

FOCUS
ON
SCIENCE

Energy Resources

Basic Level



Physical Science
Forces and Motion on Earth

FOCUScurriculum

866-315-7880 • www.focuscurriculum.com



Scientific Inquiry

The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

Construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.

Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.

Physical Science

Energy exists in many forms, and when these forms change energy is conserved.

The Sun is a major source of energy for Earth. Other sources of energy include nuclear and geothermal energy.

Fossil fuels contain stored solar energy and are considered non-renewable resources. They are a major source of energy in the United States. Solar energy, wind, moving water, and biomass are some examples of renewable energy resources.

Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations.

Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations.

Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.

Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy.

Electrical circuits provide a means of transferring electrical energy. Energy cannot be created or destroyed, but only changed from one form into another.

Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.



English Language Arts

The following is a selective listing of the competencies and indicators addressed in this book.

Word Recognition

- Use word recognition skills and strategies quickly, accurately, and automatically when decoding unfamiliar words

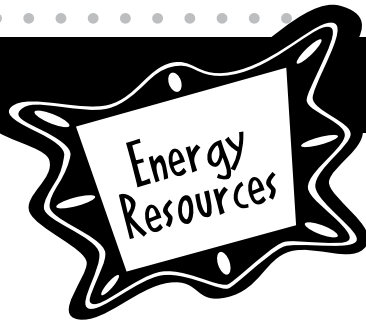
Background Knowledge and Vocabulary Development

- Use self-monitoring strategies to identify specific vocabulary difficulties that disrupt comprehension, and employ an efficient course of action, such as using a known word base or a resource such as a glossary to resolve the difficulty

Comprehension Strategies

- Use a variety of strategies (e.g., summarizing, forming questions, visualizing, and making connections) to support understanding of texts read

For use with your students, please purchase curriculum materials with your school license.



Published by FOCUScurriculum
866-315-7880
www.focuscurriculum.com

Copyright © 2019 FOCUScurriculum
Order Number PS-62BL

Written by Caitlin Scott
Created by Kent Publishing Services, Inc.
Designed by Signature Design Group, Inc.

No part of this publication may be reproduced without purchasing a license from the publisher. To purchase a license to reproduce this publication, contact FOCUScurriculum. The publisher takes no responsibility for the use of any of the materials or methods described in this book, nor for the products thereof.

Every reasonable effort has been made to locate the ownership of copyrighted materials and to make due acknowledgement. Any omissions will gladly be rectified in future editions.

How to Help Your Students Make the Best Use of This Book

Encourage students to develop nonfiction literacy skills by completing the Active Reader activities. Also encourage them to . . .

- Underline main ideas in paragraphs.
- Circle details that support the main ideas.
- Write down questions as they read.
- Circle key words as well as unfamiliar words.

Printing Instructions

Student Book: print pages 5–32

Assessments: print pages 33–36

Answer Key: print pages 37–40

**FOCUS
ON
SCIENCE**

Energy Resources



How does human consumption of resources impact the environment and our health?

A natural resource is something found in nature that people use. We use some natural resources for energy such as electricity or heat. We need energy to survive.

Some energy resources might last forever. But some will not. It is important that we learn about our energy resources. Then we can decide how best to use them.

To use FocusCurriculum materials
with your students, please purchase
a school license.

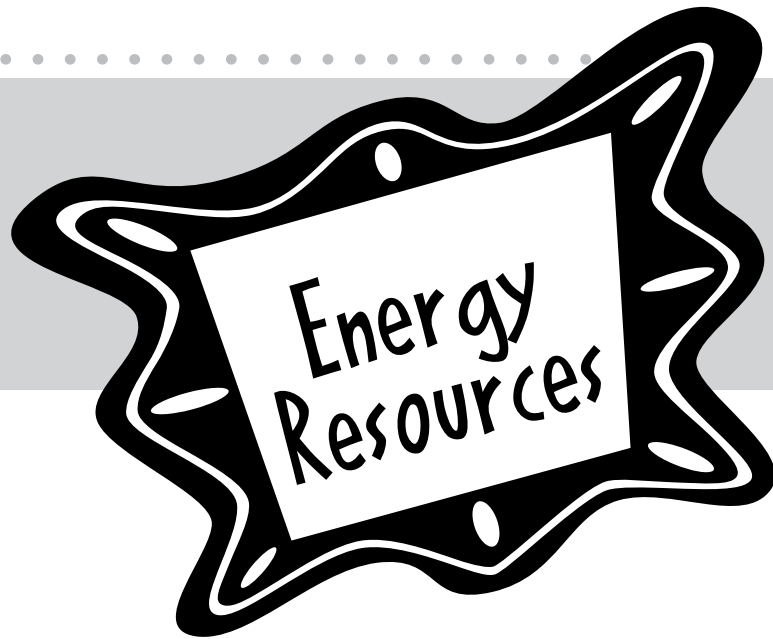


Table of Contents

Starting Points

Build Background	8
Hands On Science: Energy Use	8
Key Vocabulary	10
Key Concepts	11

Chapter 1 Renewable and Nonrenewable Energy

Renewable Energy Resources	12
Nonrenewable Energy Resources	17
Stop and Think	19
Hands On Science: Classify	20
Hands On Science: Understanding the Water Cycle	20

Chapter 2 Electricity

Making Electricity	21
Stop and Think	25
Think Like a Scientist: Summarizing and Evaluating	26

Chapter 3 Managing Energy Resources

Wise Choices	27
Stop and Think	29
Think Like a Scientist: Draw Conclusions from Data	30
Think Like a Scientist: Energy Audit	31

Glossary	32
Assessments	33
Answer Key	37



Build Background

Label It

People use energy in many different ways. Think about the different ways you can heat a building, your home, or your school. Write a sentence or two telling how you think buildings are heated.

