TNCore

Food Science and Safety – FFA Agricultural Issues Forum

CTE Common Core State Standards Aligned Lesson

This resource is best for:

Teachers of:	Food Science and Safety*	**Career Cluster:**	Agriculture, Food, and Natural Resources
Addressing Standard(s):	Food Science Trends and Issues: 15*	**Grade-Band:**	9-10, 11-12
In alignment with CTSO:	FFA – The National FFA Organization www.tnffa.org	**CTSO Event:**	Agriculture Issues Forum

*This lesson can also be adapted for use in other courses with other standards requiring research and presentation of the pros and cons of issues in an informative/explanatory manner. In standards requiring that students present two sides of an issue and then argue for one side of the issue, this lesson can be taken a step further in an argumentative manner to accommodate that aspect of the standard.

Learning Objective: The goal of this activity is to develop a student's ability to research and present both sides of an issue, in this case controversial advanced food technologies, while practicing the skills necessary to become proficient in the Common Core State Standards for Literacy in Technical Subjects. Teachers can use this activity to develop an understanding of food science trends and controversial issues in food technology to meet Standard 15 in the course. Discussions in class, reading, researching, and writing exercises are coordinated in class to help students construct a technical meaning of their research in a way that "sticks."

The following should be used during this teaching:

- Essays should be evaluated using the 2013-14 Tennessee 9-12 ELA Informative/ Explanatory Rubric, found at http://www.tncore.org/sites/www/Uploads/TNCORE/Rubrics/InfExpRubric-Gr9-12-Literacy.pdf

CTSO Competition Overview: The purpose of the Agricultural Issues Forum CDE is to provide an opportunity to expose students to the selection, research, planning, and presentation of an agricultural issue. The competitive event guidelines needed for this activity are:

- Agriculture Issues: You can download the CDE Handbook on www.tnffa.org or reference the National CDE rules at www.ffa.org.

Common Core State Standards for Literacy in Technical Subjects addressed by activity		
Strand	**Grades 9-10**	**Grades 11-12**
CCSS Reading for Technical Subjects: Key Ideas and Details	**1.** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	**1.** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
	2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	**2.** Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
CCSS Reading for Technical Subjects: Craft and Structure	**4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.	**4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
	6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	**6.** Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
CCSS Reading for Technical Subjects: Integration of Knowledge and Ideas	**9.** Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	**9.** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
CCSS Writing for Technical Subjects: Text Types and Purposes	**2.** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a) Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b) Develop the topic with well-chosen,	**2.** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a) Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

	relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c) Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d) Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e) Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f) Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	b) Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c) Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d) Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e) Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
CCSS Writing for Technical Subjects: Production and Distribution of Writing	**4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	**4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
Tennessee CTE Standards addressed by activity		
Food Science and Safety	**Food Science Trends and Issues** **15.** Research major development trends in the food science industry by analyzing documents authored by for-profit companies and lobbying organizations, defining the question each seeks to address. Compare and contrast the use of advanced technologies in food production, such as but not limited to biotechnology, irradiation, and genetically modified organisms (GMOs), citing specific textual evidence. Summarize technology principles, process effects, and consumer concerns, referencing the extent to which reasoning and evidence presented for each supports specific claims.	

What key insights should students take from this activity?
1. Agricultural biotechnology includes a group of controversial food production technologies with the potential to feed an ever-increasing world population while enhancing environmental stewardship. 2. Food irradiation is a food processing technology used to preserve food, decrease risk of food-borne infection, prevent the spread of pests, and delay ripening, among other benefits, amid public controversy regarding destruction/reduction of vitamin content of foods, destruction of good bacteria as well as bad, possible mutagenesis of bacteria leading to antibiotic resistance, and the possible carcinogenic effects of eating irradiated foods. 3. Advanced food technologies resulting in genetically modified organisms (GMOs – genetically modified crops and other uses of genetic engineering in food production) have an enormous effect on the food supply but not without controversies surrounding food allergies and other potential health effects, possible negative effects on the environment, changes in the gene pool of pests, along with other controversies.
Additional Resources
FFA Recommended References: • Agricultural Issues Forum CDE site on FFA.org for free practice materials • National FFA Core Catalog—Past CDE Material • National FFA Learn – Free Past CDE Questions and Answers • Focusing on Agricultural Issues Instructional Materials • Agriculture Issues Forum Presenter's Guide • Helpful Hints for the Ag Issues CDE from National FFA

