When it comes to oil, the world’s people seem to have an unquenchable thirst. Wasteful habits coupled with population growth fuel the demand for increased energy production. The World Energy Conference projects that global energy consumption will rise 54 percent between 1990 and 2020. Most of the increased energy production is likely to be supplied by coal, oil and natural gas. Finite resources and environmental concerns may necessitate changes in energy use over the next 50 years.

People in some countries consume much more energy than others. The average amount of energy used by each person in the world each year is equal to 1,439 kilograms of oil. However, the amount used by a person in the United States is 7,918 kilograms, and is 7,639 in Canada — well above the average. There are many countries where people use much less energy. The amount of energy used by one person in Asia is equivalent to only 738 kilograms of oil, and someone living in Africa uses only 299 kilograms — only 3.8% of the energy consumed by a North American.

Fossil Foolish

Fossil fuels, such as oil, coal and natural gas, provide 86 percent of energy produced in the world each year. Oil is the dominant source of energy, providing 40 percent, coal provides 25 percent, and natural gas provides 21 percent of all energy produced. Such heavy reliance on fossil fuels fosters concerns on two grounds. First, although new reserves are discovered each year, the Earth’s supply of these fuels is finite. Since we are using oil, coal and natural gas at much faster rates than the earth creates them, our reserves of these fuels will eventually run out.

Second, burning fossil fuels for energy is responsible for 85 percent of carbon dioxide emissions (the rest come from burning and logging of forests). Most scientists now agree that rising concentrations of carbon dioxide ($CO_2$) and other greenhouse gases in the atmosphere is resulting in potentially dangerous changes in global climate. Predicted increases in fossil fuel use are expected to raise annual carbon emissions to 9.7 billion tons by 2015, an increase of 61 percent over 1996’s 6 billion tons of emissions.

Natural gas is the fastest growing fossil fuel. By 2015, it is expected to provide a greater portion of global energy than coal. It is also the cleanest burning fossil fuel. It releases the least amount of carbon per unit of energy produced. Oil releases 1.38 times as much, and coal releases 1.79 times as much.

Of the three primary fossil fuels, coal is found in the largest supply on Earth. It is the most common source of energy consumed in India and China, and generates more electricity in the United States than any other source. In addition to carbon emissions, coal combustion releases sulphur dioxide and nitrogen oxides which pollute the air and lead to acid rain. Other environmental concerns about coal include land degradation and water pollution from mining, and disposal of hazardous coal ash.

In 1996, 64 million barrels of oil per day were produced in the world. Oil is expected to continue to be the dominant source of energy in the world for several decades. Experts predict that world oil consumption could reach as high as 105 million barrels per day by 2015. The United States, at 17.7 million barrels per day in 1996, is the biggest oil consumer.
In 1996, the United States produced 6.5 million barrels of oil per day. This level is enough to make it the world’s second biggest oil producer, but it is 30 percent lower than peak production in the early 1970’s. Furthermore, in addition to all the oil it produces, the United States is still dependent on oil imports for 46 percent of its total energy consumption. As of 1996, U.S. oil reserves were 34 percent lower than in 1977.

1,100 billion barrels is a rough estimate of how much oil is left in reserves around the world, enough to last about another 40 years at current rates of consumption. Two-thirds of known reserves are located in the Middle East; Saudi Arabia, the world’s biggest oil producer, holds one quarter alone.

**Driving Up the Stakes**

Two-thirds of the petroleum consumed in the United States is used for transportation. In the United States, the car has become a prized possession. There is one car for every 1.3 people and close to four million miles of public roads.

With the increase in population comes an increase in the number of vehicles on the road. Urban planners respond by building more roads and expanding the existing roads—a temporary solution for congestion. According to the Federal Highway Administration, congestion will likely increase by more than 400 percent over the next 20 years on the nation’s freeways and by 200 percent on other roads. In addition, while fuel efficiency of cars doubled between 1974 and 1988, very little improvement has been made since then. Average fuel efficiency of new cars is even declining due to increased use of sport utility vehicles which get fewer miles to the gallon. If the average U.S. car got just ten more miles per gallon we would save as many barrels of oil as the country imports from the Middle East.
American transportation habits differ greatly from those in other industrialized countries. In the 50 largest U.S. metro areas, 73 percent of people commute to work alone by car, 12.9 percent carpool and only 6.5 percent use public transportation, while 7.6 walk or bicycle. In European cities, about 40 percent commute by car, 37 percent use public transit, and the rest walk or bicycle. Only 15 percent of the population in industrialized Asian cities, such as Tokyo, drive to work by car. Such habits illustrate why the United States, with less than five percent of the world’s population, consumes about a quarter of the energy produced in the world each year.

