



Lesson 2: Organic v. Conventional How do we grow our food?

Grade Level & Subject: 6-8 / Life Sciences

Lesson Duration: 50 minutes (with 10 and 30 minute extensions)

OBJECTIVES

- Students will identify and describe the key differences between organic vs conventional agriculture and engage in a thought activity about the advantages/disadvantages of both methods. By examining both sides, students will explore the various perspectives and develop critical thinking skills while considering the environmental, economic, and health implications of each farming method.
- Students will analyze how human and environmental factors influence sustainability in agriculture and make plans for an advocacy project that will improve agricultural and/or environmental systems in a way that is meaningful for them and/or their school community related to how food is grown, harvested, and used around the world.

Food Education Standards:	Content Area Standards:	This lesson also aligns to:
<p>FES5: Food impacts health.</p> <p>FES6: We can make informed food choices. <i>(Identify farm practices in organic and conventional agricultural methods for plant protection (e.g., using a pesticide, integrated pest management, cultural practices), the harvest of safe products for consumers, and strategies for housing for animal welfare and the safety of animal products (e.g., meat, milk, eggs).)</i></p>	<p>NGSS MS.LS4.5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.</p>	<p>WIDA Standard 1 - Language for Social and Instructional Purposes WIDA Standard 4 - Language for Science</p>

LESSON SYNOPSIS

Students will analyze conventionally grown and organically grown food in various ways to make an argument about which form of agriculture is best using a Claim→Evidence→Reasoning model.



LESSON PREPARATION

Prep Steps	Materials
<ul style="list-style-type: none"> • Get organic and conventional examples of food, from the ham sandwich in lesson 1, precut and prepared into sample size portions. • Review the lesson and make adjustments as needed for your class. Pre-assign partners/groups (if desired, random works too). 	<ul style="list-style-type: none"> • Enough produce so that each student gets to sample (ex. Organic and conventional lettuce, tomato, onion, and pickles). • Computer with internet connection and projector • 1:1 student devices (optional) • Teacher and Student docs (linked below) • Supplemental readings

VOCABULARY

- Conventional [*kuhn-ven-shuh-nl*] (adjective) - Farming practices that may include the use of genetically modified organisms, synthetic fertilizers, pesticides, and other chemical and biological inputs.
- Drawbacks [**draw**-baks] (noun) - something less acceptable or desirable; a disadvantage or problem that works against a goal
- Merits [**mer**-its] (noun) - the quality of being particularly good or worthy, especially so as to deserve praise or reward.
- Organic [*awr-gan-ik*] (adjective) - Farming methods that limit the use of certain practices, such as biotechnology, certain fertilizers, and pesticides.

LESSON ACTIVITIES

Teacher Note: These learning tasks and videos are available online for students with access to 1:1 technology, but they should use headphones when watching videos. If your students do not have access to technology, or you don't want them online, feel free to print off the documents. If students are working online. With all documents, please make a copy, do not request access.

Engagement in Phenomena (5 minutes):

- Remind students of the previous lesson they did for AgEd. What food was the focus of the class (a ham sandwich). What were the ingredients? (ham, cheese, tomato, onion, lettuce, bread, mayonnaise, pickles).
- Call attention to the 4 examples of organic vs conventional versions of the food you brought (make sure any labels of 'organic' are not visible to students!). Group all the organic examples together and the conventional foods together.



- Ask, what is the difference between all the products? Draw a hangman game on the board and make the clue _ _ _ _ _ [ORGANIC]
- After solving the puzzle, ask students who have heard the word **'organic.'** Ask if they think they can identify which group of produce are the products that were grown organically and which were grown **conventionally.** Have them explain why they think that.
- Have students brainstorm questions they have about organic and conventional farming practices.

Instruction (25 minutes):

- **10 minutes** - Introduce to students that while they think about their questions, you want them to answer the question, "Which type of agriculture is better: organic or conventional?"
- Remind students that the feedback they got on their exit tickets from lesson 1 was based on the Claim, Evidence, and Reasoning model (C-E-R). Explain that this is a science-based framework that is used at every level of scientific investigations to find credible answers. Review the rubric with students:

	Excellent	Acceptable	Basic	Not Complete
Claim - An assertion that something is true	Makes a claim that is sufficient to answer the question and is coherent.	Makes a claim that is sufficient to answer the question or is coherent	Makes a claim but it is not sufficient or coherent enough to answer the question	Does not attempt to make a claim.
Evidence - Support for your claim	Sufficient evidence is provided to support the claim and it is coherently presented	Sufficient evidence is provided to support the claim or it is coherently presented	Evidence is provided to support the claim but it is not sufficient or coherently presented	No evidence is provided to support the claim
Reasoning - Explain how/why your evidence supports your claim and conclude the argument	Includes all of the following: describes how the cited evidence defends the claim concludes the argument in a logical way reader feels compelled to accept your argument	Includes two of the following: describes how the cited evidence defends the claim concludes the argument in a logical way reader feels compelled to accept your argument	Includes one of the following: describes how the cited evidence defends the claim concludes the argument in a logical way reader feels compelled to accept your argument	Includes none of the following: describes how the cited evidence defends the claim concludes the argument in a logical way reader feels compelled to accept your argument

