



From Seed to Sip: Journey of orange juice

Grade Level: K-12 (can be adapted for specific ages)

This project introduces students to the historical, agricultural, and environmental journey of oranges from orchard to glass. By examining the lifecycle of oranges and their processing into juice, students gain insights into global agriculture, food science, sustainable practices, and the carbon footprint of everyday foods.

Driving Question:

How does the journey of oranges from orchard to juice glass illustrate the connections between trade, agriculture, environment, and sustainability, and what choices can we make to reduce its environmental impact?

Key Inquiry Questions:

1. What factors helped spread oranges around the world, and what roles did ancient trade networks, like the Silk Road, play in this journey?
2. How are oranges grown and harvested, and what environmental challenges are involved in orange cultivation?
3. How is orange juice produced, preserved, and distributed, and what are the environmental and economic impacts of these processes?
4. How can sustainable practices in farming, packaging, and transportation make orange consumption more eco-friendly?

Supporting Video Material:

Oranges Part 1, 2, 3 and 4

Examples of Possible Activities:

1. **Mapping the Orange's Journey (History and Geography):**
 - **Activity:** Students research and map the journey of oranges across continents—from their origins in Southeast Asia to Europe, the Americas, and beyond. They label historical trade routes and key areas where oranges were first cultivated outside of Asia.
 - **Objective:** This helps students understand the role of trade networks like the Silk Road and explores how climate, trade, and culture helped popularize oranges worldwide.
2. **Environmental Impact Report (Science and Sustainability):**
 - **Activity:** Students investigate the environmental effects of orange farming, processing, and transportation, focusing on factors such as water usage,



fertilizer impact, energy consumption in processing, and greenhouse gas emissions in transport.

- **Objective:** Students write a report or create a presentation evaluating these impacts and propose changes, such as using renewable energy in juicing plants or reducing pesticide use in orchards.

3. Food Science Exploration (Technology and Processing):

- **Activity:** Students conduct an experiment by juicing oranges using different methods (manual juicing vs. machine juicing) and investigate the properties of fresh vs. pasteurized juice, learning about the processes of filtration, pasteurization, and packaging.
- **Objective:** This activity provides a hands-on understanding of food preservation methods, sensory differences, and how processing methods impact taste, texture, and nutritional quality.

4. Comparing Global Orange Markets (Economics and Trade):

- **Activity:** Students choose two major orange-producing countries, such as Brazil and Spain, and compare their production methods, challenges (like disease or climate), and trade routes. They then map how oranges from these regions reach other parts of the world and discuss the economic impacts on local economies.
- **Objective:** This activity introduces students to global trade dynamics and the concept of economic interdependence in agriculture.

5. Creating a Waste Reduction Plan (Sustainability and Consumer Impact):

- **Activity:** Students research the waste generated from orange consumption, including peel waste, unused juice, and packaging. In small groups, they design a "Waste Reduction Plan" that offers practical ways to repurpose or recycle orange byproducts, such as composting peels or reusing packaging.
- **Objective:** Students learn about waste management and consumer responsibility, exploring how small actions at the consumer level can reduce the overall environmental footprint.

Final Project Presentation:

Students will create a multi-part presentation that showcases their research and insights through the following components:

1. Interactive Map Display:

- A visual map of the orange's global journey with pins on key historical locations and descriptions of the orange trade's expansion, using either a physical map or a digital tool like Google Earth or an interactive board.

2. Environmental Impact Infographic:



- An infographic summarizing the carbon footprint of oranges from farm to juice glass, highlighting major contributors (like water usage, fertilizers, and transportation) and suggestions for reducing the carbon footprint.
3. **Food Science and Taste Test Booth:**
- A live demonstration (or recorded video) comparing fresh vs. processed orange juice, where students share findings from their food science exploration and offer taste tests to highlight the differences.
4. **Economic Impact Gallery:**
- A comparative display featuring key orange-producing countries, with infographics on production methods, economic significance, and challenges, alongside charts showing global trade patterns.
5. **Sustainable Consumption Guide:**
- A handout or poster that offers practical tips for consumers to reduce waste and make environmentally conscious choices, including composting peels, selecting eco-friendly packaging, and purchasing local or fair-trade options.

Assessment Criteria:

- **Research and Inquiry:** Ability to research and explain the orange's historical, economic, and environmental journey.
- **Presentation and Creativity:** Clarity and creativity in presenting findings through maps, infographics, and interactive elements.
- **Critical Thinking and Application:** Engagement in activities that connect theoretical knowledge with real-world applications in sustainability and trade.

Teacher's Tips for Implementing the Project:

- **Incorporate Local Context:** Encourage students to draw parallels with local fruits and their own consumption habits to personalize the lessons.
- **Promote Hands-On Learning:** Use juicing activities and taste tests to keep younger students engaged while building practical understanding of food processing.
- **Encourage Debate and Reflection:** Discuss the pros and cons of large-scale orange farming and processing, balancing economic benefits with environmental responsibilities.