

WebQuest: Exploring Energy Sources

Grade Level:	Time Frame:
9th-12th	Day 1: 50 minutes Day 2: 50 minutes
Standards (ALCOS Science):	
<p>Earth and Human Activity: 1) Investigate and analyze the use of nonrenewable energy sources (e.g., fossil fuels, nuclear, natural gas) and renewable energy sources (e.g., solar, wind, hydroelectric, geothermal) and propose solutions for their impact on the environment.</p> <p>Earth and Human Activity: 13) Obtain, evaluate, and communicate information based on evidence to explain how key natural resources (e.g., water sources, fertile soils, concentrations of minerals and fossil fuels), natural hazards, and climate changes influence human activity (e.g., mass migrations).</p> <p>Earth and Human Activity: 15) Construct an explanation based on evidence to determine the relationships among management of natural resources, human sustainability, and biodiversity (e.g., resources, waste management, per capita consumption, agricultural efficiency, urban planning).</p>	
Objectives:	
<p>Students will research various natural resources used to supply energy for human activity by obtaining and evaluating information from credible online web sources.</p> <p>Students will use research to construct an evidence-based explanation on the sustainable use of resources and be able to communicate their position to a peer group.</p>	
Background Information:	
<p>Renewable Energy- energy that comes from resources that are naturally replenished on a human timescale; these include wind, solar, geothermal, biofuel, and hydro.</p>	

Made Possible By:



<http://alcse.org/education>

Sustainable—refers to the concept that renewable energy resources will always be around and never be depleted

The sources of non-renewable energy most commonly used today, like coal and natural gas, may meet our needs now, but at the rate we’re using them, we’ll burn through them and leave none behind for future generations. These resources are secured through mining and drilling and when we use them up we have to dig and drill into the earth for more.

Renewable energy resources such as wind, solar, geothermal, and hydro can never be depleted, and that means they’re fully sustainable—both for today and tomorrow. These can be remade or restored to be used again in the same way.

There are situations that affect our use of solar energy like the position of the sun (daily and seasonally), clouds, smoke and smog, trees, buildings, and land surfaces. We need sunlight to keep us healthy and happy, but too much can give us sunburn. The sun is renewable energy; it is abundant, convenient, nonpolluting, and affordable. It is the ultimate energy source.

Materials:

- FOR EACH STUDENT:
 - Access to iPads, laptops, or computer lab
 - This activity could be completed with a textbook but is designed for online web access in order to focus on research skills using digital technology.
 - Pages from “(9th-12th) Exploring Energy Sources WebQuest” file
 - Teacher can make the file available to be digitally edited by the student or print the pages to be hand-written
 - 2 boxes or trays for the “Engage” activity
 - 1 index card with “Renewable” written on it with a Sharpie marker
 - 1 index card with “Nonrenewable” written on it with a Sharpie marker
 - 1 index card with “Sustainable” written on it with a Sharpie marker
 - 1 index card with “Non-sustainable” written on it with a Sharpie marker

Day 1 Activities

Engage (10 minutes):

1. Students will be prompted to write down on a sticky note or small scrap paper (they don’t need their name on it) the following:
 - a. “List one type of natural resource that supplies energy for human activity on earth.”
2. **Make it active!** Students will walk to place their completed answer in either the “renewable” or “nonrenewable” box or tray.
3. Two selected students (or teacher) will read the answers from each box or tray.
 - a. At this time, there is not a “right” “wrong” focus but simply to access classroom prior knowledge on the subject.

Explore (35 minutes):

1. **Research it!** Students will use computer lab, laptops, or iPads to research 8 different types of natural resources used for energy. They should complete the **Part I** section of the WebQuest by filling in the boxes of the graphical organizer.
 - a. See "**Materials**" section for file information.
 - b. Remind students of the need to use CREDIBLE sources such as websites ending in ".gov" or ".org" as opposed to using Wikipedia or other publicly edited sites.
2. Students may not finish in 35 minutes of Day 1 but can use Day 2 to complete the Part I & II tasks.

Evaluate (5 minutes):

1. **Discuss it!** Students will turn to a neighbor and list one type of energy resource that they learned about during their research and describe whether it is renewable or nonrenewable.

