Corn Controversy Debate:
Does Using Corn as Fuel Make Sense in the Face of Rising Food Insecurity?

Lesson Overview:
This lesson focuses on the controversy surrounding the use of food crops, such as corn, in the production of the biofuel ethanol. The push to diversify energy sources and lessen dependence on fossil fuels has led to the growing use of ethanol as a transport fuel in the U.S., but using corn for cars means less is available to use as food, and prices are higher. The controversy has been heating up in 2012 as record droughts have decimated the U.S. corn crop. In this lesson, students research the issue and take part in a roundtable debate over whether the U.S. should continue to mandate the diversion of corn into biofuel production. The lesson was developed based on information presented at the University of Chicago Center for International Studies 2012 Summer Teacher Institute, “Feeding the World: Challenges to Achieving Food Security.”

Written By: Deanna McBeath, Middle School Science Teacher, Bernard Zell Anshe Emet Day School, Chicago, IL

Subject(s): Social Studies, Service-Learning, Human Geography, Civics, Current Events, General Science, Earth or Environmental Science

Suggested Grade Level(s): 6-10

Time Duration: Two to five 40-45 minute class periods (depends on class size, age of students, and other factors)
Common Core State Standards Addressed:

Common Core Reading Standards for Literacy in History/Social Studies

Craft and Structure, Standard 6
- Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts). (Grades 6-8)
- Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts. (Grades 9-10)

Integration of Knowledge and Ideas, Standard 7
- Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts. (Grades 6-8)
- Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text. (Grades 9-10)

Integration of Knowledge and Ideas, Standard 8
- Distinguish among fact, opinion, and reasoned judgment in a text. (Grades 6-8)
- Assess the extent to which the reasoning and evidence in a text support the author’s claims. (Grades 9-10)

Common Core English Language Arts Speaking & Listening Standards

Comprehension and Collaboration, Standard 1
- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others’ ideas and expressing their own clearly. (Grade 6)
- Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. (Grades 9-10)

Presentation of Knowledge and Ideas, Standard 4
- Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. (Grade 6)
- Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. (Grades 9-10)
Objectives:

• Students will read nonfiction texts for information about corn ethanol biofuel.
• Students will think critically about multiple perspectives on the biofuel controversy and use graphic organizers to organize their information.
• Students will develop reasoned arguments for and against U.S. government support of corn ethanol production and use.
• Students will utilize public speaking skills to present and defend their positions in a debate format.
• OPTIONAL: Students will synthesize their knowledge of the corn-ethanol biofuel controversy into a persuasive paragraph defending their own personal viewpoint.

Materials:

• Chart paper and markers OR dry erase board and markers OR interactive whiteboard
• Access to computers with Internet for reading and information-gathering; OR pre-printed copies of selected articles and resources listed in Stakeholder Position Cards (also in “PRO/CON Information & Resources Table for Corn Biofuel Debate”; note: this table is intended for teacher use in implementing the lesson, not for handing out to students in its entirety. Students who are assigned specific roles in the discussion should be given the summary and resource links for their position only.)
• Copies of Stakeholder Position Cards – one per student, or one per pair of students (Pairs or groups of 3 are recommended. Teacher can use all cards or choose which to use, depending on class size and available time for this lesson.)
• Copies of “Graphic Organizer for Initial Research – Corn Biofuel Debate” and “Discussion Web Organizer for Corn Biofuel Debate” – these two can be printed on one page, double-sided – one per student.
• Pens/Pencils
• OPTIONAL: “Understanding Food Access As a Human Right” – video lecture, two PowerPoints, and related materials from Ray Offenheiser’s presentation at the University of Chicago Center for International Studies 2012 Summer Teacher Institute, “Feeding the World: Challenges to Achieving Food Security.”

http://cis.uchicago.edu/outreach/summerinstitute/2012/resources.shtml

Activities and Procedures:

1. Activate and assess background knowledge on the topic. Begin with a Think-Pair-Share on one or more of the following questions:
   • What is the difference between a renewable resource and a nonrenewable resource? Give an example of each.
   • What is a biofuel? [You can add, “Ethanol is a biofuel.”] What have you heard about biofuels? How are they different from other fuels?
• What does controversy mean? Why do different people have different opinions about controversial topics? Think of at least one reason people might disagree.