Often, people commute by car because they do not have any other convenient way. More and more, however, urban planners in the United States are looking at how to design communities where residents wouldn’t need to drive in order to get to work, school, stores, etc.

Worldwide, the transportation sector creates 21 percent of all energy-related greenhouse gas emissions. Personal automobiles make up the vast majority of this sector. Emissions from transportation are expected to double by 2020 as population and economic growth in developing countries like South Korea, the Philippines, Thailand, India and China spark rapid increases in car ownership.

More for Less

One important way to reduce the use of fossil fuels is to improve the energy efficiency, not only of our cars, but also of our household appliances, lights, and heating and cooling systems, among other things. Substantial improvements could be made just with the technology already available. For example, lighting uses about 20 percent of U.S. electricity. If everyone used energy-efficient flourescent light bulbs, we could save the amount of energy produced by 120 power plants.

Super windows, insulated with six sheets of glass, can actually absorb heat in the winter rather than letting it escape, dramatically reducing the amount of energy necessary to heat a building. Similarly, windows have been designed for warm climates that let in light but only 20 percent of the heat of normal windows. Some of these technologies are actually cheaper to install that more conventional ones, and those that are not pay for themselves in a couple of years with the amount of energy costs they save.

Energy Alternatives

Although fossil fuels are the predominant energy sources in the industrialized world, they are not the only game in town. Research has been continuing since the early 1970’s to develop and improve alternative sources of energy. Environmental concerns and finite resources require that we switch to cleaner, more efficient energy alternatives. Both nuclear power and renewable energy sources have been examined as possibilities to replace fossil fuels. Nuclear power presently provides 6.4 percent of the world’s energy. Renewable sources, which consist almost entirely of hydroelectric (water) power provided 7.2 percent. However, both of these energy sources have significant shortcomings. Neither is expected to increase as fast as fossil fuels in the short term, and will produce a smaller portion of energy in the immediate future.

Nukes or No Nukes

In the years following World War II, the nuclear knowledge that led to the production of atomic weapons was redeplored for peacefull energy purposes. Nuclear fission emerged as a usable source of energy, but not without risks. Dangers such as radiation poisoning, meltdown risks and unsafe disposal of nuclear wastes pose threats to the future of nuclear energy.

After 50 years of significant technological effort to support nuclear development, nuclear energy has become widely used. Approximately 30 countries produce energy from nuclear generators, accounting for 17 percent of all electricity generated globally.

Although nuclear energy is now used throughout industrialized countries, its future is still suspect. Several nuclear power plant failures have brought to the public eye the potential risks of this energy source. Controversy has developed concerning the elimination of the hazardous waste as well as the safety and loca-
Energy Futures

Earth, Wind and Solar Fire

Many believe that clean, renewable fuels—solar, wind, hydroelectric and geothermal—should play a significant role in meeting future energy needs. Renewable resources are mostly still in the primitive stages of development, but they offer the world potentially large primary energy sources, sustainable and available to every nation in one form or another.

Renewable energy supplies already fill almost ten percent of U.S. energy needs. Hydroelectric power makes up the vast majority of this energy. Many renewable energy sources have several comparable advantages. For example, although they are not free from environmental consequences, they do not have nearly the environmental impact of synthetic fuels.

Of all renewable sources, solar energy is likely to be the cornerstone of a future sustainable energy system. Sunshine is available in great quantity and is more widely distributed than any other source. A few decades from now, societies may use the sun to heat most of their water, and new buildings may take advantage of natural heating and cooling to cut energy use by more than 80 percent. Wind power also has great potential to provide electricity in most countries. Electricity is generated by propeller-driven mechanical turbines perched on strategically located towers.

Hydroelectric power supplies 20 percent of the world’s electricity and two-thirds of Canada’s electrical needs. Although there is still growth potential for this energy/resource, environmental constraints may limit development. Shortcomings, such as flooding, siltation, human displacement and wildlife endangerment surround the building of dams and reservoirs for the harnessing of hydroelectric power.
Geothermal energy, the latent heat from the Earth’s core, can provide electricity when there is no sun or wind. After hydroelectric power, geothermal energy is the next most common renewable source. Although geothermal resources are localized, they can provide energy to a number of areas along fault lines.

