Instructor: Elizabeth Piesen (2003 Science Teacher Workshop participant)
School District: Diocese of Metuchen, Our Lady of Peace School, Fords
Lesson Title: Coal vs. Nuclear Power
Grades: 6, 7, 8
Subject: Science
Overview: Students will research and develop a presentation, which will include statistics and their opinion on the efficiency of coal burning power plants compared to nuclear power plants. Their opinion will be defended in a class debate.
Objectives:

- Students will conduct Internet research on the topic of coal vs. nuclear fuel.
- Students will present their statistics using either a power point presentation or visuals that they have made based on their data.
- Students will draw a conclusion on the efficiency of coal vs. nuclear energy sources.
- Students will need to consider financial, safety and efficiency aspects of the fuel sources in order to form an informed opinion on a controversial topic.
- Students will debate their conclusions using their projects as a basis for their opinion.

Materials and Resources:

- Students will research their topic using the Internet. They will be working independently and will generate a project (either power point or written) based on their research data.
- Students will be expected to use a minimum of 5 sources for their research.
- Once the independent part of this assignment is completed, the students will get into two groups (one advocating the use of coal, the other advocating the use of nuclear energy). They will have one class period to prepare by comparing and consolidating their data and presentation materials and the following class period, the class will hold a debate.

Lesson:
Students will have already studied energy sources in the United States. They will have learned about hydroelectricity, solar power, wind, geothermal and biomass as energy sources—both their advantages and their limitations. They will have studied various fossil fuels and nuclear energy (including how a nuclear power plant works).
This assignment is an expansion of the concepts and is to be used as an independent research project.
The lesson consists of the independent project as described on the attached sheet followed by a class debate on the controversy.

COAL VS. NUCLEAR ENERGY

Since we have already studied different sources of energy, and since renewable sources are limited by location or technology, I want you to do a project that will compare the technology, efficiency and safety of the existing fuel sources of coal and nuclear energy.

Students will compare a nuclear power plant and a coal burning power plant as to the:

Amount of fuel needed
Cost of fuel
Emissions produced (especially greenhouse gases)
Solid wastes produced
Relative danger of wastes and emissions

Once research is completed, students will prepare their information in either of two formats:

- A power point presentation that includes bar graphs, pie charts, or any other format that will accurately visually illustrate their data.
- A written report with printed charts and graphs.

In either case, a physical model that presents any one of the comparisons should be included. The physical model can be a poster or a 3-dimensional model, but must represent the correct proportions. This may *not* be downloaded from the Internet.

The presentation must include an introduction, the visual comparisons with some explanation, and a conclusion that reflects your opinion about the efficiency and safety of each fuel. ***Remember to credit all sources of information used.***

Your presentation is due Monday, . Tuesday, the class will break into four groups: one advocating nuclear energy and one advocating coal from each lab group. You will choose a debate captain for each debate group and decide what information you will present and who will present each aspect. Use your visuals to defend your opinion. Every student will be involved in the debate by either explaining their visual or by presenting one of the topics that will be debated.

Suggested resources:
http://www.nei.org/index.asp
http://www.nrc.gov
http://www.uic.com.au/whyu.htm
http://www.uic.com.au/wast.htm
http://www.uic.com.au/ueg.htm
http://www.nationalcoalcouncil.org/Documents/SECURE.pdf
http://www.ceednet.org/
http://www.fossil.energy.gov/

Grading will be based on:

- Neatness 5 pts
- Solid Wastes produced 10 pts
- Introduction 5 pts.
- Conclusion 15 pts
- Amt. fuel 10 pts

- Bibliography 10 pts
- Cost of fuel 10 pts
- Physical project 10 pts
- Gas emissions 10 pts
- Debate 15 pts