- Explain that students are going to make an argument based on the C-E-R framework about what type of agriculture is best: organic or conventional.
- Show the video Pilot Light Video: English <https://vimeo.com/757651343> : Spanish <https://vimeo.com/757651788>



- Put a 'T-chart' on the board or anchor chart and record student ideas about which type of agriculture is best. Make sure students back up any ideas they have with evidence (probably from the video) as evidence. If students cannot provide evidence to support their claims, don't put it on the board.
- **10 minutes** - Explain that it is generally understood that one of the most important aspects of food is taste. Distribute the materials and food for the taste test. Ensure that they get an organic and conventional sample of each food, but do not let them know which is which. Have students conduct a taste test using the various organic and conventional food samples, recording observations, and working to identify the type of food (organic or conventional), and explaining their choices on the handout.
- **5 minutes** - Hand out the Venn Diagram and facilitate a class discussion about the observed differences and similarities or organic vs conventional produce, comparing and contrasting students' thoughts and trying to determine any patterns or general trends.

Elaborate & Assessment (15 minutes):

- Briefly introduce the 4 Pillars of Agriculture with the 4 Pillars of Agriculture handout. Explain that these pillars, along with the ham sandwich!, will be driving the lessons throughout the unit.

The Four Pillars of AgEd & Advocacy

<p><i>Each pillar becomes dynamic and fully alive through advocacy. The future of agriculture needs the ideas, actions, and experiences of young people.</i></p>			
Food Education	Growth for All	Environmental Action	Common Ground
Agriculture is a defining facet of our food systems; it promotes informed decision making for healthy futures.	Agriculture is a changing industry ripe for innovation with a wide range of careers that provide economic pathways for individuals and communities.	Agriculture is both a cause and a solution for climate change that requires social, scientific, and community driven action.	Agriculture is an entry point for thinkers of all backgrounds to come together and bridge urban & rural divides.

- After handing out the learning activities, do a quick class brainstorm around the question: What challenges or issues exist within agriculture that we are interested in exploring? Have students take notes on their sheet to return to later.
- Hand out the readings about organic vs conventional agricultural methods and reflection questions
 - [Organic vs Conventional](#)
 - [Organic food for thought](#)
 - [Comparing Conventional and Organic Agriculture](#)



- As individuals, in pairs, or groups of 3, have students go through the reading, add to the Venn Diagrams that they started from the taste test and video, and answer the 4 reflection questions.
- When they are done, have them check in with you, and if their Venn Diagrams look ok, give them the Claim, Evidence, Reasoning handout (assessment) to answer our question: Which type of agriculture is best: organic or conventional? There is really no correct answer (organic, conventional, both, or neither), as long as students provide sufficient evidence as stated in the rubric and convincing reasoning. Students should draw evidence from all sources.

Closing & Assessment - (5 minutes)

- Facilitate a class discussion to summarize the key takeaways from the lesson, emphasizing the Can all crops/livestock be grown anywhere and everywhere? How do humans have to change the environment to support agriculture? Highlight the findings that not all organisms need the same things to survive, and that specific conditions must be met for organisms to thrive.
- Review the concepts of **interconnectedness** between food and the environment, **sustainability**, and **advocacy**. Explain to students that people have different means and needs of growing, harvesting, and using agricultural products around the world, how do we make sure we maintain that over time? What factors are most important to me, to us, and to all? Advocacy is the willingness and ability to advocate (speak up) for a cause or belief that you think is important to create change. For the advocacy project, will students want to work on a project that advocates for them, for their communities, for all communities?

CONSIDERATIONS (What adaptations are needed for diverse learners and/or varying dietary needs?)

- Some students may be allergic or not like one/all of the food. Do not force anyone to eat the food, rather, engage students in an empathetic way, validating their concerns and use the opportunity to discuss different diets around the world, in the USA, and in the school community.
- Diverse readings, videos, and visuals were provided, but some students may need support in applying their learning. Support as needed.
- Make sure students have access to language support such as Google Translate.

STUDENT SHEETS AND ASSESSMENTS

- Exit ticket available at the end of the student sheets on the next pages



EXTENSION IDEAS

Short (10 min): The average American household spends \$260 per week on food ([source](#)). Have students go to [Instacart](#) and see what they can/would buy for \$260. Would that be enough to feed their entire household? How/why?

Long (30 min): Debate!