Currently, renewable energy sources are quite expensive, but if national governments and private companies make a substantial and sustained commitment to further research and development, costs should fall, and the potential of these renewable sources can be realized.

Planning for Our Energy Future

The amount of energy consumed has increased over the years with growth in the global economy and world population. Over the last half century, the population has doubled, the world economy has increased five times, and the amount of energy consumed has tripled. We face difficult energy and economic choices in the years ahead. It is apparent that the supply of fossil fuels will not be sufficient to keep up with increased consumption, spurred on by population and economic growth. In addition, continued expansion of fossil fuel use poses dire threats to the biosphere.

There is no time to waste in planning for a sustainable energy future, one that will ensure economic security as well as ecological preservation. Efforts on the international, federal, state, and individual level could produce solutions to the energy dilemma while at the same time making positive steps toward taking care of the planet. Individuals can alleviate the ill effects of fossil fuel combustion by conserving energy whenever possible. As a nation, we must commit ourselves to the research, development and implementation of cleaner, more efficient energy alternatives. But ensuring the safety of our planet will require global collaboration on sustainable energy policies, as well as reducing population growth.

Endnotes
4 Ibid.
6 Ibid.
7 Coal data: op. cit. note 1, p. 276. United States electricity data: op. cit. note 3.
11 Ibid.
15 Oil reserves estimate: Oil and Gas Journal cited in op. cit. note 15. Estimate of years reserves will last: op. cit. note 1, p. 275.
17 Op. cit. note 3. Table 1.3 shows total petroleum consumed. Table 2.1 shows petroleum consumed by the transportation sector.
18 U.S. Department of Transportation, Bureau of Transportation Statistics webpage: wwwwbts.gov.
32 Ibid.
33 Environment Canada website (www.ec.gc.ca/water).
**Are People the Problem?**

**Student Activity 21**

**Concept:**
In order to determine whether a region is “over-populated,” students must consider consumption levels of resources and energy in addition to numbers of people.

**Objectives:**
Students will be able to:
- List ways we depend on energy.
- Rank countries in terms of population size and energy consumption.
- Draw correlations between population growth and energy consumption trends.

**Subjects:**
Social studies, math, environmental science

**Skills:**
Collecting and recording data, analyzing and interpreting data, estimation, mathematical calculations, graphing

**Method:**
Through data calculations and discussion questions, students will examine the relationship between population and energy consumption.

**Materials:**
Copies of Student Worksheets 1 and 2 for each student

**Introduction:**
When studying population pressures, it is important to consider consumption levels and their environmental impacts. In this activity, students inquire into the relationships between numbers of people and energy consumption. After this examination, students are asked to consider the statement: The United States is the most overpopulated country in the world today.

**Procedure:**
1. Hand out Student Worksheet 1 to the students. Before beginning the activity, have students suggest some of the ways we use energy in this country. What aspects of our lives depend on energy being available? Have students list them.
2. Have students complete Student Worksheet 1 and the first half of Student Worksheet 2 either individually, in pairs, or as an entire class. Tell students to leave the third column in Student Worksheet 1 blank for now.
3. Discuss some of the students’ answers to the questions in Student Worksheet 2. Tell the class they will test these answers by calculating the per capita energy consumption of the world.
4. Have students follow the directions on the second half of Student Worksheet 2. Then, have a general discussion or have students write their responses to this statement: The United States is the most overpopulated country in the world today.

**Follow-up Activity:**
After determining the extent of energy consumption in the United States and the increase in energy consumption worldwide, students should now examine the environmental impacts of increased energy use worldwide. Lead a discussion on the detrimental effects of increased fossil fuel use. How can less developed countries get ahead if they do not implement the energy consumption habits of industrialized countries?