Take brief notes (on chart paper, dry erase board, or interactive whiteboard) of students’ ideas. Help to clear up misconceptions, if any about renewable vs. nonrenewable.

2. Depending on the level of background knowledge students bring, you may need to provide a definition of biofuel. Write the definition on the board. (From http://www.merriam-webster.com/dictionary/biofuel: “a fuel (as wood or ethanol) composed of or produced from biological raw materials” – or choose another definition, if you prefer.)

3. Explain that one very controversial topic in America and the world today involves the production and use of biofuels, especially ones made out of products like corn that are also used as food. It is an extremely complicated issue. Many different people and organizations and governments have different views about this issue. Scientists are working hard to study the issue, trying to make it easier for people to understand and make decisions about, but different scientists sometimes even disagree about the facts. In this lesson, we are going to learn about this complicated issue by reading different perspectives, taking on different roles, and holding a roundtable discussion and debate about the issue.

4. Assign students to groups and distribute materials – the Stakeholder Position Cards and the associated readings (either paper copies or computers with internet access). Teacher has flexibility with group arrangement. There are 14 different Stakeholder Position Cards (12 if you plan to give each group a copy of the first two “general” pro and con cards). Ideally students will be in partners or groups of three. If time is limited, not all positions need be represented. Difficulty level can be differentiated based on the number of sources listed on the card (more sources = more challenge).

5. Research time: Allow the remainder of this first class period, plus one more (as time allows), for students to read their sources and take notes on “Graphic Organizer for Initial Research – Corn Biofuel Debate.” When sufficient research has been conducted and students have a good grasp of their assigned stakeholder’s position, they are to write a brief position statement summarizing their stakeholder’s position on the question, “Should the United States government continue to support the diversion of large amounts of the corn crop into the production of the biofuel ethanol?” Alternatively, research and position statements can be continued and/or completed as homework.

6. Debate, Phase 1: To begin, groups on either side of each opposed stakeholder-pair (such as “Vehicle Owners–Pro” and “Vehicle Owners–Con”) get together to share their position statements, test out their arguments, and learn the opposing viewpoint. This can be done informally, with small groups breaking out around the classroom, or can be structured more formally as an Inner Circle/Outer Circle Debate (see Hopkins, 2011 – http://www.educationworld.com/a_lesson/03/lp304-01.shtml for details.)
7. **Debate, Phase 2:** Now that students have a more well-rounded understanding of both the pros and cons of growing and using corn biofuels from their narrow stakeholder vantage point, it is time to broaden the conversation. Regroup the students into two large groups – all PRO stakeholders in one group and all CONs in the other.
   - If time permits, you may structure Phase 2 as a formal Lincoln-Douglas-style debate – in this case, assign specific roles in the debate (as described by Hopkins, 2011) and spend at least one entire class period having students share their various arguments and work together in their PRO/CON groups to craft debate speeches. This will take 2-3 class periods.
   - If time only permits one class period, structure Phase 2 as a tag-team debate, role-play debate, or general fishbowl discussion (Hopkins, 2011).

8. Provide closure to lesson by doing an exit slip and/or allowing time for students to begin work on the homework paragraph (see below).

**Assessments:**

- Exit Slip: What do you now understand (that you didn’t before) about the biofuels controversy? What questions are you still thinking about?

- For homework (optional), assign a position paper (one paragraph for 6th-7th grades; essay-length for upper grades) asking students to state and defend their own personal position on the question of corn ethanol production in the U.S.

- Extension: Find and bring in a current article (published in the past month) that discusses this issue. Be prepared to summarize the article, explain how it connects to and builds upon the topics discussed in class, and give your opinion and/or predictions about future policy.

**Adaptations:**

Differentiation can be achieved by assigning positions with fewer listed sources to struggling readers or modifying homework expectations. All assessment measures can be adapted to fit your population. Some students may be graded simply on how much their thinking grew, their willingness to participate, and helpfulness to others. Additionally, teachers are encouraged to adapt the readings to student ability levels prior to assigning them for homework or using them in class. All materials can be shortened or adapted for language.