Rate Your Knowledge

Here are two groups of words that have do to with energy. Add a word to each list. Then, write a label in the gray box that describes the words in the list.

car	solar
computer	electrical
stove	coal



Energy Use Many things we use every day take energy to make them work. Anything that we plug into an outlet on the wall uses electricity. Anything that uses batteries is using energy from the batteries.

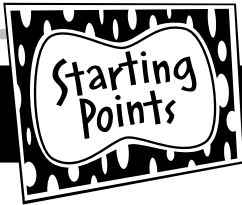
1. On the next page, draw a rough sketch of your room at home.
2. Include a picture of everything in your room that uses energy.
3. Complete the table to tell the name of each object that uses energy and the source of the energy that object uses.



My Room

To use FocusCurriculum materials with your students, please purchase a school license.

Things That Use Energy	Where the Energy Comes From



Key Vocabulary

Use Roots to Unlock Meaning

The words listed below have to do with energy and natural resources. Each word is important to know, but some of them may be new to you. Rate your knowledge of each one by checking the appropriate column. Give the definition, if you know the word.

	I don't know it.	I've seen it, but I'm not sure what it means.	I know it well, it means...
circuit			
transformer			
renewable			
nonrenewable			
hydropower			

Making Electricity

Many science words come from Greek or Latin. Knowing Greek and Latin prefixes and roots can help you unlock the meaning of many science terms. The prefix re- means "to do again." Use your knowledge to discover the meanings of the following words.

1. **Renew**

possible meaning: _____

2. **React**

possible meaning: _____

3. **Review**

possible meaning: _____

Key Concepts

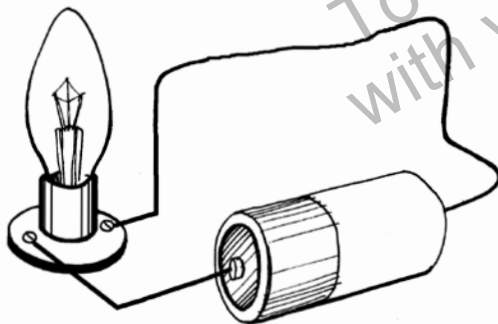
Electricity

Electricity is in our homes and in our school. We use it every day. There are many different ways to make electricity. For example, the chemicals in a battery mix together and make energy. But how does the electricity get out of the battery? We also burn coal to make electricity. But how does it get from the coal plant to your house?

Electricity moves along loops of wire called **circuits**. These loops might be short. For example, in the picture, the energy travels from a battery to a light bulb.

But electricity can travel a long way, too. A machine called a **transformer** helps electricity travel many miles. In the transformer the electric current changes from low to high voltage. Voltage is the force or strength of an electric current. High voltage is very strong. It can travel a long way.

But we need low voltage to run things in our homes and schools. So the electricity goes to another transformer. This transformer changes the electricity back to low voltage. Now we can use the energy.



Wires connect the battery to the light bulb creating an electric circuit.

ACTIVE READER

1 Monitor *Underline the sentences that tell us what a circuit is.*

2 Infer *Find the word transformer in the text. What words before and after transformer help you determine what the word means?*

Chapter 1 Renewable and Nonrenewable Energy

FOCUS

The underlined sentences tell important ideas about energy resources. Read this section to learn about renewable resources.

There are two kinds of natural energy sources: renewable and nonrenewable. Renewable resources replace themselves. The resources replace themselves as fast as, or faster than, we use them.

Renewable Energy Resources

Solar Energy

We get solar energy from the sun. It is renewable. The sun comes up every day. In fact, the sun will give us energy for the next five billion years!

There are two kinds of solar energy: passive and active. Think about how the sun heats up your car on a hot day. That's passive solar energy. Another name for this kind of energy is **thermal energy** or heat energy.

We get active solar energy by using a collector, such as a solar panel. The solar panel captures sunlight energy. Then, it stores the energy in a battery. Next, the energy is turned into electricity. The electricity can then be used to power things or heat a home.

ACTIVE READER

1 Predict Look at the name of the chapter. What do you think this chapter is about?

2 Words in Context
What are two synonyms for thermal energy?



Many products capture solar energy. Use the phrase solar energy product to search the Internet and find out more!

Wind Energy

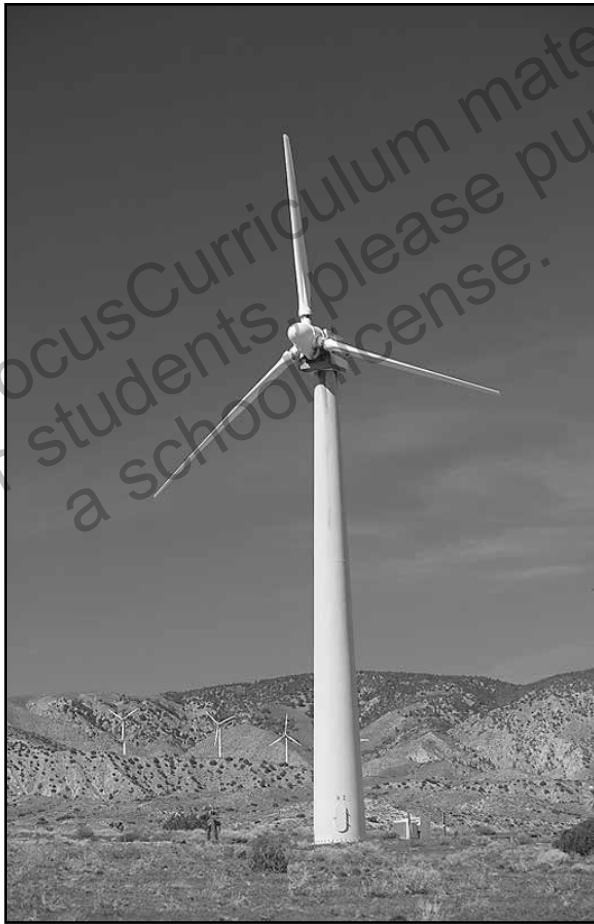
Wind is another kind of renewable energy source. When the sun heats parts of the earth, hot air rises and cold air falls. This makes wind. Air is always moving. Just like solar energy, wind energy will last a very long time. In fact, as long as we have sunshine, we will have wind.