Potential Lesson Plan Design:

Day 1

Set: Bring in a food item that is different today because of a controversial food technology process, e.g. an ear of corn, a bottle of canola oil or some other possibly GMO or irradiated food or food product and set it in front of the class. Ask students to work in groups to list everything they know about the product in three minutes. Have groups take turns sharing one item at a time with the class as you record on the board. If no one identifies anything about how the food was developed or processed, ask leading questions to lead the group to the specific technology that was incorporated into the specific food item. Once the class has identified the food technology used in developing or processing the food item, move into the lesson.

Topic under Discussion	Guiding Questions
Brainstorming controversial food technologies	1. Do you think the corn that we eat or the corn we use for animal feed has always been pest and drought resistant out in the fields? How did it become more pest and drought resistant over the years to result in increased production? 2. Does canola oil come from the canola plant? Since it comes from the rapeseed plant, why don't we call it rapeseed oil? What are the issues surrounding human consumption of rapeseed oil and how has this been addressed to result in canola oil, one of the most popular and healthiest oils on the market? 3. How can the microorganism count on fresh foods be decreased while increasing their shelf life without changing the wholesomeness of these foods?

Lesson: Write the title *Food Production Technology* on the board with three columns below it titled *What We Know*, *Pros*, and *Cons*. During the first 10-15 minutes of class, lead a brainstorming session in which students identify their current knowledge and beliefs on the issues surrounding trends in food production and technology, such as biotechnology, irradiation, and GMOs. Other technologies may be identified by the students or the teacher. The teacher should guide the class until all of the technologies that the teacher wants to cover in this lesson are listed on the board. This will give you an understanding of what your students already know or do not know about the topic prior to diving in to their research.

To transition to the next activity, divide the class into groups of 3-7 students, depending on teacher's preference. The FFA Agricultural Issues Forum event allows 3-7 students per team but the teacher should select group sizes that work for the particular class.

Each group should first identify the specific technologies (such as biotechnology, irradiation, GMOs, or others) that will be researched and addressed by their group in this activity and assign one topic to each group member. Each member of the group should spend the remaining class time gathering relevant information on his/her specific topic from multiple sources to select the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples. Students should determine the meaning of words and phrases as they are used in each resource and evaluate the authors' differing points of view on the same issue by assessing the authors' claims, reasoning, and evidence.

Day 2

Provide the students with the following guiding questions regarding the specific food technology's use in food production to use along with their research from Day 1 in constructing their informative essays. Each student should write their own essay describe the chosen technology and its pros and cons, and address the guiding questions while including the citing of specific textual evidence. Students should include a bibliography citing specific resources used in their research.

Topic under Discussion	Guiding Questions
Multiple authoritative sources students used in conducting this research on controversial food technologies	1. Why is the use of current food technologies such as biotechnology, GMOs, and irradiation important to today's consumer and economy? 2. What is the nature of the controversies surrounding the use of this technology in food production? 3. What organizations and/or companies are involved in this issue? 4. What is the historical background of controversies surrounding use of this technology? 5. What caused the controversy of the use of this technology? 6. What are the claims and the counterclaims of the use of this technology? 7. How strong are the claims and the counterclaims regarding this technology?

The teacher should evaluate the essays using the 2013-14 Tennessee 9-12 ELA Informative/ Explanatory Rubric, found at http://www.tncore.org/sites/www/Uploads/TNCORE/Rubrics/InfExpRubric-Gr9-12-Literacy.pdf.

