FOOD WALK-THROUGH

Date & Time of Day *(Example: March 10th, 2020)*	**Describe the weather** *Write or draw!*	
Type of Edible Plant	**Tally** *(example: I, III, IIII)*	**Notes** *(draw or write down what you find)*
Vegetables 		
Fruits 		
Herbs 		

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Step 3: Reflection on the Local Outdoor Exploration

------> Discuss your results with an adult or classmate, and write your responses on paper/in your field journal.

A) What did you find interesting when researching the local climate and edible plants found in the San Francisco Bay Area?

B) Were you able to find any edible plants? What surprised you about what you were able to find?

C) Why is it important to have edible plants growing in our neighborhoods?

D) What can you do to promote growing edible plants in your neighborhood?

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UNDERSTANDING FOOD ORIGINS AND CALCULATING FOOD MILES

Step 1: Understanding Your Connection to the Food System

The food system is a complex web of interconnected web of resources, activities and people. Every choice you make as a consumer of food has an impact on the broader food system. In this activity you will make connections between the meals you ate recently and the farms where it was produced.

Materials: food, information from someone who regularly buys food for your household, internet access for research

Glossary

Food miles: Food miles are the distance between where a food is grown (on the farm) and where it is ultimately consumed by the person eating the food.

1. Find a piece of fruit or a vegetable in your home. If those aren't available try and choose a food product with simple ingredients. Find the label that describes the company or farm where this food came from.

Example: Mango

2. Take a picture of your food product and upload it below.

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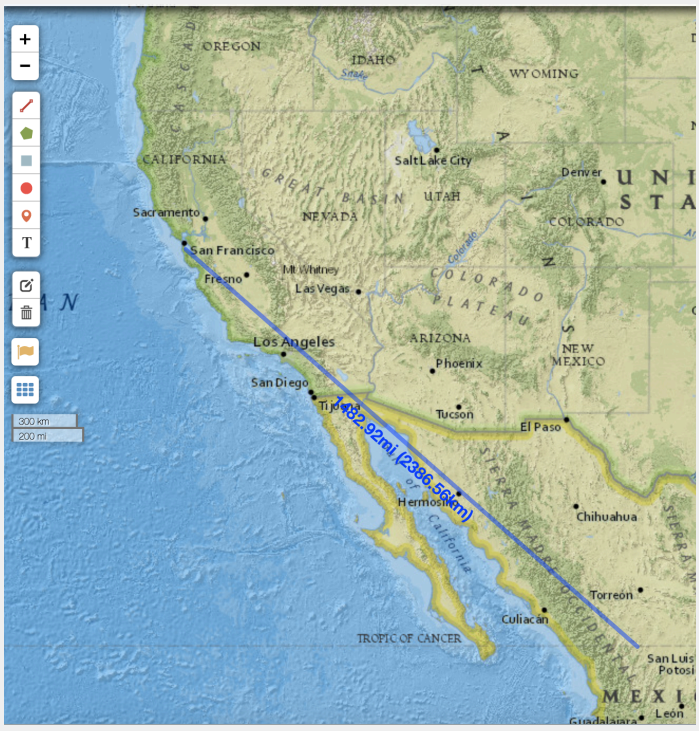
Step 2: Calculating Food Miles

3. Use the National Geographic MapMaker to measure the distance from the origin of your food product to your home. You will draw a line from the location of origin to your home, and the map will calculate the distance in miles and kilometers.
    a. Click on this link to enter the map http://mapmaker.nationalgeographic.org/
    b. Use the zoom feature on the left side of the screen to find the location where your food came from (origin). If you can only find the country, find a point roughly in the middle of that country
    c. Click on the red colored “draw a polyline” symbol below the zoom symbols.
    d. Click on the location of origin to start the polyline
    e. Use the zoom feature to find your home (in the bay area). You may need to zoom in closer to find the city where you live.
    f. Click on the city where you live to end the polyline
    g. Congrats! You have finished your polyline and should see the number of miles located along your line. Take a picture or screenshot of your completed map.
    h. Record the number of food miles below

Example for Bunny mango from Mexico:



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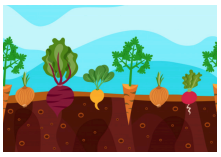
4. Upload a screenshot or photo of your map below.

5. Fill out the table below to the best of your abilities. You may need to conduct additional research online or ask someone in your household where they purchased the food.

					
Stage of Food System	**Farm, and product origin**	**Company, Processing**	**Distribution - Number of Food Miles**	**Market**	**You**
Example	Farm location unknown, country of Mexico	Bunny, part of Freska Produce International	Travelled from an unknown city in Mexico to San Mateo, CA Food Miles: 1,482.92	Safeway Market	Drove in a car to pick up groceries
Your food product			Food Miles:		

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Step 3: Reflection on understanding food origins

→ Discuss your results with a parent or classmate, or write responses on paper/in your field journal.

A) What did you find interesting or surprising about the origin of your food?

B) In thinking about the process it takes for your chosen food product to reach you, what did you learn about the food system?

C) How easy or difficult was it to find information about the origin of your food and the farm it was grown on?