Wind turbines look like big fans. The wind flows over the blades and makes the blades turn. The turning blades are connected to a drive shaft. The drive shaft turns an electric generator. This generator makes electricity.

The Conservation of Energy

The Law of Conservation of Energy states that energy cannot be created or destroyed. However, it can change form. For example, mechanical energy can be converted to electrical energy by a wind turbine. When this happens, some of the energy is converted to heat instead of being captured as electricity. In this way, the process of converting energy can cause pollution in the environment. Some systems are better than others in creating usable energy.

A wind turbine has blades that catch the wind. As the wind hits the blades, they turn. The blades are connected to a generator which also turns. The generator then creates electricity.



ACTIVE READER

1 Compare and Contrast

How are solar and wind energy alike and different?

Alike _____

Different _____

Good to Know

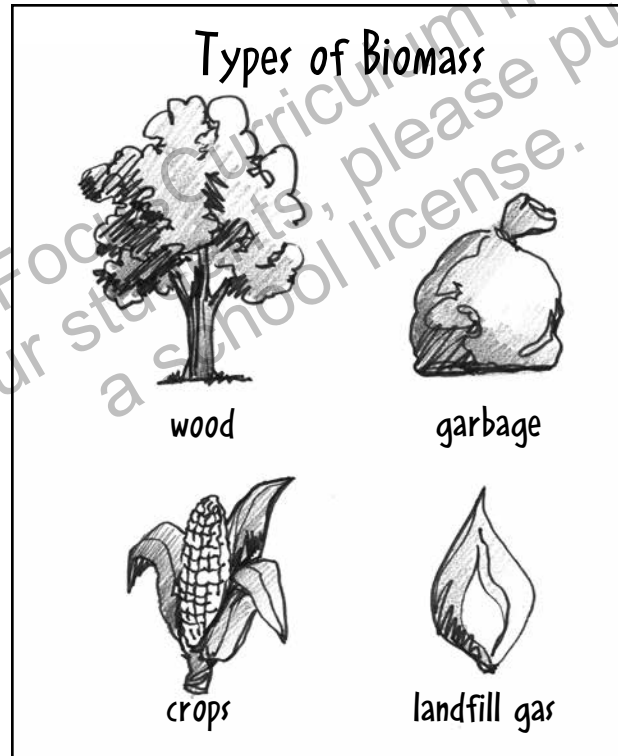
A wind turbine is as tall as a 20-story building. It has three blades that are 200 feet across. It would be much taller than your school. The largest wind turbines in the world have blades longer than a football field. These large turbines capture more wind.

Biomass Energy

Biomass is another name for material made from plants and animals. Logs, sticks, and crops are all kinds of biomass. Biomass is used to make renewable energy. This energy is renewable because plants can grow back when people use them up.

Some biomass is burned to heat our houses. For example, people burn logs in fireplaces or wood stoves. Some biomass is used to make fuel. Companies change plants into ethanol or biodiesel. This fuel can be used in cars and trucks instead of gasoline.

Energy created from biomass is usually clean. But burning biomass can create some air pollution.



Biomass can be burned for heat or changed into fuel.

ACTIVE READER

1 Hypothesize *Why do you think people have chimneys for fireplaces and wood stoves? Think about the smoke made when burning wood.*

2 Infer *Find the word ethanol in the text. What words in the next sentence tell you what ethanol means?*

Good to Know

Some other countries get a lot of their energy from biomass. For example, sugarcane is cheap to grow and easy to turn into ethanol. About 50 percent of Brazil's cars and trucks use fuel from sugar cane.

Hydropower Energy

Another kind of renewable energy comes from water. **Hydropower** is energy made from running water. It is an unending resource. Why? Because of the water cycle.

People collect the energy of moving water by using turbines. Turbines have blades just like wind turbines. The water pushes against the blades and turns them. The turbine spins a generator. This makes electricity.

One way to make water move more quickly is to build a dam across a river. When the water pours out of the dam, the turbines spin fast. The dam allows people to control how much water is released and how much energy is made.



A hydropower plant harnesses the power of moving water to create electricity.

ACTIVE READER

1 Use Roots *Hydro is Greek and means “water.” Use what you know about hydro to figure out what hydropower means.*

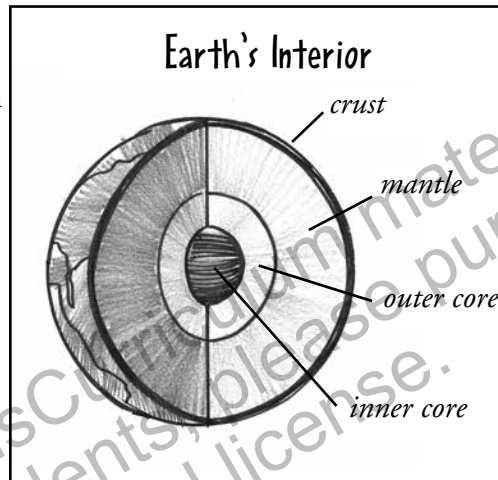
Geothermal Energy

Earth is made of layers: crust, mantle, and core. The crust is broken into large plates. These plates ride on a layer of hot lava. The plates move around very slowly.

