



Hydroelectric Dam Debate

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INTRODUCTION

In this lesson, students will take on the role of a U.S. senator who has to decide whether or not to support a proposal to build hydroelectric dams across the nation. S/he will have to weigh the pros and cons of both sides and write a letter of response explaining why s/he has chosen to vote one way over the other. (Note: The dam used as an example in this lesson plan is fictional, however the story of a real dam controversy could be used in its place, such as, Aswan, Three Gorges, James Bay dam, etc.)

LESSON OVERVIEW

Grade Level and Subject: Grades 9-12: Social Science & Government, Language Arts

Length: Two class Periods: One for research and the second for debate

Objectives:

After completing this lesson, students will be able to:

- Enhance their decision-making and debate skills
- Explain and support an argument
- Understand the pros and cons of hydroelectric dam building
- Connect the importance of water with the need for policies that control its use

National Standards Addressed:

This lesson addresses the following National Education Standards¹:

- **Content Standard:** [**NSS-C.9-12.3 PRINCIPLES OF DEMOCRACY**](#)
How Does the Government Established by the Constitution Embodify the Purposes, Values, and Principles of American Democracy?
 - How are power and responsibility distributed, shared, and limited in the government established by the United States Constitution?
 - How is the national government organized and what does it do?
 - How are state and local governments organized and what do they do?
 - What is the place of law in the American constitutional system?

¹ Education World (2008) *U.S. National Education Standards*. Retrieved February 12, 2009, from <http://www.education-world.com/standards/national/index.shtml>.

- How does the American political system provide for choice and opportunities for participation?
- **Content Standard:** [NSS-G.K-12.5 ENVIRONMENT AND SOCIETY](#)
As a result of activities in grades K-12, all students should
 - Understand how human actions modify the physical environment.
 - Understand how physical systems affect human systems.
 - Understand the changes that occur in the meaning, use, distribution, and importance of resources.
- **Content standard:** [NL-ENG.K-12.6 APPLYING KNOWLEDGE](#)
 - Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts.
- **Content standard:** [NL-ENG.K-12.8 DEVELOPING RESEARCH SKILLS](#)
 - Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

Materials Needed:

- Access to a computer lab with internet
- Reproducible #1- **Pros and Cons of Building a Hydroelectric Dam**
- Reproducible #2- **Explanatory Letter Assignment**
- Reproducible #3- **Reflection and Discussion Questions**

Assessment:

Students will be assessed through the following activities:

- Research done on **Reproducible #1- Pros and Cons of Building a Hydroelectric Dam**
- Completion and quality of **Reproducible #2- Explanatory Letter Assignment**
- Completion of **Reproducible #3- Reflection and Discussion Questions**
- Participation in group debate

LESSON BACKGROUND

Relevant Vocabulary:

- **Hydroelectric Dam:** A dam that produces energy and electricity.
- **Constituents:** A voter in a district, the citizens represented by a Congressman.
- **Veto:** Presidential power to reject a bill approved by the House and Senate.
- **Bill:** A proposed law; requires approval of the House, Senate, and President to be enacted.

Information:

Water is a very important natural resource, and therefore policies are created to help control its use and availability. Hydroelectric dams help to capture water and turn its energy into electricity. They

are a cleaner energy source than fossil fuels, but their construction requires a lot of energy and materials. Building and maintaining dams can cost millions or even billions of dollars.

Dams can also cause habitat destruction and relocation of towns, depending upon where they are built. However, they also provide and store water for local use, and help to navigate and control rivers and other waterways.

Resources:

Basic info on dams: <http://ga.water.usgs.gov/edu/wuhy.html>

FAQ of dams: <http://www.internationalrivers.org/en/node/480>

More FAQs: <http://www.dnr.state.wi.us/org/water/wm/dsfm/dams/faq.html>

Tour of a Hydroelectric Project: <http://www.fwee.org/walktour/index.html>

Resources for holding a debate: http://www.educationworld.com/a_lesson/lesson/lesson304b.shtml

LESSON STEPS

Warm-Up: *What Do You Know about Dams?*

1. Have students brainstorm what they already know about dams. Ask questions such as:
 - a) Why do we build hydroelectric dams? What are they used for?
 - b) How do they work?
 - c) What are some positive aspects of dams?
 - d) Can you think of any negative impacts?

Activity One: *Becoming a Senator*

1. Pass out **Reproducible #1- Pros and Cons of Building a Hydroelectric Dam**. Go through the instructions with students and ask if there are any questions.
2. Let students use the computer for the rest of the class period to research information for their worksheet.
3. Before class ends, pass out and explain **Reproducible #2- Explanatory Letter Assignment**. Determine an appropriate amount of time for your students to complete the assignment at home, or schedule another day of class for them to work on it.

Activity Two: *Debate*

1. On the day the assignment is due, have students split into two groups based upon whether they voted yes or no on the bill.
2. Have students from each side give an explanation of why they voted the way that they did.
3. Give each side the opportunity to ask questions of those on the opposing side, and allow for discussion and debate in response to the question. Make sure they consider all angles, such

as downriver rights and energy potential for their area, and have them consider other options and compromises such as changing the size of the dam.

4. At the end, have a final vote on whether or not to pass the proposal. Let students know that they do NOT have to vote the same way they did in their homework if the debate changed their mind. As the teacher, and therefore the President, you can choose to either pass or veto the bill.

