

# \$1 Million Orange

Key Topics: Nutrition, Preserve, Processing, Food Systems, Agriculture, Local

Grade Levels: K, 6-8

Inside or Outside

## **Lesson Overview:**

In this lesson students will make orange “juicicles” to learn the steps and costs involved in processing food from its original form to its final form. Students will demonstrate the increased cost of food as it is processed. The activity in this lesson will promote a natural curiosity about how food affects their health while reinforcing food and agriculture as their connection to a better quality of life. Students will assess the advantages and disadvantages of processed food and its effect on our society in jobs, costs, energy use, health, and environmental impacts as well as discuss the ways in which supporting local agriculture is different from importing food from other regions and countries.

## **Activity:**

Part 1 - Intro Discussion: 10 minutes

Part 2 - Juicicle Production and Cleanup: 35 minutes

Part 3 - Wrap Up Discussion: 15 minutes



## **Suggested Activities & Learning Objectives by Grade:**

- K:
  - K-ESS3-3 How does the food we eat affect the environment?
  - K-ESS3-3 How can we change our food choices to improve the environment?
- 2:
  - 2-LS2-2 How does the food production system distribute seeds across the world unintentionally?
- 4:
  - 4-ESS3-1 What fuels are used to transport produce and how do those fuels affect the environment?
- MS:
  - MS-ESS3-3 How can we quantify the impacts of food production on the environment?
  - MS-ESS3-4 How do increases in human population and per-capita consumption affect the environment in terms of food?

## **Essential Question(s) that Connect CCCs and SEPs:**

- How can our classroom model an orange juicicle factory to study how food systems function? Can we model how this system functions? What jobs will we need to model to follow how an

orange travels from a farmer to the freezer at a grocery store? ([Systems](#); [Developing and Using Models](#))

- Is there a pattern to this data in our chart? (Every step of processing adds labor, materials, and energy needs that result in an additional cost.) ([Patterns](#); [Analyzing and Interpreting Data](#))
- How does supporting local agriculture change at different scales? (Economic impact of supporting a local farmer ~ 60% of every dollar stays in local economy). Can I make this bigger or smaller? (More dollars invested in local agriculture results in more dollars in our local economy which can result in more jobs). ([Scale](#); [Asking Questions and Defining Problems](#))
- How can I explain how food systems works at this scale? Can I explain how our food system on a larger scale affects nature at other scales? For example, how does our food system in California, America, and around the World affect our environment? Land use? Emissions? Soil health? Our ocean and waste management? Can I explain how what happens at this scale affects nature at other scales? ([Scale](#); [Construct Explanations and Design Solutions](#))

### **Materials:**

- 1 orange with price tag
- ½ fresh orange per student
- Hand juicer
- Bowl
- Pitcher
- 1 small paper cup per student
- Masking tape
- 1 popsicle stick per student
- Knife
- Cutting board
- Measuring cup
- Water
- Freezer space
- Tables if doing activity outside

For K-2 adaptation include the [Life of an Orange Script](#) and any costumes or name tags you can gather for the “actors”

### **EG Team Support Needed:**

- Procure local produce for activity through the Food Bank, Gregg Wangard, or a farmers market/grocery store.

### **Prep:**

This entire lesson can take place outside with proper planning and set up! Adequate table space will be needed for students to process the orange juicicles. Tables can usually be checked out from the custodian on campus. In the case of rain or unenjoyable weather, this lesson can also be taught 100% inside.

- Because juicicles will take some time to freeze, connect ahead of time with classroom teacher to let them know they should carve out time in their schedule to enjoy the juicicles with the kids!

Support them with a book recommendation to read during the tasting. Recommended: *An Orange in January* by Dianna Hutts Aston

- Wash cooking surfaces well with soap and warm water, rinse, and dry.
- Draw the following chart on the board. Have a recorder fill in the chart as the activity progresses.

JOB	PROCESS	MATERIALS	LABOR	ENERGY	COST

**Activity Procedure:**

**Engage:**

Begin with a classroom discussion in the seating area in your garden or in the classroom.



*Comprehension Check*

Write the following underlined questions on your board and record student answers:

What’s the difference between an orange and an orange juicicle?

What steps do you think are taken to make juicicles from oranges?