Deep in Earth, the mantle is made of very hot magma. This heat comes close to the surface where Earth's crust is thin. It heats the rock and water around it.

The energy we get from this heat is called **geothermal** energy. To do this, we find places where Earth's crust is thin and where there is also plenty of water deep underground. Then, we dig deep wells and pump heated underground water to the surface. This energy can then heat homes. It can also turn a generator to produce electricity.

This resource will never be used up. This makes geothermal energy a renewable resource.



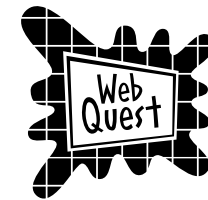
ACTIVE READER

1 Use Roots *The word geothermal comes from two Greek words. Geo means "earth," and therme means "heat." What do you think geothermal means?*

FOCUS QUESTIONS

1. List four sources of renewable energy.

2. What makes these energy sources renewable?



What places on our planet have the thinnest crust?

It is a place where there are many volcanoes. To find out, search the Internet using the phrase "ring of fire."

FOCUS

The next section tells about nonrenewable resources. The underlined sentences tell an important idea about these resources. Look for reasons why these resources were formed.

Nonrenewable Energy Resources

Fossil Fuels

Nonrenewable resources take a long time for nature to make. They can be used up quicker than they are replaced. Most oils, coal, and natural gases are nonrenewable. They are called fossil fuels. This is because they are formed from fossils. Here's how the earth makes oil and natural gas:

1. Long ago, plants and animals died.
2. Over millions of years, layers of mud covered the dead plants and animals.
3. These tons of mud pressed down on the dead plants and animals.
4. This pressure caused heat.
5. Heat turned the plant and animal fossils into oil or natural gas.

Today people drill into the earth to get the oil or natural gas. These resources are then changed into fuels that people can use.

But we are using oil much faster than the earth can make it. This is why fossil fuels such as oil are called nonrenewable resources.

ACTIVE READER

1 Hypothesize How long might it take for the earth to make more nonrenewable resources if people used them all up in the next few years?

Good to Know

Saudi Arabia, Russia, and the United States have a lot of oil. But, the amount of oil in the United States is shrinking each year. At the same time, we are using more and more oil. This is why the United States buys oil from other countries.

Coal

Have you ever had a barbecue outside where people burned charcoal to cook food? This is one type of coal. Other types of coal can be burned to heat buildings or to create electricity.

Like oil and natural gas, people are using coal faster than nature can make it. Coal is made in much the same way as oil and natural gas. Here's how the earth makes coal:

1. Long ago, parts of the earth were covered with swampy forests.
2. When plants in the forests died, they sank to the bottom of the swamps.
3. Over millions of years, these plants were covered with more water and mud.
4. Heat and pressure from the layers of mud turned the dead plants into coal.

Today people dig deep mines to get this coal out of the earth. Then, the coal goes to a plant. The coal gets cleaned. This makes the coal better for burning to create energy.

FOCUS QUESTIONS

1. How are fossil fuels formed?

2. How do we get energy from coal?

ACTIVE READER

1 Compare *What is one way coal is like oil?*

2 Contrast *What is one way coal is different from oil?*

Good to Know

For hundreds of years, people burned coal in open fires to heat their homes. Coal dust can make a house very dirty. It often made people sick. Today coal is turned into energy for our homes in a power plant. This makes it a lot cleaner, although burning coal still creates some pollution.

Stop and Think

This page will help you summarize what you have read so far.

1. Why are fossil fuels considered nonrenewable?

- (1) They can never ever be replaced.
- (2) People use them faster than nature creates them.
- (3) They are not made by nature.
- (4) People do not want to use them up.

2. Which is a renewable resource?

- (1) gasoline
- (2) natural gas
- (3) crude oil
- (4) wind energy

3. Which is a nonrenewable resource?

- (1) solar energy
- (2) wind energy
- (3) crude oil
- (4) hydropower

Base your answers to questions 4 and 5 on your knowledge of science.

4. Identify whether trees are a renewable or nonrenewable resource.

5. Explain why trees are the type of resource they are.

Dear Ms. Understanding,
 Is water always a renewable resource? I've heard about water becoming so polluted that you can't drink it or swim in it. Isn't that water nonrenewable?



Baffled in Brooklyn

Dear Baffled,
 Water pollution is a problem we need to solve. If we pollute our water, we will not be able to use it. But, nature will eventually renew the water, so water is still a renewable resource. So, the lesson here is that we need to be careful with our resources even when they are renewable.



