



TEACHER-LED ACTIVITY | GRADE RANGE: 6–8

Cool Energy

OBJECTIVES

Students will:

- Identify forms of renewable and nonrenewable energy.
- Analyze the benefits and tradeoffs of multiple sources of energy.
- Apply their understanding of energy sources to a real-life scenario.

OVERVIEW

Students will participate in a WebQuest activity to collect information on renewable and nonrenewable forms of energy, focusing on the benefits and tradeoffs of each. They will use their findings to start thinking about what form of energy would be best for their specific needs when it comes to keeping cool in warm weather.

TIMING

45–60 minutes

MATERIALS NEEDED

- Device with internet access, one per student, pair, or group
- **Renewable and Nonrenewable Energy Sources** student handout, one per student
- **Energy WebQuest** student handout, one per student
- **Exit Ticket** student handout, one half-sheet per student

ESSENTIAL QUESTION

- What is the best form of energy to keep me cool?

PROCEDURE

Engage

1. Introduce students to the upcoming concept by displaying and discussing the following essential question:

What is the best form of energy to keep me cool?

Learn

2. Ask a volunteer to share the difference between renewable and nonrenewable energy. Reinforce that renewable energy can be replenished naturally and relatively quickly. Energy sources are considered nonrenewable if they cannot be replenished in a relatively short amount of time.

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3. Distribute a **Renewable and Nonrenewable Energy Sources** handout to each student. Read the ten energy sources aloud to the group with a brief explanation of each. Take a moment to consider what makes each renewable or nonrenewable.

Note: The [energy4me®](https://www.energy4me.com) website is referenced throughout the WebQuest and can be used as a teacher and student resource.

Apply

4. Distribute one **Energy WebQuest** handout to each student. Students will use the websites provided to fill in the table with energy descriptions and the benefits and tradeoffs of each form of energy.
5. After completing the WebQuest, students should again consider the essential question: What is the best form of energy to keep me cool? Applying what they have learned, students will decide which form of energy would be the best choice to use to keep people cool in warm weather and record their responses on their handouts. Encourage students to provide reasoning and evidence from the information they gathered during the WebQuest.

Discuss

6. Give students an opportunity to share their responses and reasoning with the class.

Reflect

7. Distribute an **Exit Ticket** Student Handout to each student and ask them to reflect upon the activity's essential question by completing a confidence rating. Collect them as students leave and use responses to determine their level of understanding. Consider taking time in a future session to address misconceptions, highlight key takeaways, or share interesting insights brought up on the tickets.

EXTENSION IDEAS FOR EDUCATORS

- Organize a classroom debate in which students use their research to debate which energy source is the best.
- Facilitate an energy fair through which students can educate their peers or community on the different energy sources.
- Have students role-play energy consultants. Provide them with real-life scenarios to which they must recommend energy solutions.

NATIONAL CONTENT STANDARDS

National Science Standards

- MS-ESS3-3: Apply scientific principles for monitoring and minimizing human impact on the environment.
- MS-ESS3-4: Construct an argument supported by evidence for how consumption of natural resources impacts Earth's systems.

Common Core State Standards for ELA

- SL.1: Engage effectively in a range of collaborative discussions.
- SL.6: Adapt speech to a variety of contexts and tasks.
- W.1: Write arguments to support claims with clear reasons and relevant evidence.
- W.7: Conduct short research projects to answer a question.

Science and Engineering Practices

- Asking Questions and Defining Problems.
- Engaging in Argument from Evidence.

THE 10 ENERGY SOURCES

RENEWABLE

A natural resource that can be replenished over time faster than it is used; we will not run out of renewable resources



BIOMASS

Something that is alive or was alive a short time ago and is used as fuel. The most common biomass is wood but can also be crops, garbage, or animal waste.



GEOHERMAL

Energy that is produced by the internal heat of the Earth.



HYDROPOWER

The use of falling or fast-moving water to create energy and produce electricity.



SOLAR

Radiant light and heat from the sun that is collected and used to create thermal or electrical energy.



WIND

The use of moving air to create energy and produce electricity.

NONRENEWABLE

A natural resource that cannot be easily replaced fast enough to keep up with how much is used; we can use up our supply of nonrenewable resources



COAL

A shiny black rock that is formed when dead plants are buried and compressed over millions of years. It is a fossil fuel that can be burned to create energy.



NATURAL GAS

A mixture of gases found underground that results from plant and animals being buried and subjected to high temperatures for millions of years. This fossil fuel can be burned to create heat.



PETROLEUM

A liquid mixture of hydrocarbons called "oil" that is found underground in certain rock strata and is the result of the decomposition of living things over time. It is a fossil fuel that is used as gasoline, heating oil, or to make things like plastic.



PROPANE

A flammable gas found in petroleum and natural gas that can be compressed and used as fuel. This fossil fuel is a byproduct of processing natural gas and crude oil and is most commonly used for cooking and heating.



URANIUM

A radioactive metal found in rocks underground that's atoms can be split to release energy.

*WHAT ARE FOSSIL FUELS?

Fossil fuels are formed over hundreds of millions of years from the remains of living plants and animals that received their energy from the sun when they were alive and stored it in their remains after they died and decomposed. Millions of years of compression and high temperatures produced materials that can be extracted from underground to create energy.

Directions: Use the website below to learn more about each type of energy and its benefits and tradeoffs. [Energy Sources](#)

| Energy Source | Description | Benefits | Tradeoffs | Other Suggested Websites |
|---------------|-------------|----------|-----------|---|
| Biomass | | | | https://www.eia.gov/energyexplained/biomass/biomass-and-the-environment.php |
| Geothermal | | | | https://earth.org/geothermal-energy-advantages-and-disadvantages/ |
| Hydropower | | | | https://earth.org/pros-and-cons-of-hydroelectric-energy/ |
| Solar | | | | https://earth.org/what-are-the-advantages-and-disadvantages-of-solar-energy/ |
| Wind | | | | https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy |
| Coal | | | | https://education.nationalgeographic.org/resource/coal/ |
| Natural Gas | | | | https://www.energy.gov/natural-gas |
| Petroleum | | | | https://www.energy.gov/oil |
| Propane | | | | https://afdc.energy.gov/fuels/propane-benefits |
| Uranium | | | | https://www.energy.gov/nuclear |

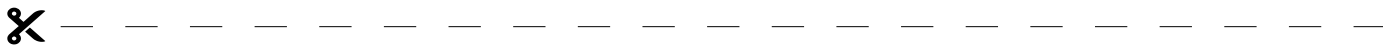
Directions: Using what you have learned during the WebQuest, write a paragraph explaining which form of energy would be the best choice to keep people cool during warm weather



Exit Ticket

Rate your confidence in your ability to independently complete each action:

| Action | Very Confident | Somewhat Confident | I Still Need Help |
|---|----------------|--------------------|-------------------|
| I can differentiate between renewable and nonrenewable energy sources. | | | |
| I understand the benefits and tradeoffs of different forms of energy. | | | |
| I can identify at least three types of renewable and nonrenewable energy. | | | |



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