Biofuel Beliefs

Students use research skills to investigate various viewpoints surrounding the issue of ethanol as a fuel in Wisconsin.

Grade Level: 9–12 (5–8)

Subject Areas: Agriculture, Environmental Education, Language Arts, Science, Social Studies

Setting: Classroom, Library, Computer lab

Time:
Preparation: 30 minutes
Activity: Up to one week

Vocabulary: Energy input, Energy output, Ethanol, Net energy value (NEV)

Getting Ready: It may be helpful to involve the school librarian with research.

Academic Standards:
Common Core ELA: RL.9-12.1, RL.9-12.1i, W.9-12.1, W.9-12.1i, W.9-12.2&4&7-8

NGSS: HS-ESS3-1, HS-ESS3-4
SEP: Engaging in Argument from Evidence
CCC: Influence of Science, Engineering, and Technology on Society and the Natural World, Science is a Human Endeavor


Materials
- Copies of Ethanol Viewpoint Form
- Articles and Web sites on ethanol (see the Resources section of the KEEP Web site for BioFutures and the articles).

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should include reference information to help the reader find the resource, but it also identifies who authored the resource. (Knowing if the author is a member of a certain organization or receives funding from a particular agency can provide insight into motivations or influences behind the viewpoint presented).

- Everyone in the group should read all the sources, but each group member can be responsible for drafting the Ethanol Viewpoint Form for one of the sources. They should then meet as a group and share their work and edit and revise the form together.

4. After the groups have investigated at least two different sources of viewpoints about ethanol, have each group present their findings to the class.

5. When the students finish their presentations, have them post the Ethanol Viewpoint Form on the wall. Challenge the class to group similar or related viewpoints together. They can create a diagram similar to the one on the next page, where ethanol is in the center and the viewpoints are grouped around the center.

Closure
Have students summarize the various opinions presented in the diagram (Step 5). Were they aware of these different viewpoints before they conducted this research? Why do students think there are varying opinions?

Ask students to present their own viewpoints (compare to the survey conducted in the orientation). Do they find themselves agreeing with one or more of these viewpoints? Generate a list of questions about what else they would like to know about ethanol before they form an opinion.

Have students examine their energy use in relation to transportation.

NOTE: You can also conclude the activity with a debate on the pros and cons of using ethanol. You can divide students into groups and assign them each a role to play (farmer, politician, feed company president, investor, etc.).

Assessment

Formative
- Did students use effective research strategies to identify a variety of different viewpoints about ethanol?
- By reading students’ Ethanol Viewpoint Forms, can the reader quickly understand the viewpoint of the source?
- Were students able to group similar viewpoints together?

Summative
Have students write an informative article about ethanol and the various viewpoints involved. Encourage students to be objective and not to favor any viewpoint. Discuss the challenges with developing a paper of this format and the strategies they use to remain impartial. They can submit the article to the school newspaper or their local paper.

Extensions
Have students each pick a viewpoint and stage a debate.

Take students on a field trip to an ethanol production facility or invite staff from the facility to come be a guest speaker in the classroom.

Resources:
Ethanol Across America
www.ethanolacrossamerica.net/education.html
All About Ethanol
www.ethanol.org/
Renewable Fuels Association
https://ethanolrfa.org/
Growth Energy (America’s Ethanol Supporters)
https://growthenergy.org/
Opposition to Ethanol
www.energyjustice.net/ethanol/
**Pro-Ethanol Viewpoint**
- Net Energy Value (NEV) is positive
- Good for Wisconsin’s farming economy
- Low air pollutant emissions

**Anti-Ethanol Viewpoint**
- Net Energy Balance (NEV) is negative
- Not enough corn for food and/or feed
- More research needed

**Ethanol—(Issues)** Viewpoints that think there is not enough corn for food or feed. Viewpoints that think the Net Energy Balance is negative. Viewpoints that think the net energy balance is positive. Viewpoints that think there should be more research.