The Great Debate

Lesson Overview:

This lesson is designed to help students understand the differences in stakeholder perspectives and the collaboration required to overcome the complex problem of creating a bioenergy infrastructure.

Keywords:

biofuels, energy, debate, stakeholders

Grade Range:

6-12

Background:

Textbooks and resources for science teachers can become quickly outdated at the rapid pace of technological advancement and research (Laursen, Liston, Thiry, & Graf, 2007). It has been shown that incorporating the latest research into classroom lessons can stimulate the imaginations of students and foster their passion for the subject matter (Haine & Kloda, 2014). Improving renewable energy education can lead to changes in public perceptions and attitudes about energy (Bang, Ellinger, Hadjimarcou, & Traichal, 2000), which may lead to more sustainable energy-use behaviors (Zografakis, Menegaki, & Tsagarakis, 2008).

"Northwest Advanced Renewables Alliance (NARA) is an alliance of public universities, government laboratories and private industry that provides technologies, resources and analyses for stakeholders interested in using forest residuals to create bio-based alternatives to petroleum-based products such as jet fuel. The Alliance is funded through a five-year grant provided by USDA National Institute of Food and Agriculture" (NARA, 2015).

Holding debates in the classroom has several benefits to students. Public speaking, listening, teamwork, strategizing, seeing an issue from multiple perspectives, understanding one topic deeply rather than having an understanding of many topics at surface level.

Next Generation Science Standards & Common Core:

ES S3. A:1 ELF 4.1 Humans transform energy from the environment into forms for human endeavors.

ELF 4.4 Humans transport energy from place to place.

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ELF 4.7 Different sources of energy and the different ways energy can be transformed, transported and stored each have different benefits and drawbacks.

ELF 6.4 Earth has limited energy resources.

ELF 7.4 Increasing demand for and limited supplies of fossil fuels affects quality of life.

Goals:

Through guided research and a team debate of the issues, students will demonstrate why different stakeholders with different perspectives come together to work on a project with a common goal. Students are divided into teams representing a unique stakeholder perspective and body of knowledge. After they have researched the issues from their group's perspective, the class engages in a formal debate where each group voices their concerns and opinions about creating a biofuel production facility in their town. The whole class must reach a consensus on whether or not to produce biofuel in their local area.

Objectives:

- Students will understand that changing a part of our country's energy production over to sustainable sources like biofuels requires the partnership of many diverse stakeholders.
- Students will be able to explain the benefits and limitations of biofuels from a perspective other than their own, recognizing that compromises are sometimes needed to accomplish large projects.

Materials:

- Research packets for each group
- Writing materials to plan debate strategy
- Separate spaces for each group to work independently

Set up:

Teachers will need to create research packets for each group that is place specific. These packets need to contain different the pros and cons of the NARA project for each group. Teachers will also need to create either a PowerPoint or some sort of material introducing the NARA project before the debate occurs.

Classroom Time:

60 minutes or one class period. The first 15 minutes are spent going over the research packets, 25 minutes for the debate, and the last 20 minutes can be used for discussion and a group decision.

Introduction (Engage):

Either the day before or the period before this lesson, students need to be introduced to the NARA project and/or biofuels. This can be done by a PowerPoint presentation, a verbal lesson followed or accompanied by a worksheet, or different readings about the project. The following website can

be used to access information about the project: https://www.nararenewables.org/.

Activity (Explore):

The students need to be broken up into equal groups (this can depend on how many stakeholders the teacher wants represented in the debate). Each group can either choose who they want to represent, the teacher can choose each group, or the groups can be chosen at random. After receiving their packets, the students will be given 10-15 minutes to discuss and strategize for the debate. Some examples of groups are: University researcher, logging company, town or state policy maker, animal rights activists, NARA stakeholder, airline company (ex: Alaska airlines), private landowner, Department of Natural Resources, ect.

For the debate, the classroom can either be set up in two different ways. The first way would have all the students sitting a circle so that they can all discuss their groups' pros and cons at the same time or the teacher can have one group at a time come up and state their case.

Students will then have 25 minutes for the debate.

Explanation

The teacher can then lead a discussion based on the following questions/prompts:

-Do you think that the NARA project had to deal with meetings like this before they started? Why or why not?

-Would a project like this have to continue holding stakeholder meetings throughout the project? Why or why not?

-Discuss the importance of holding a meeting/ debate like this one.

-Can the students see any difficulties in trying to hold meeting like this? Go into detail on why or why not.

Elaboration:

The students will need to work together as a whole group and will have 10-20 minutes to come up with a plan for their community. This plan will need to address all the groups involved in the debate and either justify having their community participate in the NARA project or not allow the NARA project to occur there. This can be written down on one piece of paper and presented to the teacher or if there is time, one student can represent the group and give a small presentation on their group decision.

Evaluation

Each individual group can then write a small paper on the debate and the outcome of it. The teacher can either have the groups address one of these topics or have them write a bigger paper that encompasses all of these topics.

-Their role in the NARA project. What benefits the community would receive from having the NARA project join or what negative effects could occur if the NARA project occurred.

-Their own personal opinions on the NARA project and if they changed at all during the debate.

-The difficulties of a big project like the NARA project and the usefulness of a big meeting/debate for a town/community.

-The results of the debate and justify why they agreed or disagreed to having the NARA team join their community.

Additional resources:

The NARA website can act as resources for creating the packets and provide background information for the introduction. Students can also look at this website if they are interested in finding out more information than provided in their packets.

NARA project website: https://www.nararenewables.org/

The following websites provide different lesson plans that can be used before the debate to act as an introduction into energy literacy. They can also provide future lessons that pair well with The Great Debate.

Facing the Future: https://www.facingthefuture.org/

NARA Energy Literacy Principles Matrix: http://energyliteracyprinciples.org/

References:

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