CHERNOBYL:
A THEME TO INTEGRATE THE NATURAL AND SOCIAL SCIENCES

Lesson Plans

A Joint Effort of the Center for Russia, East Europe, and Central Asia (CREECA), the Wisconsin Teacher Enhancement Program in Biology (WisTEB), and Friends of Chernobyl Centers United States (FOCCUS)

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Chernobyl

The Environmental and Economic Components
Of a Nuclear Disaster

Prepared for The Center for Russia, East Europe, and Central Asia
Wisconsin Teacher Enhancement in Biology

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Standards or Thematic Strand

Social Studies Standards:
Standard for Wisconsin Social Studies: Explain and evaluate the effects of new technology, global economic interdependence and competition on the development of national policies on the lives of individuals and families in the U.S.

NCSS Theme: #8 Science, Technology, and Society

Science Standards:
Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits.

Investigate how current plans or proposals concerning resource management, scientific knowledge, or technical development will have an impact on the environment, ecology, and quality of life in a community or region.

Introduction-Purpose/Rationale
There is much disagreement about the way in which we perceive and deal with the environment. There are powerful forces on each side and each maintains that their cause is the just one. Periodically, we are confronted with an incident that is so powerful that it brings these opposing forces into direct conflict and vies for the attention of the public and attempts to make public policy that supports the contention of one of the parties. The disaster in Chernobyl in 1986 was an incident of that import. There are many lessons that we can learn from that event and many lessons that we can use to help our students become better thinkers, better learners, and hopefully better stewards of the earth.
Objectives:

Knowledge: The student will:

a. Determine the facts surrounding the accident at Chernobyl nuclear complex in 1986.
b. Identify the immediate causes of the accident
c. Identify some of the consequences of the accident
d. Define the attitudes toward nuclear power and environmental issues of specific groups in American society.
e. Describe the potential environmental risks of nuclear power
f. Describe the impact on U.S. energy production of a phase out of nuclear power.

Skills: Students will develop skills in:

a. Oral presentation in front of the class using multi-media format
b. Analysis of complex social and economic issues
c. Research methods and source identification

Attitudes: Students will:

a. Demonstrate an appreciation of the interrelationships between environmental and energy policy
b. Demonstrate an appreciation of the interrelations between various academic disciplines, science and social studies.

Recommended Grade Level:

This unit would be appropriate for students in the 10th through the 12th grade.

Time Allotment:

Seven to eight days of class time (assuming a 50 minute class period)
Procedure:

Assign in advance the reading: “Living With the Monster Chornoybl”, from National Geographic

Show the film: Back to Chornoybl from Nova

A Study Guide to Accompany the Video

1. Describe a nuclear disaster depicted in the video.

2. Where did this happen? When?

3. What caused it? Who was to blame?

4. What were the immediate results? Who was effected? How?

5. What were the long-range results?

6. Could this happen here?

7. How could be make sure that it doesn’t?

Brainstorm some solutions to the problem. There will develop an argument to get away from nuclear sources of energy. While we can allow that this is indeed possible there will be a concurrent cost to achieve that. Let’s look at the implications of that action.

Divide the class into groups of 4-5 students and then designate one-half pro nuclear energy and one-half anti-nuclear energy. It is advisable to let them determine their position but you may make the determination.

Provide 2-3 days for research and preparation. time to use computer labs, Internet, and media center
Teacher Directions to the Groups

There is a pending presidential election in the year 2000. There will be no incumbent president and 435 seats of the House of Representatives will be up for election and 33 senate seats will be available. The senate could reasonably swing to a Democratic majority. Much is at stake.

Since the economy is in good shape it is not “the economy, stupid.” Other issues will emerge as paramount in determining the loci of power. One of these issues will certainly be energy, particularly nuclear energy. This is a very controversial issue and engenders strong feelings both for and against across the country. The position on this issue may be pivotal in deciding who will dominate the leadership of this government and control public policy out into the future. Therefore, the political candidates will need to take a stand on this issue. To do this they will need a good deal of information.

Your group represents a professional consulting firm that has been hired to make a presentation to the leaders of the two major political parties, including the presidential candidates themselves. You are doing this on a contingency fee. If you are successful you may charge the highest consulting fee. If you do not prevail you will be paid only the fee that the receiving body chooses to award. Conceivably it could be nothing.

Your presentation should outline for them the problem as you see it, the arguments for this position and accompanying data of support. You should be aware of the rebuttal that will surely arise from the other side and be prepared to thwart that position. Keep in mind that there are some political realities here that will have to be recognized. This presentation will need to be done in the most professional manner utilizing all of the techniques at your disposal knowing that you will be competing with an alternative point of view that will also be presented. The party panel will ultimately choose one proposal. You will have a time limit and the winner will be awarded the benefits by the market system.

To Assure Student Success They Will Need to:

1. Acquire a firm understanding of the issue.
2. Collect data to illustrate this problem.
3. Identify the arguments for your position.
4. Project the arguments that your opponents will generate.
5. Locate accurate and vital data to support your position.
6. Create an argument from that data.
7. Locate vital and accurate data to refute your opponent’s position.
8. Create arguments and rebuttals from the data to refute your opponent.
9. Arrive at a recommended policy and argue why is this the appropriate position.
10. Develop a total and powerful presentation.
Decision Making Realities

1. The party and the candidate wishes to get elected.
2. The policies that they adopt must meet with the agreement of the majority of voters in November of 2000.
3. Some policies are more important that are others
4. There are powerful interest groups that exert a good deal of influence on other voters. The parties are vitally aware of this.
5. Voters have a variety of concerns around the issue of nuclear energy, some are for safety, some are for security, and some are for the economics of this source of power. These concerns must be balanced as more attention and resources is given to one less can be given to others. Values are very important here.
6. Everyone is going to operate from his or her own self-interest. Your task is to convince them that your proposal furthers that goal.