**Extra Credit/Additional Resources:**

Journey to Forever – Links to more biofuel lesson plans: [http://www.journeytoforever.org/edu.html#biofuel](http://www.journeytoforever.org/edu.html#biofuel)
### PRO/CON Information & Resources Table for Corn Biofuel Debate

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OTHER ARGUMENTS & RESOURCES:

AVERAGE GLOBAL (NON-AMERICAN) CONSUMER – PRO:

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This can be used as general background information for the debate, or it can be turned into one of the perspectives represented in the discussion. Students representing this position may need to do independent research, using links above and below as a jumping-off point.

See also:

Biofuels, Environment, and Food: The Story Gets More Complicated
2011 Global Food Policy Report – David Laborde and Siwa Msangi, IFPRI
http://www.ifpri.org/node/8439

Interactive World Map with Food Statistics:
http://cironline.org/reports/map-world-food-statistics-2971

(Also see “Figure 6” from Offenheiser PowerPoint, copied below, for a map of relative food prices worldwide)

AVERAGE GLOBAL (NON-AMERICAN) CONSUMER – CON:

Internationally, many oppose corn biofuel production. Governments, individuals, and especially non-governmental organizations working on behalf of the world’s poor oppose the use of corn as fuel because it indirectly contributes to food insecurity, food crises, and famine in certain areas. When there is less corn available, prices rise; in America, we may end up paying a little more for our groceries, but in some other places, people end up having to pay two or three times as much money to get the same amount of food (see “Figure 6” from Offenheiser PowerPoint, copied below, for a map of relative food prices worldwide). Most Americans are not aware of how greatly people from around the world are affected by the availability and price of U.S. corn and other crops for sale on the international market.

UN Calls on U.S. to Reduce Ethanol Production, FT Reports – By John Deane - Aug 10, 2012

US Drought Could Cause Global Unrest
By Brandon Keim – July 24, 2012
http://www.wired.com/wiredscience/2012/07/drought-food-prices-unrest


US drought could pinch world's poor, says think tank IFPRI – Tue Aug 7, 2012
http://af.reuters.com/article/topNews/idAFJQE87600K20120807
## PROUD AMERICAN CITIZENS – PRO:

Citizens who care about an independent, economically strong America tend to argue in support of ethanol.
- They point out that the growth, production, and use of U.S. corn-based ethanol increases employment and helps the economy by creating thousands of ‘green’ jobs here in America.
- Using ethanol lessens our dependence on foreign oil, making us a stronger, more independent country. For many years, the U.S. has been involved in military operations in the middle east—prime oil-producing territory. Lessening our dependence on foreign oil may mean we can end or reduce our military involvement overseas and bring more of our troops home.

See general resources above (first box) for some of these arguments.

Current statistics on energy independence: [http://mtv.good.is/election2012/energy](http://mtv.good.is/election2012/energy)

## AVERAGE AMERICAN CONSUMER – CON:

American citizens might oppose corn ethanol production because it indirectly makes them spend more at the grocery store, especially when corn crop yields are low (as in 2012). Less corn on the market means higher prices for meat, eggs, and dairy products (from animals that eat corn) as well as for the myriad of American processed foods made with corn ingredients.

Worst U.S. Drought in 50 Years to Raise Food Prices in 2013 – By James West, Climate Desk – July 26, 2012

## AMERICAN CORN FARMERS – PRO:

Crop farmers who grow corn are pro- (for) ethanol production. They benefit when corn is made into biofuel because ethanol production guarantees a strong market for their crop and they can sell at higher prices. Corn farmers might also support a flexible ethanol policy if it could be used to stabilize corn prices.

National Corn Growers Association

“Ethanol Facts” from Iowa Corn:

## AMERICAN ANIMAL FARMERS – CON:

Livestock farmers who feed corn to their animals may be against corn ethanol production because it drives up the price of their feed (for cows, sheep, chicken, pork, and farmed fish).

