

Energy WebQuest- Nonrenewable and Renewable Energy

Name _____ Date _____ Period _____ Score _____

Essential questions:

How do people make use of resources to power their everyday energy needs?

How does the use of these resources impact the environment?

What are steps we can take to lessen the impact of energy production and use on the planet?

Objectives:

1. Define energy and the major sources of energy currently in use.
2. Explain the difference between energy efficiency and energy conservation.
3. Describe nonrenewable energy sources and the advantages and disadvantages of each.
4. Describe renewable energy sources and the advantages and disadvantages of each.
5. Evaluate energy sources for their contribution to sustainability and energy independence for the U.S.

Part 1

Energy Webquest: Introduction to Energy and Nonrenewable Energy Sources

Go to this website

<http://www.eia.gov/kids/energy.cfm?page=1>

Energy Basics

1. Define energy and list 7 forms of energy.

2. What are the two types of energy?

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3. Draw and label the pie chart that shows U.S. Energy Consumption by Energy Source.

Energy Calculators

1. What does Btu stand for?

2. List the unit primarily used for each type of energy - listed first on each “calculator”
 - a. **Coal-**
 - b. **Electricity-**
 - c. **Natural gas-**
 - d. **Crude oil-**
 - e. **Gasoline-**
 - f. **Diesel fuel and heating oil-**

3. How many Btu’s are in one quad?

Energy Sources – first page <http://www.eia.gov/kids/energy.cfm?page=2>

1. What percent of U.S. energy comes from nonrenewable energy sources?

2. List the four categories of nonrenewable energy sources.

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Click on the major heading “Renewable”

http://www.eia.gov/kids/energy.cfm?page=renewable_home-basics

1. The five renewable sources used most often are:

2. Why don't we use more renewable energy sources?

Go back to Energy Sources – first page, click on Electricity

http://www.eia.gov/kids/energy.cfm?page=electricity_home-basics

1. What does it mean to say that electricity is a secondary energy source?

Click on Science of Electricity, Read Magnets and Electricity

http://www.eia.gov/kids/energy.cfm?page=electricity_science-basics

1. Complete this quote:

By using moving _____ and _____ wire together, electric
_____ create electricity. Electric generators essentially convert
_____ energy (the energy of motion) into _____ energy.

2. How does a battery produce electricity?

3. Explain how we can produce electricity by turning a turbine.

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Go to Electricity in the U.S.

http://www.eia.gov/kids/energy.cfm?page=electricity_in_the_united_states-basics

1. What is the main way that we turn turbines in the U.S.?
2. Look at the graphic labeled “Sources of U.S. Electricity Generation” and complete the following chart:

Energy source	Percent of U.S. Electricity generated from this source
Renewable energy sources (includes hydroelectric at 8%)	
Petroleum	
Nuclear	
Natural Gas	
Coal	

Go into Nonrenewable, Oil

http://www.eia.gov/kids/energy.cfm?page=nonrenewable_home-basics

1. Explain how oil is formed.
2. List the five states that produce the most oil in the U.S.

3. Complete the following chart for the top 5 oil-producing countries in the world:

Country producing oil	% of world's supply it produces

3. What is an oil refinery?
4. What three steps are used to refine oil?

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5. Complete the following table showing what is produced from a barrel of oil:

Product	Amount produced from a barrel of oil
Diesel	
Other distillates	
Jet Fuel	
Other products	
Heavy fuel oil	
LPG	
gasoline	

6. Review these pollutants that come from petroleum. What are the negative environmental or health impacts of each?

Pollutant	Negative environmental or health impacts
Carbon dioxide (CO ₂)	
Carbon monoxide (CO)	
Sulfur dioxide (SO ₂)	
Nitrogen oxides (NO _x) and Volatile Organic Compounds (VOC)	
Particulate matter (PM)	
Lead and various air toxics such as benzene, formaldehyde, acetaldehyde, and 1,3-butadiene may be emitted when some types of petroleum are burned	

Go to Natural Gas http://www.eia.gov/kids/energy.cfm?page=natural_gas_home-basics

1. What is the primary component of natural gas?
2. Where is most of the natural gas used in the U.S. produced?
3. How is natural gas moved from the producing fields to the consumer?
4. What is LNG and how is it transported?

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5. What are the top 5 natural gas producing states/regions in the U.S.?

6. Natural gas is a relatively clean burning fuel, meaning it produces less _____ than oil or coal.

7. Under “Advances in Drilling...”, what is fracking and what are its environmental impacts?

Go to Coal: http://www.eia.gov/kids/energy.cfm?page=coal_home-basics

1. List the four types of coal and the characteristics of each:

Type of coal	% carbon content	Heating value rank	State where it is mined
		1	
		2	
		3	
		4	

2. Describe surface mining.

3. Describe underground mining

4. 93% of the coal used in the U.S. is used to produce _____.

5. What is mountaintop mining?

6. What are the primary pollutants that come from burning coal?

7. What are fly ash and bottom ash? What is used to remove these from emissions?

Go to Uranium: http://www.eia.gov/kids/energy.cfm?page=nuclear_home-basics

1. What is the difference between nuclear fission and nuclear fusion?
2. Which is used in nuclear power plants?
3. What is the most common fuel used in nuclear power plants?
4. What are the steps that produce electricity from this fuel?
5. Explain the two types of nuclear power plants.

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6. Draw and label the parts of a boiling water nuclear reactor.

7. Nuclear power plants produce no _____

but they do generate _____.

8. What are two ways that spent fuel (which is still radioactive) can be stored?