



Go 'O' No

by Mary Beth Bauer

Audience: 9-12 grade

Activity Length: *Note: These are suggested times, but the full lesson length will depend greatly on classroom structure and student pace. Day 1: 30-45 minutes; Day 2: 50-60-minute class period; Days 3,4,5: 50-60-minute class period

TEKS:

English

- English I §110.36.c
 - 1.A, 1.C, 1.D, 3, 4.G, 5.D
- English II §110.37.c
 - 1.A, 1.C, 1.D, 3, 4.G, 5.D
- English III §110.38.c
 - 1.A, 1.C, 1.D, 3, 4.G, 5.D
- English IV §110.39.c
 - 1.A, 1.C, 1.D, 3, 4.G, 5.D

Science

- Biology §112.42.c
 - 1.A, 1.B, 1.C, 1.E, 1.F, 1.H, 3.C, 4.B, 4.C
- Environmental Systems §112.50.c
 - 1.A, 1.B, 1.E, 1.F, 1.H, 3.C, 4.B, 4.C, 6.A, 11.C, 12.C

Agriculture, Food, and Natural Resources

- Principles of Agriculture, Food, and Natural Resources §130.2.c
 - 1.B, 3.B, 4.B, 4.E, 6.A, 6.B, 11.B, 11.D, 11.E, 13.B, 13.C, 15.A, 15.B
- Advanced Plant Science §130.25.c
 - 1.B, 15.E, 18.C

Objectives:

- Describe the characteristics of organic and inorganic fertilizers.
- Design and implement an investigation comparing the productivity of selected plants when grown with different types (organic and inorganic) of fertilizers.
- Compare and contrast the advantages and disadvantages of organic and traditionally produced crops.
- Relate consumer choice to changes in agriculture.

Engage and Explore (Day 1)

1. Provide variety of organic and not-organic food sources for students to view (and eat if all safety protocols are followed).



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- Discuss any differences in appearance and taste.
 - Discuss family buying habits – organic or not.
 - Discuss what the students think organic means.
2. Assign pairs of students the following terms. Their job is to find the definition and an example of each and share with the rest of the class during the last 20 minutes of class:
- Fertilizer
 - Organic fertilizer
 - Inorganic fertilizer
 - Organic crop
 - Food productivity
 - Organic farming
 - Parts of a fertilizer label
 - Green revolution

Explain and Elaborate (Day 2)

1. Assign lab groups the inquiry task of designing and setting up an experiment that compares the productivity of a plant* when grown with organic fertilizers as opposed to inorganic fertilizers. Design must include the controlled variables and a specific measure of productivity as well as specific procedures for setting up the experiment. Instructor must approve the experiment.
2. Materials available include the following: vegetable plants or ryegrass seeds (*teacher preference), soil, appropriately sized containers, light source, one organic fertilizer, one inorganic fertilizer, measurement equipment for fertilizer and water.
3. Students will set up the experiment and record any initial observations/measurements. This may not happen until Day 3, depending on how the first part of Day 2 goes.

Explain and Elaborate (Day 3-4)

1. Students will watch each of the following You Tube videos:
 - a. <https://www.youtube.com/watch?v=SNe8R2iQQqY> (Organic vs Chemical Farming)
 - b. <https://www.youtube.com/watch?v=1dKUhUN5Yx4> (Organic vs Conventional Farming)
 - c. https://www.youtube.com/watch?v=Pi_jtoHENW4 (Conventional vs Organic Farming ... Which One)
2. Students will read the following History of Organic Farming:
 - a. <https://www.sare.org/Learning-Center/Bulletins/Transitioning-to-Organic-Production/Text-Version/History-of-Organic-Farming-in-the-United-States>



3. Student groups will then prepare a short video using iMovie, Flipgrid, or another platform. The purpose of the video is to both share the pros and cons of organic and conventional food production AND to take and support their personal stand on the issue. Students will have 2 days to prepare and submit videos; these will be previewed by the instructor and watched and discussed during class.

Evaluate (Day 5)

1. When either ryegrass has grown enough to measure or food production has occurred (if using vegetable plants), students will complete the experimental portion of the lesson.**
2. Students then will complete the lab write-up using their data. (*Note: See a lab write-up rubric below)
3. Finally, students will write a 3-5 paragraph persuasive paper that relates their original video stance on organic vs. conventional with their experimental results.

**Other lessons pertaining to agriculture/food production/sustainability will be completed in the intervening days between starting the investigation and finishing the investigation.

Other lessons could include:

- Cost of Food activity (found in the old Project Wild books)
- IPM activities found here: <https://www.ipm.iastate.edu/module-1-introduction-ipm>
- Texas Farm Bureau Plant Pests lesson found here: file:///C:/Users/jwalker1/Downloads/PlantPests_OnlineLesson.pdf
- Food Evolution video found on Amazon (watch/discuss/write about it/create a viewing guide)



Lab Write Up – Organic vs Conventional Fertilizers

5 pts	Title Page
5 pts	Purpose
5 pts	Hypothesis
5 pts	Materials
5 pts	Specific procedures
5 pts	Safety requirements
5 pts	Independent, dependent, and controlled variables
10 pts	Data chart
10 pts	Descriptive paragraph of qualitative observations (plant/food color, quality, etc.)
20 pts	Graphical representation of data
25 pts	Conclusions and Analysis – must include the answers to the following questions:
	<ul style="list-style-type: none">• What did your results indicate concerning productivity with organic vs inorganic fertilizer?• Copy and interpret the fertilizer label from the conventional fertilizer.• Copy and interpret the fertilizer label from the organic fertilizer.• Describe at least two specific sources of error and explain how they could be mitigated.• Can these results be applied to all food crops? Why or why not?