Ms. Understanding

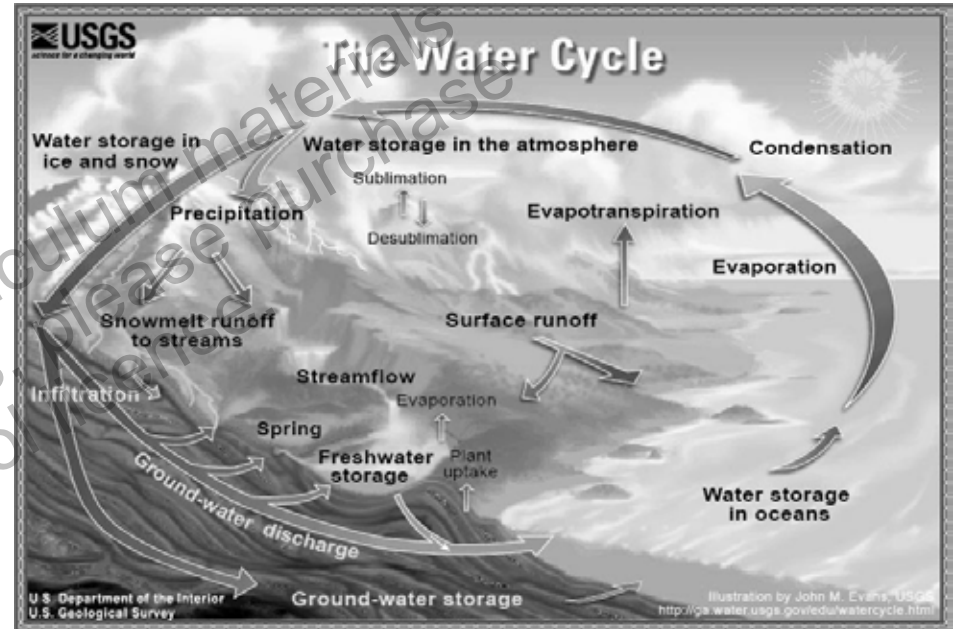
To use FocusCurriculum materials, please purchase with your students, a school license.



Classify Organize the energy resources into two groups by writing each one in the correct column. Then label the columns.

coal oil geothermal
hydropower natural gas solar wind

Understanding the Water Cycle The water cycle has four steps. Look at the diagram. Then write a number next to each step to show the correct order.



To use FocusCurriculum materials with your students, please purchase a school license.

- ___ 1 Water evaporates.
- ___ Water cools and falls as rain or snow.
- ___ Water forms clouds.
- ___ Water returns to oceans, seas, and lakes.

Chapter 1 Electricity

FOCUS

The underlined sentence tells an important idea about electricity. Read the next section. Find out more about what kinds of resources are used to create electricity.

Use Your Knowledge

Electricity is used for many things. It can turn on a lamp. It can light a football field. We use electricity every day.

Electricity is made from many different renewable and nonrenewable resources. For example, coal is burned to make electricity. Coal is nonrenewable. Other renewable resources, such as wind power, are never used up.

The chart below shows what energy resources were used to make electricity in the United States in 2016.

Energy Resource	Amount of U.S. Electricity Made in 2016
Natural Gas	33.8%
Coal	30.4%
Nuclear	19.7%
Hydropower	6.5%
Wind	5.6%
Biomass	1.5%
Solar	0.9%
Oil	0.6%
Geothermal	0.4%

ACTIVE READER

1 Interpret Look at the chart. Which resources do we use most?

2 Interpret Look at the chart. Which resources do we use least?

Good to Know

Energy is measured watts and kilowatts. There are 1,000 watts in a kilowatt. A 40 watt light bulb uses 40 watts of electricity in an hour. Use multiplication to find out how many watts a 40 watt light bulb uses in 3 hours.

Renewable Energy: Promise and Problems

There are good and bad things about using renewable resources to make electricity. One good thing is that renewable resources will not run out. They are also very clean. They do not cause pollution that makes our air or water dirty.

But, there are also bad things. On a cloudy day, we cannot get much solar energy. Wind energy also changes. The wind is not always blowing. This is one reason why it is important to get electricity from more than one resource.



Solar panels like these collect the renewable energy of the sun to heat homes and buildings.

ACTIVE READER

1 Words in Context Find the word *pollution* in the text. What words in the sentence tell you what *pollution* means?



There are many ways to fight pollution. To find out more use the phrase "pollution prevention" when you search the Internet.

There are good and bad things about using hydropower and geothermal energy. Energy from water and the earth will last for a long time. These resources are also cleaner than fossil fuels.

But we cannot get geothermal energy everywhere in the world. To get geothermal energy, you need to be in a place where the earth's crust is thin. Then you can reach the steam and hot water just below Earth's surface.

To use hydropower, you have to be near running water. To capture the energy in the water, people build large dams. Building dams can be expensive and dams can hurt animals such as fish.

Nuclear Energy

Like nonrenewable energy, nuclear energy creates dangerous pollution. Nuclear energy is created by splitting a uranium atom in a machine called a nuclear reactor.

But energy is just one thing that's created. Dangerous waste is also created when we split atoms. This nuclear waste is harmful. It can kill plants, animals, and people. It has to be buried deep in the earth. It will take millions of years for the waste to be safe.

Nuclear power plants create renewable energy. However, they create harmful wastes which need to be stored carefully.



ACTIVE READER

1 Compare How are the disadvantages of hydropower and geothermal power alike?

2 Contrast How are the disadvantages of hydropower and geothermal power different?

Good to Know

Because magma lies under Earth's crust, geothermal power should be available everywhere. Right? Well, magma is often buried too deep to reach. It would cost too much to drill down to get it. You may be surprised to learn that one place on Earth that uses a lot of geothermal energy is Iceland.

Nonrenewable Energy: Good and Bad

Nonrenewable energy resources are cheap. But, they all have the same major problem. We are using them up faster than the earth can make them. In the future, coal, oil, and natural gas will run out. As the supply decreases, the price of these resources will become very expensive.

Another problem is when we burn oil, coal, and natural gas, poisonous gases pollute our air. Also, when these fuels are taken out of the ground or spilled, they can pollute our water or land.

Oil is a nonrenewable resource. We are using it up faster than it can be replaced.



FOCUS QUESTIONS

1. How is energy from water and the earth like energy from the sun and wind?

2. What makes an energy source nonrenewable?

ACTIVE READER

1 Use Word Roots The suffix *-tion* can turn a verb into a noun. We know that *pollution* is something that makes air, land, or water dirty. What do you think *pollute* means?