**Suggested Answers to Student Worksheet 1**

<table>
<thead>
<tr>
<th>Energy Consumption</th>
<th>Population</th>
<th>Energy Use (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe/Central Asia, 33.6%</td>
<td>East Asia/Pacific, 33.9%</td>
<td>North America, 7,823</td>
</tr>
<tr>
<td>North America, 28.6%</td>
<td>South Asia, 22.0%</td>
<td>Europe/Central Asia, 3,097</td>
</tr>
<tr>
<td>East Asia/Pacific, 22.2%</td>
<td>Europe/Central Asia, 15.4%</td>
<td>Middle East/N.Africa, 1,374</td>
</tr>
<tr>
<td>Latin America/Caribbean, 5.7%</td>
<td>Sub-Saharan Africa, 10.1%</td>
<td>Latin America/Caribbean, 960</td>
</tr>
<tr>
<td>Middle East/N.Africa, 4.8%</td>
<td>Latin America/Caribbean, 8.4%</td>
<td>East Asia/Pacific, 934</td>
</tr>
<tr>
<td>South Asia, 3.4%</td>
<td>North America, 5.2%</td>
<td>Sub-Saharan Africa, 237</td>
</tr>
<tr>
<td>Sub-Saharan Africa, 1.7%</td>
<td>Middle East/N.Africa, 4.9%</td>
<td>South Asia, 222</td>
</tr>
</tbody>
</table>

**Suggested Answers to Student Worksheet 2**

1. a) 29% b) 3%
2. Answers may vary, but remember: a decrease in the population might help decrease energy consumption, but a decrease in the growth rate would not, unless it decreases to a negative rate.
3. Answers may vary. However, a decrease in population growth does not automatically create an increase in energy consumption.
4. Some of the many possible answers include: increase in air pollution, increased climate change, more ozone layer depletion, shortage of fuels and more political conflicts.
5. The data suggest that factors such as energy consumption should also be considered when discussing the problem of overpopulation.
Are People the Problem?

Do countries with the smallest population size have the smallest population problem?

Energy has been a vital prerequisite for development in technology, science, medicine, etc. It is an important factor in the world today. By looking at its relationship to population size, we can shed some light on the above questions.

Look at these figures for the seven basic world areas.

<table>
<thead>
<tr>
<th>Area</th>
<th>Energy Used(^1) (metric tons of oil equivalent)</th>
<th>Energy Use(^2) Percent of World Total</th>
<th>Population</th>
<th>Population Percent of World Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe/Central Asia</td>
<td>2,658,274,000</td>
<td>33.6%</td>
<td>858,314,040</td>
<td>15.4%</td>
</tr>
<tr>
<td>East Asia/Pacific</td>
<td>1,762,310,000</td>
<td>22.2%</td>
<td>1,887,116,379</td>
<td>33.9%</td>
</tr>
<tr>
<td>South Asia</td>
<td>271,293,000</td>
<td>3.4%</td>
<td>1,220,040,541</td>
<td>22.0%</td>
</tr>
<tr>
<td>Middle East/N. Africa</td>
<td>376,793,000</td>
<td>3.4%</td>
<td>1,220,040,541</td>
<td>4.9%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>133,471,000</td>
<td>1.7%</td>
<td>563,168,776</td>
<td>10.1%</td>
</tr>
<tr>
<td>Latin America/Caribbean</td>
<td>451,011,000</td>
<td>5.7%</td>
<td>469,803,125</td>
<td>8.4%</td>
</tr>
<tr>
<td>North America</td>
<td>2,267,710,000</td>
<td>28.6%</td>
<td>289,894,647</td>
<td>5.2%</td>
</tr>
<tr>
<td>World Total</td>
<td>7,920,862,000</td>
<td>100%</td>
<td>5,564,533,468</td>
<td>100%</td>
</tr>
</tbody>
</table>

What do the data tell us? List the world areas in decreasing order of energy consumption and then population size. Indicate the percentage after each. Leave the category “Per Capita Energy Consumption” blank for now.

<table>
<thead>
<tr>
<th>highest</th>
<th>Energy Consumption</th>
<th>Population Energy use</th>
<th>Per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
</tbody>
</table>

lowest

---

Are People the Problem?

Student Worksheet 2

Part 1:

1. 5.2% of the world’s population consumes __________ % of the world’s energy while ...

22% of the world’s population consumes __________ % of the world’s energy.

What might account for this?

2. In your opinion, would a decrease in the North American population growth rate decrease national energy consumption?

3. In your opinion, would a decrease in the population growth of South Asia automatically increase energy consumption in South Asia?

4. If all world areas eventually reach an energy consumption level comparable to that of North America, what problems might result?

5. How does the information presented here suggest that the problem of overpopulation involves more than a simple increase in numbers?

Part 2:

1. Now, turn back to Student Worksheet 1 and calculate the energy use per person and again list the areas in descending order. (Note: You should convert your answers to kilograms; 1 metric ton = 1,000 kilograms).