Wrap-Up: *Reflection*

1. Have students fill out **Reproducible #3- Hydroelectric Dam Reflection and Discussion Questions** on their own and/or as a journaling activity. When they are finished, go through the questions together and share their responses.

Extension:

1. **Other Viewpoints** – Build on the students’ debates and letters by having them represent other interests in the hydroelectric debate. Visit this website http://www.icenetwork.ca/about_us/gwcvictoria%20island/ to read about endangered species and displaced peoples to be impacted by a proposed hydroelectric project on Victoria Island, Ontario, Canada. Have students read the letters and viewpoints on this website and debate the issue from various perspectives (i.e. that of the American Eel, a tribal representative, an environmental activist representing the Endangered Species Act, the electric company, local businesses and townspeople, a fisherman, the local government, the Minister of Environment, etc.)
2. **Hydroelectric Energy Consumption** - Use the following websites to compare and contrast Hydroelectric Energy Consumption by state (http://www.statemaster.com/graph/ene_hyd_ene_con-energy-hydroelectric-consumption) and by country (<http://www.energyinsights.net/cgi-script/csArticles/articles/000001/000133.htm>). Based on their research, have students brainstorm and discuss why various regions may use different amounts of hydroelectric energy. How does your state compare? Why might this number be higher or lower than other states?
3. **Actual Dam Debates** – Have your students do **Activity One**, but substitute the imaginary scenario for a real one. Research cases such as the Aswan, Three Gorges, or James Bay dams, or find one in your area. Students can write their letters to actual organizations involved in the issue.

CONCLUSION

By taking on the role of a senator and researching how to vote on a proposal, students will learn decision-making and research skills, as well as have a better understanding of the role of policymakers. They will also realize the importance of water to our society, understand hydroelectric dams and water usage, and learn some arguments for and against hydroelectric projects.

Name _____
Hour _____
Date _____

Pros and Cons of Building a Hydroelectric Dam

Scenario: You are a United States Senator and have just been informed of a bill that has been introduced to provide funding for construction of hydroelectric dams across the country. Normally, you would have your staff members brief you on the pros and cons of the issue, but they are all out sick with a very contagious form of pneumonia and you must do it yourself. This is a very controversial issue, because although dams help produce energy and provide fresh water, they can also ruin habitats and force people to relocate. You must decide what the best choice will be for the people that you represent.

Assume that you live in a large state in the western U.S. where water resources and access are minimal. A dam will help to provide fresh water for agriculture and home use, but the best site for construction will force a town of 5,000 people to completely relocate. It will also damage the habitat of many species, and wildlife advocacy groups are not going to be happy about that. However, many industries in the area are happy for the extra energy and water, which will help to improve their productivity.

Before you decide to vote yes or no on the proposal, there are some questions that you should consider:

- What are the extra costs going to be? How big will the dam be? The U.S. government will provide some initial funding, but not enough to completely finish the dam and continue its upkeep afterwards. Where will the money come from?
- Next year will be time for your re-election: what do your constituents think of this plan and what choice is going to make you the most popular?
- What short-term and long-term effects will the dam have on local wildlife, waterways, and humans? Do people downstream have the same rights as those who live right near the dam?
- What examples have there been of dams being built? Were they successful? Unsuccessful?
- What are some other options for energy in your state? Is this a cleaner form than others?

Start by checking out some of these basic websites that your Chief of Staff managed to send you despite his/her incapability to get out of bed:

- <http://ga.water.usgs.gov/edu/wuhy.html> Basic info on dams
- <http://www.internationalrivers.org/en/node/480> FAQs on dams
- <http://www.fwee.org/walktour/index.html> Tour of a Hydroelectric Project
- <http://www.dnr.state.wi.us/org/water/wm/dsfm/dams/faq.html> More FAQs

Now that you've gotten some basic information, search the web and conduct more research on the topic. Create a list of Pros and Cons, and decide from there if you wish to support or reject his bill. Record your most helpful resources for future reference, and make sure to cite any sources if you wish to use statistics, specific facts, or any other findings that require citation.

Helpful Resources:

PROS

CONS



Name _____
Date _____
Hour _____

Explanatory Letter Assignment

Now that you have made your decision, you must send a letter to those whose side of the argument you did NOT support, explaining why you chose to vote the opposite way. Remember, you are up for re-election next year, so you want them to know that you did listen to and consider their concerns, but that you decided to go another way based upon your research. A thorough explanation will be needed to help gain support for your decision.

If you voted **NO** on the bill → Write a letter to *Farmers R Us* agricultural company who was going to benefit greatly from the use of extra water from the dam.

If you voted **YES** on the bill → Write a letter to *Friends of the Fish*, a nonprofit organization who work to protect fish and other species that live in the local waterways.

Please use standard letter formatting and proper grammar and spelling.

Name _____
Date _____
Hour _____

Hydroelectric Dam Reflection and Discussion Questions

1. After listening to the debate, was your final vote the same as it was in your homework assignment? Why or why not?
2. Which opposing argument did you find the most significant? Why?
3. What was the most difficult part of the decision making process?
4. Creating a hydroelectric dam is a way to control our water sources and how they are used. Why are these water control policies needed, and why do people take such a vested interest in them?