What do these steps involve? (energy, money, labor)

How much would we charge? If we turned our class into an orange juicicle factory, how much do you think we would need to charge for a juicicle to cover the cost of production? (record predictions)

**Explore:**

Action

1. Today our classroom is going to become an orange juicicle factory to **model** how our **food system functions**. What jobs will we need to model to fully study how an orange travels from a farmer to the freezer at a grocery store? (**Systems; Developing and Using Models.**) Take the class through the process of making orange juicicles (refer to step 5 for a list of jobs and steps). With each step, discuss the materials, labor, and energy that would be involved.
2. Divide the class so that each group of students has a job from number 5 (below).
3. Have every student wash their hands. 20 seconds, or the length of time it takes to sing happy birthday, is the right amount of time it takes to clean germs off of our hands.
4. Have the students in each group determine how much they would charge for their part of the process and record this information on the classroom chart on the board.
5. Jobs and steps:
  - Farmers            grow and harvest oranges, truck them to processor
  - Slicers             cut oranges in half until there is one half per person

- Juicers            squeeze orange halves into a bowl
- Blenders        stir in 1/3 cup of water to the juice of each orange half
- Packagers        pour mixture into a small paper cup
- Labelers         put tape on each cup with product name and ingredients label
- Truckers         carry orange juicicles to freezer

6. Have students insert sticks into juicicles after 20 minutes (or as soon as they begin to thicken).

**Explain:**

Turn your attention to the chart the class has been filling out throughout the activity. Is there a **pattern** to the **data in our chart**? Every step of processing adds labor, materials, and energy needs that result in an additional cost. (**Patterns; Analyzing and Interpreting Data**). Discuss what price the class would sell their product for to pay their costs and make a reasonable profit. Introduce what minimum wage is, and how this relates to the cost of living. Why would it be cheaper to buy the ingredients and materials and make it at home?

**Elaborate:**

[Because juicicles will be in the process of freezing, skip ahead to Evaluation.]

Enjoy the orange juicicles as an afternoon snack. Pair it with the story: *An Orange in January* by Dianna Hutts Aston for elementary aged children. Review tasting etiquette: Use 5 senses while waiting for everyone to receive their taste; lizard lick and rabbit nibbles if nervous; don't yuck my yum.

**Evaluation:**



Write the following on your graphic organizer and discuss answers and implications as a class:

Three advantages of buying processed foods

The disadvantages

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Possible answers:

Advantages: Convenience, taste, cost

Disadvantages: Can be low in nutrition/have additives, transportation/shipping and environmental impacts, can be more expensive than if you prepared it yourself.

Why is it more expensive to buy processed foods than unprocessed foods? Is this always the case? (compare the cost of a fresh orange with a processed orange food from the store (sunkist, orange juicicle, orange concentrate). Is the cost of food related to nutritional value? **How does our food system affect nature at other scales?** In other words, how does having so many processed foods affects our society in jobs, costs, energy use, health, and environmental impacts. (Explore the pros and cons, eg. why don't we all make everything from scratch? There is a wide range of factors that influence our decisions, as individuals and societies, about our food system). (**Scale; Construct Explanations and Design Solutions; Principle V - Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors**) One consideration that food consumers weigh is whether to purchase local food or not.

Has anyone seen advertisements for buying local? Large farms can often cut costs by using machinery and pesticides to do the work that your local farmer spends doing by hand. But when consumers support local agriculture, 60% of every dollar they spend stays in the local economy. What impact can that have in a community? (Scale; Asking Questions and Defining Problems)

Also, refer back to the Learning Objectives for your grade level and ensure that they have been met by asking the given learning objective question.

### **Extension Activities:**

- Have students research food preparation in other cultures such as that of Native Americans in precolonial times. Compare it with food preparation today.
- Have students investigate prices of foods in their original form and the same products in processed forms. How many processed products can they find for one original food?
- Prior to this extension activity, ask students to find a food item with a product of origin label at home. (Be prepared with extra food.) Have each student complete the [Where Does My Food Come From? Activity Sheet](#) by using [National Geographic's Mapmaker Interactive](#) to find the distance between their food's country of origin and the town in which they live. Instructions are found on the activity sheet. Compare the distances and determine whose food traveled the farthest and shortest distances. What are some possible reasons the food traveled so far? Discuss how the climate of a particular location affects what foods can be grown there. Identify the different jobs involved in getting food from the farm to the table (e.g., grower, harvester, truck driver, packagers, processors, warehouse operators, grocers etc.).

### **Tips and Caveats:**

- You can adapt the recipe to utilize seasonal produce! You can make soup, tomato sauce, pumpkin seeds, or anything that can be purchased as a "processed food" inside of grocery stores. Use this seasonal produce guide to inspire you: <http://recipes.latimes.com/produce-guide/>. Refer to the weekly Food Bank ordering form to see what local produce you can procure for free.

## Adaptations for K-2

Omit academically rigorous classroom discussions and instead hold up an orange and ask students where they think the orange came from.

Have children learn through a play: Use the “Life of an Orange Script” (linked in materials section). Have 10 brave children be the actors and let all of the other kids narrate. How would the story be different if that orange were to be made into an orange juicicle to be sold at the grocery store?

Provide more assistance and guidance to groups when making the juicicles. Review the steps the orange went through to become a juicicle at a grocery store and have children determine the cost.

### **Cited Curriculum:**

LifeLab - The Growing Classroom: [Eat a Rainbow](#) and [Rainbow Smoothie](#)

National Agriculture in the Classroom: [Who Grew My Soup?](#)