2. Do you still feel the same about your answer to the first question on Student Worksheet 1?

3. Considering what you have studied, again respond to this statement: The United States is the most overpopulated country in the world today.
Getting Around

Student Activity 22

Introduction:

North Americans have a long-standing love affair with their cars. There are more cars per person in the United States than in any other country. As the population increases, so do the number of cars on the road, and hence the congestion and pollution. Motor vehicles are major contributors to air pollution, ozone depletion, climate change, acid rain and the loss of scenic beauty as roads and parking lots pave over the American landscape. Using less or cleaner burning fuel would reduce this pollution. After the oil embargo of 1973, Americans sought smaller, more fuel efficient vehicles, but now with low gas prices, sport utility vehicles (SUVs) and minivans are becoming more popular. These larger vehicles emit more pollution than cars because the 1975 policy mandating higher fuel efficiency was more lenient on these automobiles. With the international pressures to reduce greenhouse gas emissions, our transportation habits are the source of debate. Some current options follow:

- Increase fuel efficiency of SUVs and minivans.
- Develop alternative fuels for internal combustion, like ethanol and methanol.
- Provide electric or hybrid electric/internal combustion vehicles.
- Expand public transportation systems in metropolitan areas.

Procedure:

1. In order to assess transportation habits and viewpoints in their local area, students will develop a survey to conduct in the community. As a class, have students devise the survey questions (see examples on next page). Students might want to question people about their desire for some of the alternative transportation options.

2. While developing the survey students should consider how best to compile the data. Have students word the questions in a manner which is easy to evaluate. This might be with yes/no questions, multiple choice, other styles, or a combination of styles (see sample questions on next page). Also, have students determine whether they wish to do a demographic breakdown of their data. If so, they should add spaces for survey takers to check off factors such as their age and gender.

3. Once the content of the survey is determined, a representative from the class should type it up. Then copies should be made so that each student has at least ten surveys to administer.

4. Conducting the survey may be done in a variety of ways. Since students wish to get a diverse sample from the community at large, it may be easiest for them to go to a busy area, such as a shopping mall or outside of a grocery store or subway station. Students can either seek permission to set up a table or they can walk around with a clipboard and ask questions of interested passers-by. Another option would be to go door-to-door in their neighborhoods, if they have parental and school approval. Respondents should be assured that their answers will be kept completely anonymous. Also, please remind students that the purpose of this activity is to collect data and not to make judgments upon any individual’s responses.

5. Each student should be responsible for tallying his/her own results. These results can then be compiled by one or two students in the class.

6. What do these results say about transportation habits in your community? Have students draw basic conclusions from the survey results. Consider having these results published in the school and/or local community newspaper.

Follow-up Activity:

Students can formulate recommendations for managing the community’s transportation problems. They can explore the advantages and disadvantages of implementing various options, such as creating or widening roads, building a mass transit system, encouraging carpooling, limiting growth, etc. This activity is not limited to the classroom. Students can voice their ideas at city council meetings or through letters to the editor of the area newspaper.

Concept:

Transportation habits in the U.S. and Canada contribute greatly to each nation’s dependency on fossil fuels. These habits need to be evaluated as we seek solutions to growing transportation problems.

Objectives:

Students will be able to:

- Create and conduct a transportation survey.
- Analyze the collected data and publicize the result.
- Suggest ways of managing transportation in their local area.

Subjects:

Environmental science, language arts, social studies, family life

Skills:

Developing and administering a survey, tabulating and interpreting data, evaluation

Method:

Students conduct a community survey to determine local transportation habits.

Materials:

Copies of Sample Questions and Survey Tips
Yes/No Survey

All questions have only yes or no answers. You might want a few comment-type questions.

1. Do you drive a vehicle?
2. Would you characterize traffic in your area as congested?
3. Are you aware of a place where you could get ethanol?
4. If an electric car suited your needs in all areas except had a slightly higher cost and was limited to commuting use only, would you buy it?
5. Did you know about electric cars being available on the market?
6. Do you use your car to commute to school or work?
7. Do you carpool? (If so, how many people are in your carpool?)
8. Do you think the area needs more roads and highways?
9. Do you feel that your area’s public transit system is adequate for your needs?

Multiple Choice Survey

The choices should be labeled (a, b, c, etc.), or there should be places for people to mark their choices.