Resources: Teacher Handouts

Economics:

Opportunity Costs

There isn’t enough to go around and fulfill all of our wants and needs. Therefore we must make choices. As we choose we give up the next most attractive alternative. For example, if we choose to get rid of nuclear energy as a power choice we must surrender an amount of benefit we got from that energy. We may have to live with higher fuel costs (we can drive less), brown outs in the summer time (we will learn to live with the discomfort), or accept a lower standard of living.

If we choose nuclear power we are trading off the possibility comfort for the possibility of a nuclear disaster. As we choose more of one alternative we surrender more of the next best thing; it’s a trade-off. You can look at it like this:

![Diagram showing opportunity costs]

You can’t have it both ways.
Political Science:

The American political culture has developed around the concept of adversarial decision making. We determine who the decision maker is—perhaps the citizen voter, the judge, a legislator, the school board. We determine what position by this person or group would benefit us knowing full well there are opposing groups that will make contrary claims for they want the decision maker to decide on their behalf. Only one of us can prevail without some compromise.

Therefore, we identify our political resources such as prestige, organizational ability, reputation, time, money and determine how we can best use these to influence the decision makers to choose our position. This may take the form of writing letters, donating money, campaigning for the candidate, serving in public office or attempting to convince others to share our views.

This is what your presentation is about.

Media Literacy:

In a nation where public policy is shaped by the opinions and the values of the people, by the people, and for the people” much depends on the attitude and the behavior of these people. If the decision-makers are to respond to the wishes and the whims of these people, they need to know the desires of these constituents. The problem is that the opinions held are in large measure malleable and that there are powerful forces out there attempting to shape and to sway those opinions. The media is often the institution chosen to secure access to these opinions. This generates attitudes, which evolves into behavior that looks like voting, supporting candidates, advocating public policy, and contributing time and money to candidates.

We need to realize these media can manipulate information to achieve a desired result of swaying the decision-makers to one side or the other. We need to learn what is good information and where to get it. We also need to be able to recognize bad information. The trouble is that it looks very often very much the same.
An Illustration of Media Literacy

Problems in the Schools 1940

Running in the Halls
Chewing gum
Failure to line up correctly
Not putting waste in wastebaskets
Inappropriate talking

Problems in the Schools 1990

Homicide
Assault
Rape
Drug Addiction
Teen Pregnancy

Question: What has happened to the schools?

What needs to be done? What public policy ought we to make to correct this serious problem?

Reality check: Before we rush off into the policy making department and bring to bear all of the devices that governments use to do this kind of thing we would be wise to determine what the basis of our information is. Is this good information? There is lots of information available but if we are to create laws and conventions we had best be operating from some good sources.

Is the source above good? Actually it’s not! It appears to be the result of a study. It is in fact a statement by T. Cullen Davis of Texas, a wealthy and conservative businessman who is an opponent of public schools and a supporter of home schooling and vouchers.

It was first found posted on a bulletin board at Yale. It was printed by a school paper and later picked up by major newspapers including the Wall Street Journal. It was presented on national television by Dan Rather and was used in a speech by Barbara Bush then the first lady of the U.S. It certainly looked true. However, Davis admitted that it was merely a statement of his view of the schools because “he had been there.” Is this the basis on which we should make important decisions? What is good information?
Extension and Enrichment

Chernobyl: Multiple Intelligence’s Applications

**Numbers:** Do a statistical study of this incident. Compare it to other disasters of a different nature.
Do a longitudinal study of incidence of nuclear related illnesses

**Literature:** Act out the play Sargaphalas in class.
Write poetry that reflects your attitude and feelings about this incident.

**Visual:** Create an annotated videography about the Chernobly incident.

Do a film study of a movie related to Chernobyl and compare it to a similar movie about a disaster, perhaps the movie Rage.

**Interpersonal:** Interview victims of posttraumatic stress syndrome and look for these symptoms in the literature of the survivors of Chernobyl.

**Resources:**

*The World’s Worst Nuclear Accident*
By Charles Recknagel, Radio Free Europe, 1996

*Chernobyl, firsthand*
Nicholas Lenssen, World Watch, Jan. 1994

*Meltdown*
Nicholas Lenssen, World Watch, May 1996

*Living With the Monster of Chernobyl.*
National Geographic, August 1994 pp.100-115

*Nuclear Energy: Realities, Myths, and Policy Issues*
Michael Corradini, UW-Madison 1999
Assessment and Evaluation

Each element is scored on a scale of 1-5, 5 being the highest.

Presentation

Each presentation will last between 10-15 minutes

Active participation by all members of the group.

Each member demonstrates understanding of the issues and the group's position.

Illustrates creativity in presentation, i.e. the use of audio visual materials.

Content

There are a good number and variety of sources

Consistency and appropriateness of positions given the goals of the group

Quality and depth of arguments

Appropriate use of facts to support the group's arguments

Ability to rebut counter arguments
Supplemental Resources

Books:
Max W. Carbon. *Nuclear Power: Villain or Victim?*
Pebble Beach Publishers, Madison, WI 1997

*Nuclear Powered Health: The Implications for Health and Nuclear Power Production*
Who Publications, NY 1994

*Chernobyl: Environmental Health and Human Rights Implications*
International Medical Commission on Chernobyl
Toronto 1996

Mevedev, Grigori. *The Truth about Chernobyl*
Basic books, NY 1991

Organizations:

*Nuclear Energy Information Service*
P.O. Box 1637
Evanston, IL 60204-1637
(847) 869-7650

*Committee for Nuclear Responsibility*
P.O. Box 421993
San Francisco 94142
http://www.rat.cal.org/radiation/CNR/