

Narrative  
Nonfiction

# Planet POWER

*by Hannah Sperber*

Mc  
Graw  
Hill

PAIRED  
READ

Helios and Phaeton

## STRATEGIES & SKILLS

### Comprehension

**Strategy:** Ask and Answer Questions

**Skill:** Main Idea and Key Details

### Vocabulary Strategy

Latin and Greek Prefixes

### Vocabulary

coincidence, consequences, consume, converted, efficient, incredible, installed, renewable

### Content Standards

Science

Earth Science

Word Count: 1,154\*\*

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\*\*The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.



## Essential Question

How have our energy resources changed over the years?

# Planet POWER

by *Hannah Sperber*

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**PAIRED  
READ**

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# Introduction

We use energy for lots of things. We use it to make light. We use it to run our computers. We use it to make heat. Energy is incredible.

Most of the energy we consume today comes from burning **fossil fuels**. Oil, gas, and coal are fossil fuels. Fossil fuels come from plants and animals that lived millions of years ago.



Burning fossil fuels such as coal pollutes the air.



**Wind farms power millions of homes in the United States.**

Burning fossil fuels pollutes the air. Fossil fuels can only be used once. This means that they are not renewable. One day, they will run out.

The sun, water, and wind are renewable sources of energy. Renewable energy doesn't pollute the air. We can use renewable energy again and again.

So, it is no coincidence that many people try to use renewable energy today. We can use energy from the wind to power our homes. We can use energy from the sun to heat them. We can use energy from water to make electricity.

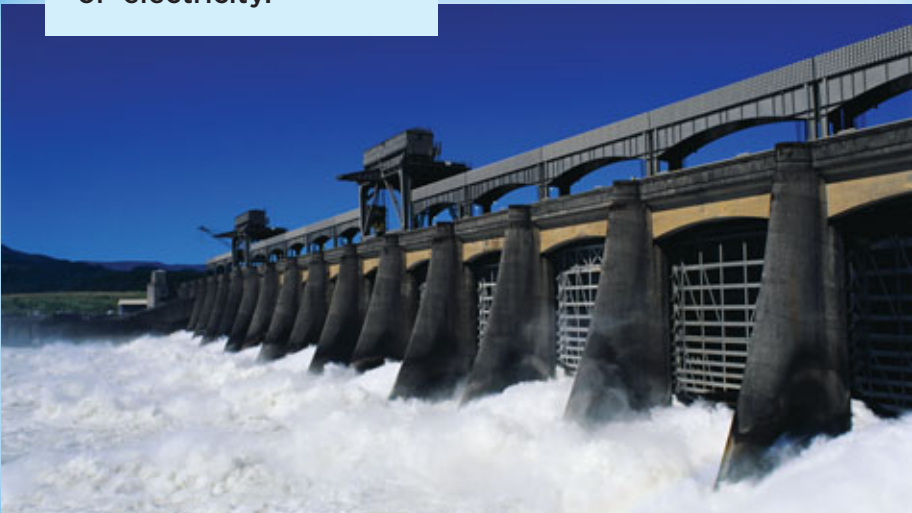
## CHAPTER 1

# The Power of Water

In ancient times, people used the moving water in rivers and streams to turn waterwheels. The wheels milled flour. Later, dams were built across rivers. People used the energy from the moving water to make electricity. There is also energy in the waves in the ocean.

Today people still **harness** the energy of water for hydropower. The movement of the water can turn machines called **turbines**. The turbines can **generate** electricity.

Dams can make a lot of electricity.



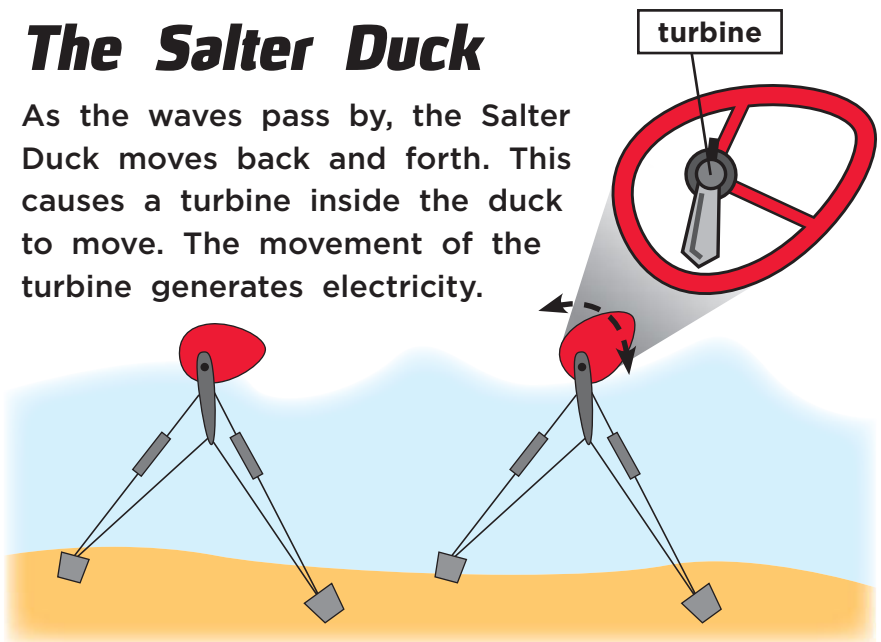
In the 1970s, there was a shortage of oil. Oil is one of our main sources of energy. A scientist named Stephen Salter looked at ways to use energy from the ocean waves.