1. What size vehicle do you drive, if you own one?
   - motorcycle
   - minivan
   - compact car
   - van
   - sport utility vehicle
2. How often do you check the air in your tires?
   - once a week
   - once a month
   - once a year
   - never
3. When buying a vehicle what features are most important?
   - gas mileage
   - color
   - style/appearance
   - roominess/comfort
   - engine size
   - other
4. How would you characterize traffic in your area?
   - very few cars on the road
   - few cars on the road
   - moderate traffic
   - congested
   - very congested
5. What type of gas do you use?
   - unleaded
   - premium unleaded
   - ethanol
   - methanol
   - diesel
   - other
6. How many miles do you put on your car each week?
   - 0-100
   - 101-300
   - 301-600
   - 601-1100
   - 1101+
7. How many cars are owned by your household? (Circle)
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
8. Do you drive the speed limit?
   - always under
   - sometimes under
   - at speed limit
   - sometimes over
   - always over
9. What types of alternative transportation do you use? (Circle all that apply)
   - None
   - bike
   - bus
   - subway
   - light rail
   - carpool
   - walk
10. How often do you use alternative transportation?
    - never
    - rarely
    - sometimes
    - mostly/often
    - always
An Energizing Policy

Student Activity 23

Introduction:
In comparison with other industrialized countries, America is lagging in its efforts to reduce emissions. Although North America comprises only five percent of the world's population, it consumes 29 percent of the world's energy. In the mid-1980s, oil prices dropped sharply, discouraging investment in U.S. oil exploration, conservation and development of alternative energy sources and energy-efficient technologies. Consequently, greenhouse gases have continued to increase, up 8.8% between 1990 and 1996. Therefore, goals set in 1992 at the UN Conference on Environment and Development (UNCED) no longer seem attainable. With a better understanding of the economic and political approaches to reduce emissions, the participants at the 1997 Framework Convention on Climate Change (COP3) Kyoto Conference began new international discussions and strategies for reducing greenhouse gas emissions.

Procedure:
1. Distribute copies of the Student Worksheet.
2. A list of resources where students might wish to start their research has been provided. Be sure to encourage them to go beyond this list. If students request literature from organizations, advise them to write or call at least one month before the paper is due.
3. Allow students creativity with this project, and encourage them to think of both the international and domestic positions surrounding energy issues. To attain a greater understanding of the complexity of energy issues, students should elaborate on the many viewpoints surrounding their topic.
4. When grading the research papers, look for demonstrated research, clarity of thought, persuasive argumentation and critical thinking skills.

Follow-up Activity:
As a class, have the students put together a comprehensive proposal for the United States' or Canada's energy policy and send it to the lawmakers. To prepare for this activity, divide the students into groups, based on the focus of their papers. In these groups, students will work together to create their portion of the energy policy proposal for the country. Each group will decide what position it is taking and provide detail of how to accomplish this position. These proposals may include several recommendations, but it is important to be as specific as possible. For instance, if recommending increased energy conservation measures, be precise about what form these measures would take and how they should be implemented. For each recommendation, give a full explanation as to why this plan would be best for the country. Informing students of this follow-up activity up front may be useful in minimizing the need for further research during this stage. Once each group has written its proposal, compile the group papers into the comprehensive energy policy proposal. Each group's section can be a separate chapter in the proposal. Finally, the class should work together to develop an introduction and conclusion to the comprehensive proposal, and then it could be sent to the lawmakers.

Office of the President
The White House
1600 Pennsylvania Ave., NW
Washington, DC 20500
email: president@whitehouse.gov

Representative _____________
The U.S. House of Representatives
Washington, DC 20515

Senator _____________
The U.S. Senate
Washington, DC 20510
Who's mine? www.senate.gov

House of Commons
Parliament Buildings
Ottawa, Ontario K1A 0A6

Concept:
Develop energy policies to meet a country's energy needs while reducing greenhouse gas emissions.

Objectives:
Students will be able to:
• Research a specific energy issue.
• Determine economic and environmental costs and benefits of current energy types and consumption levels, along with possible alternatives.
• Formulate a proposal for energy use.

Subjects:
Language arts, environmental science, social studies, economics, civics/government

Skills:
Critical thinking, research, writing, decision making, persuasion

Method:
Students research a topic related to energy use and policy in the United States or Canada and formulate a position, weighing costs and benefits.