Day 3

Students should divide back into their small groups to compile all of their research about the various technologies, compare and contrast findings from the first day's research and the essays, selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples.

Students should determine the central ideas or information from their group's research and individual essays and compile an accurate summary for the group including the citing of specific textual evidence (no more than two pages) along with a bibliography that makes clear the relationships among the key details and ideas for each guiding question from Day 2

Day 4

Students should divide into their groups to prepare for a maximum 15 minute presentation to debate their group's food technology issues using their pros and cons, supporting each with specific data, and evidence. The FFA competitive event requires that presentations be performed in official FFA dress. The teacher should communicate professional dress requirements to students if deemed important for this activity in the classroom. Costumes, props, skits and other creative paraphernalia may be used by the student as well if deemed appropriate by the teacher for this activity in the classroom. Each presentation must include:

1. Introduction
2. Pro
3. Con
4. Summary of Pro (including evidence and reasoning)
5. Summary of Con (including evidence and reasoning)

Students should be reminded that after each presentation, their group will be required to turn in their individual as well as group two-page essays and bibliographies. Group essays should be evaluated using the Tennessee 9-12 ELA Informational/Explanatory Rubric, found at: http://www.tncore.org/sites/www/Uploads/TNCORE/Rubrics/InfExpRubric-Gr9-12-Literacy.pdf.

Since this lesson is aligned with the FFA Agricultural Issues Forum competitive event which requires that students present both sides of the issue equally, students should not draw a final conclusion supporting one side over the other. Although students may have their own opinions, students should understand that the purpose of this competitive event is just to present an issue, not argue a side of the issue, and that in the competitive event, points would be deducted if they did. For the sake of the learning experience in the classroom, the teacher may require students to go one step further and draw a final conclusion supporting a pro or con viewpoint, thereby addressing CCSS for Literacy in Technical Subjects Standard 1.

Days 5 and 6

Group Presentations: Each group will be given five minutes for set up, 15 minutes for presentation, seven minutes for questions, and three minutes for tear down. Group presentations should be evaluated using the rubric included in the competition guidelines on page 28, http://www.tnffa.org/docs/4thEditionCDEHandbook.pdf.

Discussion	Sample Guiding Questions
Each group's summary and presentation materials	1. Why is it important that we discuss food technologies and their impact on our society and our economy? 2. What evidence do you have from your resources to support that comment/answer to my question? 3. Have the class ask questions of the presenters after each presentation. The teacher should provide constructive feedback to the presenters on the presentations. Students may be asked to turn in written constructive comments on the presentations if this feedback is desired by the teacher.

Additional Comments: The teacher can select students from this class activity to compete in the FFA Agricultural Issues Career Development Event. To qualify, students must present their issue at least five times in the community to meet the CDE requirements. Documentation of the forums may be used as additional class activities. Documentation may include:

1. Letters from organizations
2. News articles that include the date of the presentation and/or the date the article is printed
3. Photos showing attendance at forums along with independent documentation of the date of the forum presentation (3 X 5 or 4 X 6)
4. Independent documentation of the starting times of multiple forums when held on the same day
5. Scrapbook pages created about the forums

Scaffolding and support for special education students, English language learners, and struggling readers: Consider pre-teaching synonyms of difficult vocabulary words. Lower-level readers and ELL students can still be challenged without being overloaded with difficulty. This strategy can also be used to differentiate for stronger readers by introducing new, and more challenging, vocabulary. Struggling readers would also benefit from visual aids to illustrate many of the ideas presented. A few pre-selected references, pictures, diagrams, and charts alongside the text will go far to aid students as they dissect these resources provided by the teacher.

Note: Social, ethnic, racial, religious, and gender bias is best determined at the local level where educators have in-depth knowledge of the culture and values of the community in which students live. TDOE asks local districts to review these materials for social, ethnic, racial, religious, and gender bias before use in local schools.