Stop and Think

This page will help you remember what you have read.

1. Which resources are used to make electricity?

- | | |
|---------------------------------|--|
| (1) renewable resources only | (3) both renewable and nonrenewable resources |
| (2) nonrenewable resources only | (4) neither renewable nor nonrenewable resources |

2. What is one good thing about renewable resources?

- | | |
|---|--|
| (1) They create pollution. | (3) They are very inexpensive. |
| (2) The earth is renewing them quickly. | (4) The earth is never damaged by their use. |

3. What is one bad thing about renewable resources?

- | | |
|--|---|
| (1) We cannot find them everywhere. | (3) We do not know where to find them. |
| (2) They can pollute the air, land, and water. | (4) We are using them faster than the earth creates them. |

4. What is one bad thing about nonrenewable resources?

- | | |
|--|---|
| (1) We do not know where to find them. | (3) We do not know how to turn them into electricity. |
| (2) We do not know how to collect the resources. | (4) We are using them faster than the earth makes them. |

Dear Ms. Understanding,

I don't understand why people don't stop using nonrenewable resources. Renewable resources are cleaner and will last forever. So, why does the United States still use coal and oil?



Surprised in Schenectady

Dear Surprised,

In the past, nonrenewable resources were cheaper. Often, this is still true today. But things are changing. Nonrenewable resources are getting more expensive. People are worried about pollution. Scientists are learning ways to make renewable resources cheaper. I wonder how the United States will create electricity when you are an adult.



Ms. Understanding



Summarizing and Evaluating You have read about the advantages and disadvantages of using different types of resources to create electricity. Summarize what you have read by writing the advantages in the Pros column and the disadvantages in the Cons column.

Energy Resource	Pros	Cons
Solar	It is clean.	It does not work as well on cloudy days.
Wind		
Hydropower		
Geothermal		
Oil		
Natural Gas		
Coal		
Nuclear		

Chapter 3 Managing Energy Resources

FOCUS

This section tells how we can manage, or control, our energy resources. The first paragraph tells two main ways to do this. What are they?

Wise Choices

Every person in the world can find better ways to use our resources. This means you! There are two ways to manage our resources. First, we can conserve, or use less, energy. Second, we can use clean energy.

Use Less Energy

The United States uses nearly \$1 million of energy every minute. That's more than any other country. About one-fifth of this energy is used in homes. But it's easy to save energy everyday. Here are four ways to save energy.

1. Turn off and unplug appliances when you aren't using them.
2. Turn off the lights when you leave a room.
3. When it's cold, put on a sweater, and ask your family to turn down the heat.
4. When it's hot, wear shorts and a T-shirt, and ask your family to turn down the airconditioner or open the window.

There are other things that you can do to save energy. New appliances such as stoves and refrigerators can save energy than older ones. They cost a bit more, but they save money and energy over time.

ACTIVE READER

1 Words in Context Find the word conserve in the text. What words tell you what conserve means?

2 Extend What could you do tomorrow to save energy?

Good to Know

You've heard it before—Reduce, Reuse, Recycle. We know that it is better for the earth if we use less paper, water, and other products. Did you know that using less also saves energy? It takes energy to make every piece of paper we write on or appliance we buy. If we use less, that saves energy.

Choose Clean Energy

You can also choose clean energy. Some of these choices are easy to make. For example, don't ask for a ride to your friend's house in a car. Ride your bike or walk. Walking or biking does not cause pollution. But riding in a car does.

To find other kinds of clean energy, talk to others. Find out how your community gets electricity. Do you get your electricity from wind, solar, hydropower, or geothermal power? Can you do the same at home?

If your electric company doesn't use cleaner energy, write a letter to the company. Ask them to use cleaner energy. You can also write to people in government and ask them to bring cleaner energy companies to your community.

FOCUS QUESTIONS

1. What are two ways to better use our resources?

2. What is one thing you could do now to save our resources?

ACTIVE READER

1 Interpret How is riding a bike or walking cleaner than driving?

2 Synthesize What is the main idea of the last paragraph?



Find out about more ways to save energy and stop pollution. Type the phrase reduce, reuse, recycle into a web search engine.

Stop and Think

This page will help you remember what you have read.

1. Why is it important to use less energy and use clean energy?

- (1) to save money and decrease pollution
- (2) to help energy companies make more money
- (3) to make our lives more comfortable and easy
- (4) to help scientists inventing new ways to create energy

2. What would be a good way to save energy in the winter?

- (1) Leave most of the lights on when you leave a room.
- (2) Leave all the appliances on when you aren't using them.
- (3) Put on a sweater and ask your family to turn down the heat.
- (4) Wear shorts and ask your family to turn up the air conditioner.

3. Why are new appliances sometimes better for the environment?

- (1) They are less expensive.
- (2) They are smaller than before.
- (3) They use less energy.
- (4) They come in more colors.

4. Which would NOT help save energy?

- (1) insulating your home
- (2) buying renewable energy
- (3) replacing old appliances
- (4) keeping appliances plugged in

Dear Ms. Understanding,

Is riding a bus better than taking a car? I know that a bus uses gasoline and it pollutes, but many people can ride in a bus. Only a few people can ride in a car. Doesn't that save energy and pollute less?



Bus Rider in Buffalo

Dear Bus Rider,

You are correct. Buses do save energy and pollute less. It's true you can fit more people in a bus than in a car. Some cities even buy buses that use less fuel or use a fuel that makes less pollution. Find out if your city's buses are this good.



Ms. Understanding



Draw Conclusions from Data Students have found out how much it costs to heat a home using different energy sources. They want to figure out which is the cheapest. Here is the information they found. But some information is still missing. Study the chart and answer the questions that follow.