Materials
Copies of Student Worksheet
Research materials from various energy associations (see attached list), public interest groups and library resources
An Energizing Policy

Student Worksheet

North America is the largest consumer of energy per capita, and our primary source of energy in the United States is coal, a nonrenewable resource. Is our country on the right track? Are there other options? Should we lower our energy use and if so, how?

Your assignment is to identify the best course of action for the United States (or Canada) on any of the topics below. Describe the different options within your topic and address both the positive and negative aspects of these options. You should explore environmental and economic costs and benefits. Then, formulate a position as to what you think is best for the United States (or Canada) and why. A list of resources has been provided to help you start your research. Whatever course of action you choose, be sure to back it up with the data you uncover in your research.

Possible Energy Topics:
1. Weigh the pros and cons of our current sources of fuel for vehicles, along with some other options that are not in wide use. For example: gasoline vs. ethanol, or catalytic converter vehicles vs. electric cars, hydrogen or solar powered cars, etc.

2. Propose the degree to which we should rely on domestic vs. imported oil by looking at the current trends and future options.

3. Discuss the benefits and drawbacks of nonrenewable vs. renewable energy resources.

4. Transportation systems currently focus on highways for vehicles. Compare this to funding and developing alternative and mass transit systems.

5. Look into oil exploration and report on the possibilities of new sources like the Arctic National Wildlife Refuge. Are there others? What are the pluses and minuses of oil drilling in these areas?

6. Analyze the trends in household and business energy use. Compare the energy-efficient technologies for these consumers to each other and to less efficient technologies.


8. Look at the current level of funding for research and development of alternative energy sources and propose what it should be. (Higher or Lower?)

9. Research how oil exploration and/or vehicle manufacturers are subsidized and hypothesize about how this affects their productivity vs. subsidizing alternative fuel development.
An Energizing Policy

Suggested Resources on Energy Information

GOVERNMENT AGENCIES:
U.S. Department of Energy
PA-40
1000 Independence Avenue, SW
Washington, DC 20585
202/586-5575
www.doc.gov/

National Alternative Fuels Hotline
PO Box 12316
Arlington, VA 22209
800/423-1DOE
www.afdc.nrel.gov/misc/sources.html

Nation Clean Cities Hotline
800/224-8437

Natural Resources Canada
Public Inquiries; Main Floor
580 Booth Street
Ottawa, Ontario Canada
K1A 0E4
613/995-0947
www.nrcan.gc.ca; www.es.nrcan.gc.ca/

Environment Canada/ The Green Lane
www.ec.gc.ca/
www.ed.gc.ca/climate

INDUSTRY ORGANIZATIONS:
American Gas Association
1515 Wilson Boulevard
Arlington, VA 22209
703/841-8400
www.agaa.com

American Petroleum Institute
1220 L Street, NW
Washington, DC 20036
202/682-8000
www.api.org

Electric Power Research Institute
1019 19th Street, NW, #1000
Washington, DC 20036
202/872-9222
650/855-2000 (CA Headquarters)
www.epri.com

Interstate Natural Gas Association of America
10 G Street, NE, Suite 700
Washington, DC 20006
202/626-3200
www.ingaa.org

National Bio-Energy Industries Association
122 C Street, NW, 4th Floor
Washington, DC 20001
202/383-2540

National Hydrogen Association
1800 M Street, NW, Suite 300
Washington, DC 20006
202/223-5545
www.ttcorp.com/nha

Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006
202/739-8000
www.nei.org

Renewable Fuels Association
1 Massachusetts Avenue, NW, Suite 820
Washington, DC 20001
202/289-3835

Solar Energy Industries Association
122 C Street, NW 4th Floor
Washington, DC 20001
202/383-2600
www.seia.org

PUBLIC INTEREST GROUPS:
Consumer Energy Council of America
Research Foundation
2000 L Street, NW, #802
Washington, DC 20036
202/659-0404
www.cecaf.org

Public Citizen
1600 20th Street, NW
Washington, DC 20009
202/588-1000
www.citizen.org/

Union of Concerned Scientists
1616 P Street, NW, Suite 310
Washington, DC 20036
202/332-0900
www.ucsusa.org

World Resources Institute
1709 New York Avenue, NW, Suite 700
Washington, DC 20006
202/638-6300
www.wri.org/wri/

Energy Council of Canada
30 Colonnade Rd., Suite #400
Ottawa, Ontario K2E 7J6
613/952-6469
www.energy.ca/