Radiation: A Slow Death - Lesson Plan

Title of Lesson: Debating the Risks of Nuclear Production

Audience: High School Science

Duration: Approximately five 50 minute periods

Specific Objectives:

1. Students will participate in an informed debate stating positions about nuclear energy and radiation.
2. Students will exhibit understanding of costs and benefits of nuclear energy and weapons production

Materials:
DVD Radiation: A Slow Death
Butcher paper and markers
Internet access for reading materials and student research

National Science Education Content Standards A and F:
Science as Inquiry and Science in Personal and Social Perspectives
Fundamental concepts contained in these standards include:

COMMUNICATE AND DEFEND A SCIENTIFIC ARGUMENT
Students in school science programs should develop the abilities associated with accurate and effective communication. These include using language appropriately, speaking clearly and logically, and constructing a reasoned argument.

NATURAL AND HUMAN-INDUCED HAZARDS
Students should understand the costs and trade-offs of various hazards--ranging from those with minor risk to a few people to major catastrophes with major risk to many people.

SCIENCE AND TECHNOLOGY IN LOCAL, NATIONAL, AND GLOBAL CHALLENGES
Students should understand the appropriateness and value of basic questions--"What can happen?"--"What are the odds?"--and "How do scientists and engineers know what will happen?"

Day 1: Introduction to Nuclear Energy and Radiation

Procedure

Access prior knowledge by having students list everything they know about nuclear energy and radiation

Distribute copies of "How Nuclear Energy Works and What it's Used For" from http://www.nei.org/scienceclub/4yourclassproject/4ycp_hownucenergyworks.html
Or "Nuclear Energy" from http://www.tva.gov/power/nuclear.htm

As students read more about this topic, they will add to the list of things they know about nuclear energy and radiation.

For homework students will conduct individual research on nuclear energy and the effects of radiation.

Day 2: Understanding the Issues

Procedure

After viewing the third section of the DVD on the Hanford Nuclear Site students will take notes recording how various community members felt about the presence of the Hanford Nuclear Site in their region:

- The farmer downwind from Hanford
- The woman living near Hanford with thyroid problems
- The nuclear engineer working at Hanford
- The environmentalist employed by the government to clean up radioactive waste

Day 3: Preparing for Debate

Procedure

Introduce the debate topic:

The government is planning on building a nuclear production facility in your neighborhood. It will provide electricity to your region and numerous jobs. Do you support or oppose this action?

Choose three or four students to be team leaders for the two sides of this debate: those who support the creation of a nuclear facility and those who oppose one.

Ask each team to brainstorm arguments for their position on large sheets of butcher paper. The rest of the class will walk back and forth between the two groups considering which side has the stronger arguments. Team members should consider the risks and costs to the community as well as who benefits and who suffers.

Team leaders can be given additional resources such as:

On-line Hanford news

http://www.hanfordnews.com/

Washington senator Patty Murray on the Hanford clean up
http://murray.senate.gov/hanfordcleanup/index.cfm

Day 4: Taking Sides

Procedure

Students will view the butcher paper brainstorms from the previous day and choose which team they will support. In these two groups, students will prioritize their strongest arguments and come up with counterarguments to the opposing team. The team will choose five people from the team to serve as speakers. These representatives will present the team's arguments and counterarguments.

Day 5: The Debate

Procedure

Have the two teams face off. Side A will present an argument and Side B will present a counterargument. Then Side B will present an argument and Side A will counter. The debate will continue in this fashion until all five team members have participated.

Assessment

After the debate, all students will write a paragraph stating which side of the argument they would choose. Students must express their position clearly and provide at least three reasons of support.

Conclusion

This week we examined nuclear energy and the benefits and costs of radiation on people and the environment. You have used scientific research in your debates to help you communicate your positions. Your ability to express your arguments in this type of debate can impact people's positions on controversial issues.