1. **5 minutes** - Review the concept of organic farming and conventional farming. Briefly discuss the basic principles, practices, and key differences between the two methods. b. Engage the students by asking open-ended questions to gauge their prior knowledge and opinions on the topic.
2. Group Formation a. Divide the class into two groups: Group A (advocates for organic farming) and Group B (advocates for conventional farming). Encourage students to select the group they feel most aligned with or assign them randomly if needed. a. Each group should assign roles within their team, such as a speaker, researcher, or rebuttal specialist, to ensure that all members are actively involved in the debate. b. Groups should discuss and organize their arguments, considering both the strengths and weaknesses of their farming method. Encourage critical thinking and the development of persuasive arguments.
3. Research Phase (**10 minutes**): a. Provide each group with ample time to conduct research on their respective farming methods. Encourage students to gather information from credible sources, heavily using the sources provided, but they can look online too. b. Emphasize the importance of considering various aspects such as environmental impact, cost-effectiveness, food safety, and nutritional value. Encourage students to take notes and compile relevant evidence to support their arguments.
4. Debate (**10 minutes**): a. Allocate a specific amount of time to each group for presenting their arguments and counter-arguments. b. Set ground rules for respectful and constructive debate, including guidelines for turn-taking, listening, and addressing opposing arguments. c. Group A presents their arguments supporting organic farming, followed by Group B presenting their arguments supporting conventional farming. d. After each group presents their main points, allow time for rebuttals, counter-arguments, and questions from the opposing group. e. Encourage students to engage in a healthy, evidence-based discussion while respecting different viewpoints.
5. Conclusion and Reflection (**5 minutes**): a. Facilitate a class discussion reflecting on the debate. Ask students to share their thoughts, insights, and any changed perspectives they may have gained through the process. b. Summarize the main points discussed during the debate, highlighting the advantages and considerations of each farming method. c. Conclude the lesson by emphasizing the importance of critical thinking, research, and respectful discourse in addressing complex issues.

**REFLECTION AND NEXT STEPS**

Activities that worked	Topics to revisit	Community extension opportunities



Name _____ Class _____ Date _____

STUDENT SHEET: The Four Pillars of AgEd & Advocacy

The Four Pillars of AgEd & Advocacy

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This lesson mostly approached Food Education and Growth For All.. What challenges or issues exist within agriculture that we are interested in exploring?



Name _____ Class _____ Date _____

STUDENT SHEET: Lesson 2 - Organic vs Conventional Food Production: *Claim, Evidence and Reasoning*

Directions: Follow the Claim, Evidence, and Reasoning model below as you analyze organic vs conventional farming practices used in the production of our food.

Question: Which type of agriculture is better: Organic or Conventional?
Claim: <i>State an answer to your question.</i>
Evidence: <i>Relevant observations and reliable information that supports your claim.</i>
Reasoning: <i>Link the claim to the evidence by explaining <u>how</u> the evidence supports the claim.</i>

Adapted from: <https://www.chemedx.org/blog/%E2%80%9Cscience-reasoning-rubric%E2%80%9D-support-argumentative-writing>

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Name _____ Class _____ Date _____

Can You Taste the Difference? Organic vs. Conventional

Adapted from: https://cdn.agclassroom.org/media/uploads/2019/03/27/Claim_Evidence_Reasoning-Organic_vs_Conv.pdf

Sample	Describe the Size & Shape	Describe the Color & Appearance	Rate the Taste out of 10	Which method of production do you think this is?	Explain your choice:
Lettuce #1					
Lettuce #2					
Tomato #1					
Tomato #2					
Onion #1					
Onion #2					
Pickles #1					
Pickles #2					



Name _____ Class _____ Date _____

Reflection Questions

To discern the difference between organic and conventional farming, think of an analogy. Imagine you need to accomplish a task such as cutting down a large tree from your backyard. You could use a variety of tools. You could use an ax, a handsaw, a chainsaw, or even an automated tree harvesting machine. Each of these methods have different pros and cons in different circumstances. The ax or the handsaw would be the cheapest, but would require the most time and physical exertion to complete the task. The chainsaw or automated machine would require much less work, but would cost more and might be more difficult to find. Farmers also use tools to produce our food and must analyze the pros and cons of each tool used in the production of our food. There are tools to manage weeds, tools to eliminate harmful pests, tools to improve soil nutrients, tools to improve water efficiency, etc. A conventional farmer can use a wider variety of tools including genetically modified seed, synthetic fertilizer, and pesticides. Organic farmers cannot use genetically modified seed and have fewer options for fertilizer and pesticide.

The biggest problem with the debate over “organic” and “conventional” crops is that it leaves the impression that there are only two ways to grow food... a “good” way and a “bad” way. The most important problem to be solved is discovering the best way to feed a growing world while also reducing the amount of land, water, and energy that is required. Reflecting on what you have learned, answer the following questions:

1. What are the merits and drawbacks of conventional farming methods?

2. What are the merits and drawbacks of organic farming methods?

3. How can both farming systems help provide an adequate food supply for a growing population?

4. What misconceptions could consumers have about organic/conventional food production?



Organic vs Conventional Food Production