Location of Home	Size of Home	Age of Home	Energy Source	Yearly Cost
Tucson, Arizona	1200 sq. ft.	3 years	propane	\$356
Northern California	1600 sq.ft.	35 years	geothermal heat pump	\$504
Midwest	2300 sq. ft		electric furnace	\$1,319
Southeast		50 years	heating oil	\$649

1. The students thought an electric furnace would be the most expensive way to heat a home. Find electric furnace in the chart. Then look at the yearly cost. Is this true? Why?

2. What effect might the size and age of the home have on the yearly cost of heating?

3. What other information about the homes and their environment would help you draw conclusions?



Energy Audit Take a walk around your house. List all the things in each room that use energy. Then, list ways that you might save energy in each room. Don't forget heating and cooling.

Room	What Uses Energy	Energy Saving Ideas

Glossary

circuit – a closed loop

conserve – to prevent the waste or overuse of a resource

disadvantage – not an advantage

ethanol – fuel made from sugar cane or corn

evaporate – to change from water to water vapor in the air

fossil fuels – nonrenewable resources formed from decayed plants and animals

geothermal – energy from heat within the earth

hydropower – energy from flowing water or waves

nonrenewable – energy resources used at a faster rate than they are created by natural processes

pollution – something that makes land, air, and water unclean

renewable – energy resources created by natural processes faster at a faster rate than they are used

thermal energy – heat energy

transformer – a machine that let's electricity travel many miles

wind turbines – machines that capture the wind energy

To use FocusCurriculum materials
with your students, please purchase
a school license.

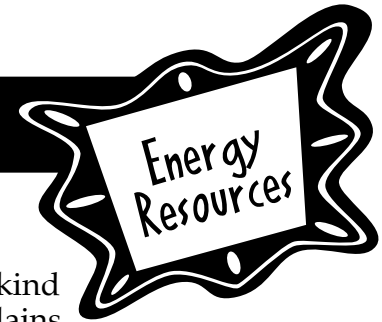
FOCUS
ON
SCIENCE

Energy Resources

Assessments

To use FocusCurriculum materials
with your students, please purchase
a school license.

Check Understanding



In the Answer Document on this page, mark your answer in the row of circles for each question by filling in the circle that has the same number as the answer you have chosen.

- Most electric power is made by burning coal and oil. A family living in central New York uses electricity for cooking and air conditioning. They use oil for heating.
How could this family use less nonrenewable resources?
 - buy a less expensive coal for heat
 - use natural gas as a fuel for cooking
 - raise the temperature setting on the air conditioner
 - install solar roof panels to generate additional electricity
- Why is natural gas a nonrenewable energy source?
 - Natural gas is difficult to find and capture.
 - The burning of natural gas could cause pollution.
 - Natural gas is everywhere, but it is expensive.
 - Once natural gas is used, it can take millions of years to be replaced.

- Which sentence tells about a kind of renewable energy and explains why it is renewable?
 - Coal: Once the coal is used up, there is no way to make additional coal.
 - Crude oil: There is a fixed amount of oil, and new oil takes millions of years to form.
 - Solar energy: There is only one sun in our solar system, and there is no replacement.
 - Hydropower: The water cycle moves water around the earth's surface, so the amount of water stays basically the same.
- Why is it a bad idea to get all of your heat using solar panels?
 - Solar energy makes pollution when it is used with wind energy.
 - Electricity from solar power is never strong enough to heat a house.
 - The sun does not always shine, so there might not be enough energy for heat.
 - The panels are expensive, so there might not be enough money to buy them.

Answer Document

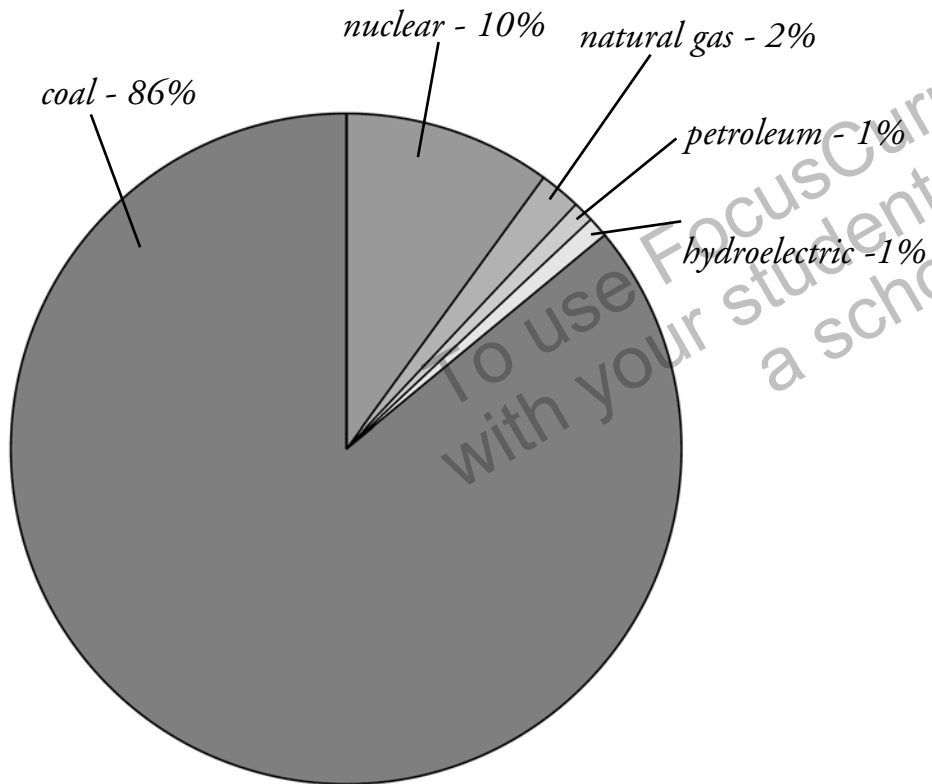
- | | | | | | | | | | |
|----|---|---|---|---|----|---|---|---|---|
| 1. | ① | ② | ③ | ④ | 3. | ① | ② | ③ | ④ |
| 2. | ① | ② | ③ | ④ | 4. | ① | ② | ③ | ④ |

Check Understanding



Use the chart below and your knowledge of science to answer questions 5, 6, and 7.