Day 2 Activities

Engage (10 minutes):

1. Students will be prompted to write down on a sticky note or small scrap paper (they don't need their name on it) the following:
 - a. "List one type of natural resource that supplies energy for human activity on earth."
2. **Make it active!** Students will walk to place their completed answer in either the "sustainable" or "non-sustainable" box or tray.
3. Two selected students (or teacher) will read the answers from each box or tray.
 - a. At this time, there is not a "right" "wrong" focus but simply to access classroom prior knowledge on the subject.

Explore (30 minutes):

1. **Research it!** Students will use computer lab, laptops, or iPads to research 8 different types of natural resources used for energy to complete any remaining research on **Part I**.
2. Students will complete **Part II** of the WebQuest Activity by using their research to form an opinion represented by a 2-3 paragraph explanation in response to the prompt on the graphic organizer.
 - a. Students may still want to research some of the terms and concepts in the actual prompt.

Evaluate (10 minutes):

2. **Discuss and Debate!** Students will form peer discussion groups to share their constructed explanations, along with their opinions, on the subject.

Extend (optional use):

Chants and Hand Motions

(from NEED.org)

Renewable Chants and Hand Motions

BIOMASS: Garbage, wood, landfill gas...it's all BIOMASS!

Hold your nose while chanting, "Garbage, wood, landfill gas." During "It's All Biomass," shake your hands near your shoulders.

GEOHERMAL: Geo-Earth, Thermal-heat—GEOHERMAL—Earth-heat!

Hold arms in a circle in front of you during "Geo-Earth." Cross arms and hug yourself for "Thermal-heat." Shout "GEOHERMAL," then repeat the motions quickly for "Earth-heat."

HYDROPOWER: Falling water, HYDROPOWER, HYDROPOWER!

With your finger tips touching, hold your hands under your chin and glide your hands down like a waterfall during "Falling water." For "HYDROPOWER, HYDROPOWER" spin your hands like a turbine.

SOLAR: SOLAR ENERGY—sun shine bright, SOLAR ENERGY—give me light!

Begin with arms over head in a big circle, swaying from side to side during "SOLAR ENERGY." Spread arms out wide during "sun shine bright." Repeat motions for second part of the chant.

WIND: Energy is flowin' in the WIND!

Make big arm circles, mimicking a wind turbine, as you say this chant.

Nonrenewable Chants and Hand Motions

COAL: COAL in the hole—makes light in the night!

During "COAL in the hole," point down with thumbs, hands in fists. During "makes light in the night," point thumbs upward in rhythm with the cadence of the chant.

NATURAL GAS: Burn clean, burn fast—NATURAL GAS!

During "Burn clean," bring one hand up in front of you, palm facing inward. During "burn fast," bring the other hand up to the first hand. During "NATURAL GAS," move hands upward together to make the shape of a flame.

PETROLEUM: Pump, pump—PETROLEUM!

Place hands together in fists in front of you. During "Pump, pump," partially extend fingers twice and return them to a fist. During "PETROLEUM," fully extend hands and move them upward, representing oil shooting from a well.

PROPANE: Put a little pressure on me—PROPANE!

Begin with hands wide apart and bring palms closer together at each word of the chant.

URANIUM: URANIUM, URANIUM—split goes the atom!

Clap twice during “URANIUM, URANIUM.” During “split goes the atom,” clap and bring hands out and up, representing the splitting atom.

References:

The National Energy Education Development Project – <http://need.org>

Part I: Research					
Energy Source	Is this resource <u>renewable</u> or <u>nonrenewable</u>?	Provide a description or a diagram/image of how this resource is used.	How does this resource influence human activity?	What environmental impact does the use of this resource have?	List your reference(s) here.
biofuels					
fossil fuels					
geothermal					
hydroelectric					
natural gas					
nuclear					
solar					
wind					

Part II: Evidence-based Explanation

From your research, choose one or two of the energy resources that you have determined to be the most sustainable for human use. In 2-3 paragraphs explain how the proper use of the selected energy resources can contribute to human sustainability and protect biodiversity.

Blank area for writing the response.