Livestock Farmers Seek Pause in Ethanol Production
**VEHICLE OWNERS – PRO:**

Our policy of blending ethanol into gasoline is often argued to have lowered prices at the pump for American drivers.

*Ethanol’s Role in Reducing Gas Prices*
*Geoff Cooper – March 06, 2012*
*http://www.ethanolrfa.org/exchange(entry/ethanol
s-role-in-reducing-gas-prices/)*

**VEHICLE OWNERS – CON:**

Burning ethanol delivers less energy than gasoline (about a third less, depending on various factors). In some vehicles, especially older models, burning ethanol fuel may damage the engine by speeding up corrosion (rusting).

*Can E15 Gasoline Really Damage Your Engine?*
*http://www.popularmechanics.com/cars/alternativ
efuel/biofuels/e15-gasoline-damage-engine*

**ENVIRONMENTALISTS (1 – Land and Resource Use) – PRO:**

Growing, producing, and using biofuels is good for the environment because they are a renewable resource, unlike fossil fuels. This lessens our use of coal, oil, and natural gas, and it lessens the need to possibly damage more of our own natural areas (both land and sea) by opening them up to drilling.

See general resources above (first box) for some of these arguments.

For a good general breakdown of US energy use, see The American Energy Spectrum
*http://awesome.good.is/transparency/web/1101/good-energy/interactive.html*

**ENVIRONMENTALISTS (1 – Land and Resource Use) – CON:**

Growing, producing, and using biofuels is bad for the environment because these crops need lots of water and space to grow. As biofuels become more popular around the world, big corporations are doing “land grabs”—buying or leasing large plots of land for these and other crops. Where is this farmland coming from? Are we cutting down rainforests to grow biofuel crops? Are we taking land away from local small farmers or indigenous groups to grow our biofuels?

*http://cis.uchicago.edu/outreach/summerinstitute/2012/resources.shtml*

In Scramble for Land, Group Says, Company Pushed Ugandans Out
ca/in-scramble-for-land-oxfam-says-ugandans-were-
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Sources:


http://cis.uchicago.edu/
Graphic Organizer for Initial Research – Corn Biofuel Debate

Name(s) ______________________________________ Date ____________

STAKEHOLDER POSITION:

____________________________________________________________

(copied from the top of your Stakeholder Position Card)

QUESTION: Should the United States government continue to support the diversion of large amounts of the corn crop into the production of the biofuel ethanol?

REASONS – Circle one: PRO or CON

As you research your position, write facts that support your argument as bullet points in this box:

________________________________________________________________

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(Use a separate sheet of paper if you need more room!)

In the box below, write a 1-2 sentence statement from the point of view of the stakeholder you represent. Your statement should summarize your position, including the most important reasons you feel the way you do about this issue.

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http://cis.uchicago.edu/
Discussion Web Organizer for Corn Ethanol Biofuel Debate

**REASONS YES (PRO):**

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**QUESTION:**
Should the United States government continue to support the diversion of large amounts of the corn crop into the production of the biofuel ethanol?

- YES
- NO

**REASONS NO (CON):**

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**CONCLUSIONS:**

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PRO – General pro-ethanol arguments and resources:

Ethanol Lane [http://www.drivingethanol.org/ethanol_lane.html]

Growth Energy – America’s Ethanol Supporters [http://www.growthenergy.org/]

Choose Ethanol – Renewable Fuels Association [http://www.chooseethanol.com/]

American Coalition for Ethanol (ACE) [http://www.ethanol.org/index.php?id=1]


CON – General con-ethanol arguments and resources:

Oxfam America – GROW Campaign – one of their five points for action is “Stop giveaways to the corn-ethanol industry” [www.oxfamamerica.org/press/files/GROW-enough-for-everyone.pdf]

The Negative Impact of Corn Ethanol [http://smarterfuelfuture.org/assets/content/resources/infographic_negative_impact_of_corn_ethanol.png]

The True Cost of Corn Ethanol (opinion piece) by Joshua Kagan [http://www.greentechmedia.com/articles/read/the-true-cost-of-corn-ethanol/]
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See CIS Feeding the World Resources –

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