Web-quest Exploration Guide

STUDENT

NAME _____ DATE _____ PERIOD _____

Energy demand is growing in the United States and around the world. At the same time, there is increasing public and political concern about the future of energy resources and the impact of energy generation and consumption on the environment. With energy demand increasing, it is important for us to know where our energy comes from, how much we consume, and how we can contribute to energy conservation and a clean energy future. This *Web-quest Exploration Guide* will direct you to several online resources related to energy. Follow the instructions and complete the worksheet to turn in to your teacher.

1. WHAT IS NONRENEWABLE ENERGY?

- Go to the *United States Environmental Protection Agency Clean Energy* Web site: http://www.epa.gov/cleanenergy/
- Click on *How does energy use affect my environment* under the *Energy and You* menu.
- Click on the links to *Coal, Oil, Natural Gas,* and *Nuclear* and fill out the following chart:

Nonrenewable Energy Resource	*Description*	*Environmental Impacts*
Coal		
Oil		
Natural Gas		
Nuclear		

- Next, go to the *Environmental Literacy Council* Web site: http://www.enviroliteracy.org/
- Click on *Energy* on the left menu and then Click on *Fossil Fuels* on the right menu.
- Answer the following questions:

1. What are some advantages of using fossil fuels?

2. Why do experts describe the rate of fossil fuel use as "unsustainable"?

II. WHAT IS RENEWABLE ENERGY?

- Go to the *National Renewable Energy Laboratory (NREL)* Web site: http://www.nrel.gov/learning/re_basics.html
- Fill out the following chart. List the seven renewable energy resources described on the *NREL* Web site, and briefly describe ways in which these resources can produce energy (click on each link to get more information).

Renewable Energy Resource	*Description*

III. RENEWABLE ENERGY VIDEO

- Go to the *National Geographic Video* Web site: http://video.nationalgeographic.com/video/index.html
- Click on *Energy* under the *Environmental Video* menu.
- Put on your headphones and watch the video, *Alternative Energy* (the video will play automatically).
- Answer the following questions:

1. Why do you think renewable energy is gaining attention in the U.S.?

2. What do you think are the barriers that are preventing the U.S. from utilizing more renewable energy sources?

IV. INTERNATIONAL ENERGY CONSUMPTION

- Go to the *International Energy Agency Dynamic Maps* Web site: http://www.iea.org/country/maps.asp
- Click on *Go to the Map* under *Map Energy Indicators*.
- Click on *Map Energy Indicators* in the upper left corner and select *Energy Consumption.*
- Click on *North America*, click on the *United States*, and record the statistics below.
- Click on *Asia (including China),* select *China,* and record the statistics below.
- Click on *OECD Europe*, select a country of your choice, and record the statistics below.
- Click on *Africa*, select *Zimbabwe*, and record the statistics below:

International Energy Indicators				
Country	***Population (million)***	***GDP[1] (billion 2000 U.S. $)***	***Energy Production (Mtoe)[2]***	***Electricity Consumption (TWh)[3]***
U.S.				
China				
OECD European Country: _____				
Zimbabwe				

[1] GDP = Gross Domestic Product: Total market value of all goods and services produced within the country in a given time. GDP = consumption + gross investment + government spending + (exports-imports).

[2] Million Tonnes of Oil Equivalent (Mtoe) is a unit of energy used for expressing the amount of energy released by burning one tonne of crude oil (see http://en.wikipedia.org/wiki/Tonne_of_oil_equivalent for more information).

[3] Terawatt hour (TWh) is a unit of energy used for expressing the amount of produced energy, electricity, and heat. 1 TWh = 1 trillion (1012 watts) (see http://en.wikipedia.org/wiki/Watt#Terawatt for more information).

- Based on the data you've recorded in the chart above, provide two reasons why you think the U.S. and China produce and consume much larger amounts of electricity.

V. WHAT TYPES OF ENERGY DO WE CONSUME IN THE U.S.?

- Go to the *U.S. Energy Information Administration* Web site: http://tonto.eia.doe.gov/energy_in_brief/renewable_energy.cfm
- Answer the following questions: *(The data is updated yearly, so you will need to fill in the year for the data provided on the Web site).*

1. In _____ (year), how much energy did the U.S. consume? _____
2. In _____ (year), what percentage of energy in the U.S. came from fossil fuels? _____
3. In _____ (year), what percentage of energy in the U.S. came from renewable sources? Give answer in Btu and as a percentage. _____
4. List the renewable energy sources that were consumed in 2006 and the percentage of total renewable energy consumed:

   Source: _____
   Percentage: _____
   Source: _____
   Percentage: _____
   Source: _____
   Percentage: _____
   Source: _____
   Percentage: _____
   Source: _____
   Percentage: _____

VI. ENERGY IN YOUR STATE

- Go to the *U.S. Energy Information Administration State Energy Profiles* Web site: http://tonto.eia.doe.gov/state/
- Select your state from the list, and select and record two interesting quick facts about energy in your state.

State:

Quick Fact 1:

Quick Fact 2:

VII. POWER PROFILER: HOW CLEAN IS THE ELECTRICITY I USE?

- Go to the *U.S. Environmental Protection Agency Clean Energy* Web site: http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html
- Enter your five-digit zip code in the box.
- Select the utility company that provides your electricity (this can be found on a copy of your home electric bill). Click *Next.*
- Review Graph 1: *What is my fuel mix?*
- Fill in the following chart:

Fuel Mix						
	Coal	Gas	Oil	Nuclear	Hydro	Non-Hydro Renewables
Your region's fuel mix (%)						
National fuel mix (%)						

- Next, click on the button *Buy Green Power* under *How Can I Make a Difference* and select your state. List a utility or program that utilizes green power products and the type of product(s) used.

State:

Utility Name:

Program Name:

Type:

VIII. FUTURE ENERGY CONSUMPTION TRENDS IN THE U.S.

- Go to the *U.S. Energy Information Administration/Annual Energy Review* Web site: http://www.eia.doe.gov/emeu/aer/
- Click on *Consumption by Source.*
- Review *Figure 6.* What are the projected trends for energy consumption in the U.S. to the year 2030?

Conclusion

Energy demands are growing, placing an increasing strain on global energy resources. In the U.S., the current energy systems rely heavily on nonrenewable resources. The challenges associated with using these resources and their projected availability put their future use in question. Increasing the amount of energy produced from renewable resources will help expand our energy options. In addition, conserving energy through new technologies and changes in behavior are important steps for creating a more sustainable energy future. Now that you have learned about various renewable and nonrenewable energy sources, as well as energy consumption in the U.S., you can take part in a class discussion prompted by the discussion questions.

Discussion Questions

1. What agencies or organizations sponsored the Web sites you collected information from and what might their bias be?

2. Do you think the information presented on the Web sites is balanced?

3. What makes some energy sources renewable and others nonrenewable?

4. What are the advantages of using renewable energy sources?

5. Do you think the U.S. has an obligation to reduce its use of nonrenewable energy sources? Why?

6. What future energy trends do you think are likely for the U.S.?