



ENERGY AND HOW IT'S USED

LESSON SUMMARY

An introduction to energy, this 2-day lesson begins with an activity stressing our 21st century dependence on energy and concludes with students identifying your state's energy resources and their role in the students' daily lives.

ACADEMIC STANDARDS

(Will populate with specifics for state)

OBJECTIVES

The student will be able to

- Define energy
- Name and tell the difference between primary and secondary sources of energy
- Tell the difference between conventional and renewable energy sources
- Identify sources of energy in use in students' daily lives

VOCABULARY

Energy – usable power (as heat or electricity); the resources for producing such power

Primary sources of energy – energy forms found in nature (natural resources) that have not been subjected to any conversion or transformation process

Secondary sources of energy – usable forms of energy derived from the transformation of primary energy sources

Renewable energy sources – sources of energy that are not depleted when used, such as wind or solar power

Conventional energy sources - sources of energy that are generally non-renewable, such as fossil fuels

BACKGROUND INFORMATION

Almost everything we use today requires some kind of **energy** to power it, but energy isn't just readily available in the air or in the wall (although in their "wireless world", many students may not consider this). Electricity is an example of a **secondary source** of energy produced from other **primary sources** of energy, such as coal, petroleum, natural gas, solar, hydro, geothermal, wind, and other sources found in the US. These natural resources are required to make the electricity and other forms of energy upon which we have come to depend.

Life as we know it would cease to exist without energy production. All of our technology and gadgets require electricity; our cars and other forms of transportation require fuel; and all of the machinery required to make material goods in plants and factories use energy.

Fossil fuels are extremely important because they are currently our main primary sources of energy to generate secondary sources (such as electricity, gasoline, and other fuels). In 2015, 67% of electricity was generated from fossil fuels ([U.S. Energy Information Administration](#)). The US has a significant amount of fossil fuels available to create electricity: coal, petroleum, natural gas, and several others. We also have solar and wind farms which help produce electricity. Fortunately, because of recent technological advances and cost reductions that have taken place in the industry, we can produce more



energy from renewable energy sources than ever before. So even though renewable energy currently makes up a smaller percentage of our electric generation capabilities when compared to fossil fuels, with continued advancement in renewable technology, renewable energy can become a more abundant source of electricity generation in our future.

LESSON ACTIVITY

Teacher will begin class with lights off (using candles if necessary) and NOT using any devices requiring electricity or batteries. Students will write stories about what their lives would be like without electricity and other energy sources.

Materials

Computer with internet
Projector to show videos
Paper
Pens

Procedure

DAY 1:

1. Teacher will begin class with the lights, computers, and any other devices requiring electricity turned off. Have candles lit if necessary. As the students come in the room, they will want to turn on the lights, but tell them you're conducting class today without electricity (you will only have to do this for a few minutes to prove a point).
2. Ask what items around the room cannot be used without electricity, batteries, etc., and record their answers (lights, computers, printers, phones, tablets, pencil sharpeners, etc.).
3. Then ask where electricity comes from, and record their answers.
4. Turn the lights back on and ask them to get in groups and create a story of what they would do all day if they lived in a world without electricity. They may use technology for this, or you can require them to use pen and paper to continue the demonstration.
5. Have them read their stories aloud to the class.
6. Homework (optional, can be done in class)

DAY 2:

1. Ask students to get out their homework and have a class discussion based on their answers. Record all or just any interesting answers.
2. Facilitate the following class discussion: We all know that we use electricity every day. Most objects and devices that we depend on would not work without electricity. (Give some examples from #4 in the homework.) But has anyone ever thought about where electricity comes from? Does it just exist in nature, or do we have to make it somehow? (Make the connection to #6 answers.) Make sure the students can define primary energy source and secondary energy source (#5) and discuss the differences.
3. Show [this video about electricity generation](#).
4. Show [this fossil fuel energy video from Bill Nye and Discovery Education](#).
5. List the following energy sources on the board: coal, oil, natural gas, solar, wind, geothermal, nuclear, and hydropower.
6. Go to [Energy.gov's site](#) and show students more information about each form of energy. Point out which forms of energy you have in your state (coal, natural gas, oil, solar, wind, hydro, geothermal).



ASSESSMENT

Day 1

Students get in groups and create a story of what they would do all day if they lived in a world without electricity; read aloud to class.

Homework: Have students complete **Student Homework Worksheet**.

Day 2

Show the above videos about energy and have a class discussion.

LESSON EXTENSIONS

Have the students research what source(s) of electricity their electricity provider uses to provide that electricity.

Go to [Energy.gov's site](#) to compare your state's energy usage with the US average and other states' usage.

Websites:

[Energy.gov site](#)

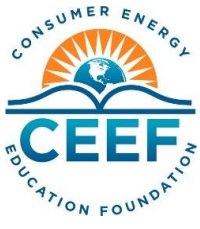
Apps that teachers can use as additional ways to teach:

[General \(all forms of energy\)](#)

[Natural gas and electricity safety app](#) (iPad)

[Bill Nye the Science Guy](#) (iPad)

SAMPLE



Student Homework Worksheet

Directions: Answer the following questions in complete sentences.

1. Describe how it felt earlier when you couldn't use items that require electricity. Was it annoying? Was it difficult to see in your classroom?

2. What is energy?

3. Name at least 3 ways we use energy on a daily basis.

4. List 15 things in your home that you use daily that require electricity.

5. Who is your electricity provider? If possible, look up how much electricity (in kWh) your household used last month. You may have to look at a bill, or you could look it up online.

6. Define primary energy source and secondary energy source.

7. Name 4 primary sources of energy in your state. You may have to research this with an adult.