Sources of Electricity for the Town of Springfield



5. What is the source for most of Springfield's electricity?

6. What problems are associated with using this source of energy?

7. Identify a renewable energy source you would like your community to use and explain the reason.

**FOCUS
ON
SCIENCE**

Energy Resources

Answer Key

Answer Key

Page 8: Starting Points: Build Background
Use Your Knowledge: Answers will vary but could include electricity, gas, fireplaces, etc.

Label It: 1. Answers will vary, but headings can include: Energy Users and Energy Sources.

Hands on Science: Energy Use: Answers will vary, but students should list both objects that use energy and sources.

Page 10: Starting Points: Key Vocabulary
Rate Your Knowledge: Answers will vary according to student's prior knowledge.

Use Prefixes: 1. To make new again; 2. To act again.

Page 11: Starting Points: Key Concepts

Active Reader: 1. Electricity moves along loops of wire called circuits.; 2. travel

Page 12: Chapter 1

Active Reader: 1. The chapter will explain the two types of energy sources; 2. passive solar energy, heat energy.

Page 13: Chapter 1

Active Reader: 1. Wind and solar energy are alike because they are both renewable resources. They are different because solar energy comes from the sun and wind energy comes from wind.

Page 14: Chapter 1

Active Reader: 1. People have chimneys to carry air pollution from burning wood outside their houses.; 2. This fuel

Page 15: Chapter 1

Active Reader: 1. Renewable energy created by waves or running water;

Page 16: Chapter 1

Active Reader: 1. Power from the earth
Focus Questions: 1: Answers will vary but could include solar, wind, biomass, hydro, and geothermal.; 2. The earth is renewing these resources faster than people are using them.

Page 17: Chapter 1

Active Reader: 1. If people use up these resources it will take millions of years for the earth to create more.

Page 18: Chapter 1

Active Reader: 1. Both are non renewable, and are created after being buried deep in the grounds for many years.; 2. Coal is a solid.

Focus Questions: 1. Plants die and are buried under intense pressure for millions of years.; 2. They are removed by deep drilling.

Page 19: Chapter 1

Stop and Think 1. (2); 2. (4); 3. (3); 4. Trees are renewable. 5. Trees will grow back, but people need to be careful to replant them.

Page 20: Chapter 1

Hands on Science: Classify: Renewable resources—geothermal, hydropower, solar, wind; Non renewable resources—coal, crude oil, natural gas, oil.

Understanding the Water Cycle: 1. Water heats up and turns into gas; 2. Water forms clouds; 3. Water falls as rain or snow; 4. Water returns to oceans, seas, and lakes.

Page 21: Chapter 2

Active Reader: 1. coal and natural gas; 2. wind, solar, biomass, geothermal

Answer Key

Page 22: Chapter 2

Active Reader: 1. Something that makes our land and water unclean.

Page 23: Chapter 2

Active Reader: 1. Both are not available everywhere in the country.; 2. Hydropower can be dangerous for fish, but geothermal power is not.

Page 24: Chapter 2

Active Reader 1. To make unclean.

Focus Questions: 1. All are renewable resources.; 2. Nonrenewable resources will run out.

Page 25: Stop and Think

1. (3); 2. (2); 3. (2); 4. (4)

Page 26: Think Like a Scientist

Resources	Pros	Cons
Solar	It is renewable. It is clean.	The sun doesn't always shine.
Wind	It is renewable. It is clean.	The wind doesn't always blow.
Hydropower	It is renewable. It is clean.	It is not available everywhere. It can endanger fish.
Geothermal	It is renewable. It is clean.	It is not available everywhere.
Oil		It is non renewable. It creates pollution.
Natural gas		It is non renewable. It creates pollution.
Coal		It is non renewable. It creates pollution.
Nuclear	It is renewable.	It creates pollution.

Page 27: Chapter 3

Active Reader: 1. Use less; 2. Answers will vary.

Page 28: Chapter 3

Active Reader: 1. You use less energy and pollute less; 2. As an adult, you can use your votes to promote the use of cleaner energy.

Focus Questions: 1. We can conserve energy and choose clean energy.; 2. Sample answer: Vote for policies to encourage the use of renewable resources.

Page 29: Chapter 3

Stop and Think: 1. (1); 2. (3); 3. (3); 4. (4)

Page 30: Think Like a Scientist

1. The data do not support this. Scientists hypothesize so that they know what data they need to collect to test their hypotheses. 2. Answers will vary. 3. Answers will vary but could include information on average temperatures in each location.

Page 31: Chapter 3

Think Like a Scientist: Energy Audit: Answers will vary.

Page 35: Assessments

Check Understanding: 1. (4); 2. (4); 3. (4); 4. (3)

Page 36: Assessments

Check Understanding: 5. This community gets most of its electricity from coal.; 6. This is a problem because coal is non renewable and causes pollution.; 7. Answers will vary, but students should name renewable energy sources and give reasons why they chose them.

To use FocusCurriculum materials
with your students, please purchase
a school license.