D) Before this activity, where did you expect this food to come from? Are the food miles longer or shorter than you expected?

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CARBON FOOTPRINT CALCULATOR

Step 1: Using the BBC Carbon Footprint Calculator

In the previous activity you traced a single food back to its point of origin and calculated food miles. However, transporting food is just one part of a food's environmental impact. The actual growing and production of food (or animals) on the farm requires land, water, fertilizer, and in the case of livestock, food for the animals. All of these resources contribute to a food's *carbon footprint.* You will use a carbon footprint calculator to estimate the carbon footprint for one food product over the course of a year.

1. Visit the BBC Carbon Footprint Calculator, link: https://www.bbc.com/news/science-environment-46459714

2. Select **two different foods** you have eaten recently (within the last three days). Choose your first food.

3. Select how frequently you eat this food.

4. The calculator should now provide information on the carbon footprint associated with your food. Fill out the table below with the results of the first food. Then repeat the process for the second food.

	Kilograms in annual greenhouse gas emissions	Equivalent of driving a car 
Example: Beef, 1-2 times per week	604kg	1,542 miles
Food # 1:		
Food #2:		

5. Explore the other graphs and information provided by the BBC calculator.

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Step 2: Reflection

→ Discuss your results with a parent or classmate, or write responses on paper/in your field journal. 

A) What did you find surprising or interesting about the greenhouse gas emissions or land use associated with the foods you chose?

B) How do your two foods compare for greenhouse gas emissions? Which food produces more and why?

C) How do your two foods compare for land use? Which food uses more land and why?

D) Based on the information in the BBC graphs, which food (source of protein) has the lowest greenhouse gas emissions?

D) We can help lower our carbon footprint by choosing foods that contribute fewer greenhouse gas emissions and use less space. What simple switches can you make in your diet to lower your carbon footprint?

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FOOD WASTE (OPTIONAL)

Step 1: Use the food waste journal to track what you throw away

More than 30% of the food we produce in the U.S goes to waste. Globally food waste contributes 8% of all greenhouse gas emissions. Although food is wasted in multiple parts of the food system (on the farm, in distribution, in grocery stores and restaurants etc) it's important to examine our own food waste habits.

*Note: This activity is optional and should not be completed if a student has health concerns related to tracking and monitoring food

Materials: Printed journal OR field journal, pencil

Directions: Students will complete the chart below to track the food waste they generate over one to five days. Add additional rows to track waste if needed.

Students *should*:

- Take detailed notes
- Include items you share with family friends if you used them (ex: milk container)

or

Students *should not*:

- Collect the waste
- Save or eat food that has gone bad cannot be eaten for whatever reason

or

Adapted from: Food Waste Audit, California Academy of Sciences, 2020

Glossary

- Food Waste: Food lost by consumers and retailers
- Compost: Items that can be sent to a commercial composting facility. Examples: yard waste, food scraps, food-soiled paper
- Trash: Items that are sent directly to the landfill. Examples: soft plastic bags, wrappers

Why learn about food waste?

Food waste is the single largest component of waste sent for disposal, much of which ends up in landfills, where it generates methane, a powerful greenhouse gas

(U.S. Environmental Protection Agency)

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FOOD WASTE JOURNAL

Date, Meal	What food did I throw away? *Write or draw the item*	Why? *Write a sentence to explain*
Example: 2/20/2020, Breakfast	❑ Meat ❑ Vegetables ❑ Milk/Dairy ❑ Bread ❑ ~~Fruit~~ ❑ Other:_____	I ate a banana then threw the peel away
	❑ Meat ❑ Vegetables ❑ Milk/Dairy ❑ Bread ❑ Fruit ❑ Other:_____	
	❑ Meat ❑ Vegetables ❑ Milk/Dairy ❑ Bread ❑ Fruit ❑ Other:_____	
	❑ Meat ❑ Vegetables ❑ Milk/Dairy ❑ Bread ❑ Fruit ❑ Other:_____	
	❑ Meat ❑ Vegetables ❑ Milk/Dairy ❑ Bread ❑ Fruit ❑ Other:_____	

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Step 2: Reflection on Food Waste Journal

→ Discuss your results with a parent or classmate, or write responses on paper/in your field journal.

A) What was surprising or interesting about the food waste you generated?

B) Your Planet Your Plan is an interactive tool you can use to learn how to reduce your food waste at home. Explore the tool and discover the environmental impact of the food you threw away.

➔ Click on FOOD in the bottom right hand corner.

C) Producing food takes a lot of water and emits carbon. How many gallons of water were wasted? How much carbon was wasted (ex equivalent of driving a car for three hours)?

D) How does knowing about the environmental impact of your food waste change your thinking?

E) How can you share what you've learned with family and friends?

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You've Completed the Food System Field Research!

What we eat is connected to a larger food system that connects people and resources around the world. Shifting our diets away from meat and toward plant-based sources of protein is one of the easiest and healthiest ways to reduce our impact on the planet. Now that you have explored the origins, food miles, carbon footprint, and food waste of some of the foods you eat, you can help educate your community on making environmentally friendly food choices. Check out the resources curated by the San Mateo County Office of Education to explore the food system further.