Salter worked to invent the Salter Duck. This machine moved up and down on the ocean waves. A turbine inside the duck converted the movements into electricity.

People didn't think that the Salter Duck would be strong enough in ocean storms. Scientists continued working on Salter's idea.

## ***The Salter Duck***

As the waves pass by, the Salter Duck moves back and forth. This causes a turbine inside the duck to move. The movement of the turbine generates electricity.



It is hard to capture the energy of ocean waves. Storms cause strong winds and waves, which can destroy equipment. Sometimes there is no wind, which means there are no waves.

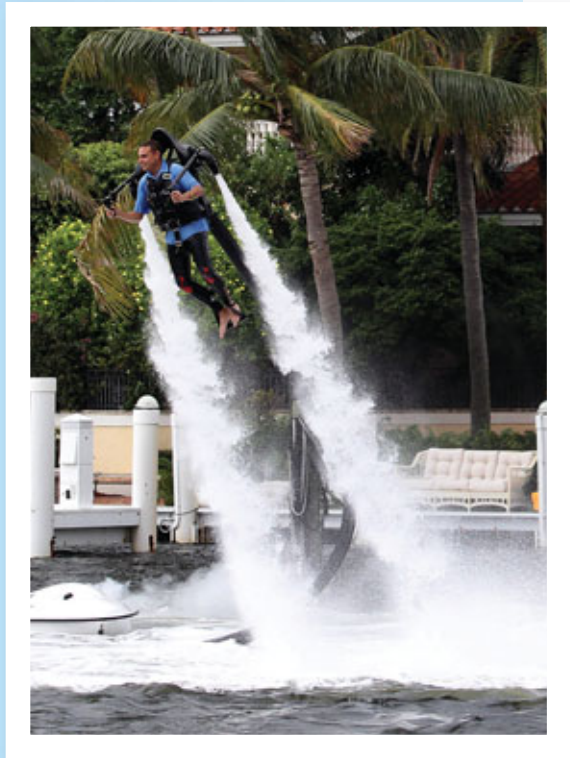
These problems haven't kept people from trying to figure out how to make energy from waves. A wave farm was built off the coast of Oregon in 2010. Scientists are working to make wave energy efficient and cheaper.

## *Up, Up, and Away!*

Water jet packs are powered by water. They can lift a person almost 30 feet into the air. A water jet pack can move at almost 30 miles per hour.

### **STOP AND CHECK**

How can we use water power to make energy?





## CHAPTER 2

# Heat from the Inside

Water, wind, and solar energy rely on the weather. There is one renewable energy source that doesn't rely on the weather.

Geothermal energy comes from the heat inside Earth. Some geothermal energy comes to the surface in hot springs. People began using geothermal energy from hot springs thousands of years ago. They used it to cook, wash, and keep warm.



Hot springs release hot water from the ground.

People began to explore more ways of using geothermal energy in the nineteenth century.

In 1931, a plumber used a hot-water well to heat a home in Oregon. The plumber set up some pipes that ran into the hot-water well.

The water inside the pipes heated

up in the well. The water was then carried back into the house. This method was an important development in geothermal heating systems.



**In a home that uses geothermal energy, pipes carry the heat from under the ground into the house.**

These days, geothermal systems are installed in many different kinds of buildings. They are used in houses and in large buildings such as schools and offices.

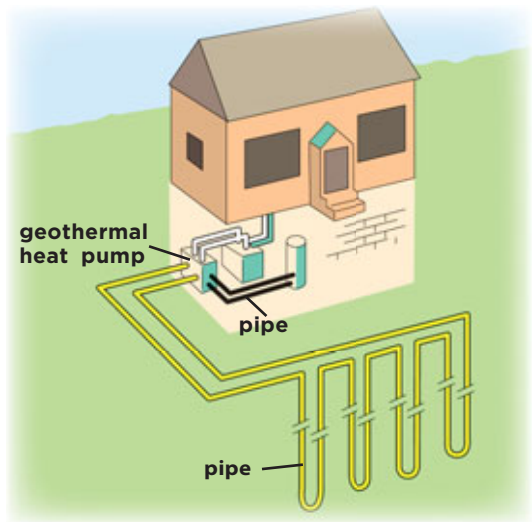
Geothermal systems in houses use heat pumps. In winter, heat from under the ground is carried through pipes to the heat pump. In summer, the heat pump takes the heat from the home and returns it to the ground.

**STOP AND CHECK**

How do people use geothermal energy?

## ***A Home Geothermal Heating System***

Heat travels from under the ground to the geothermal heat pump. The heat pump sends the warm air through the house.



## CHAPTER 3

# The Power of the Sun

Solar energy comes from the sun. It doesn't pollute the environment and is renewable.

People have used the sun's energy for a long time. The ancient Greeks wanted warm homes, so they built them to face the sun. The ancient Romans used glass in their windows to trap the heat of the sun.

Today some buildings have solar panels on their roofs. Solar panels convert the energy from the sun into hot water or electricity.



The solar panels on this roof capture the sun's energy.

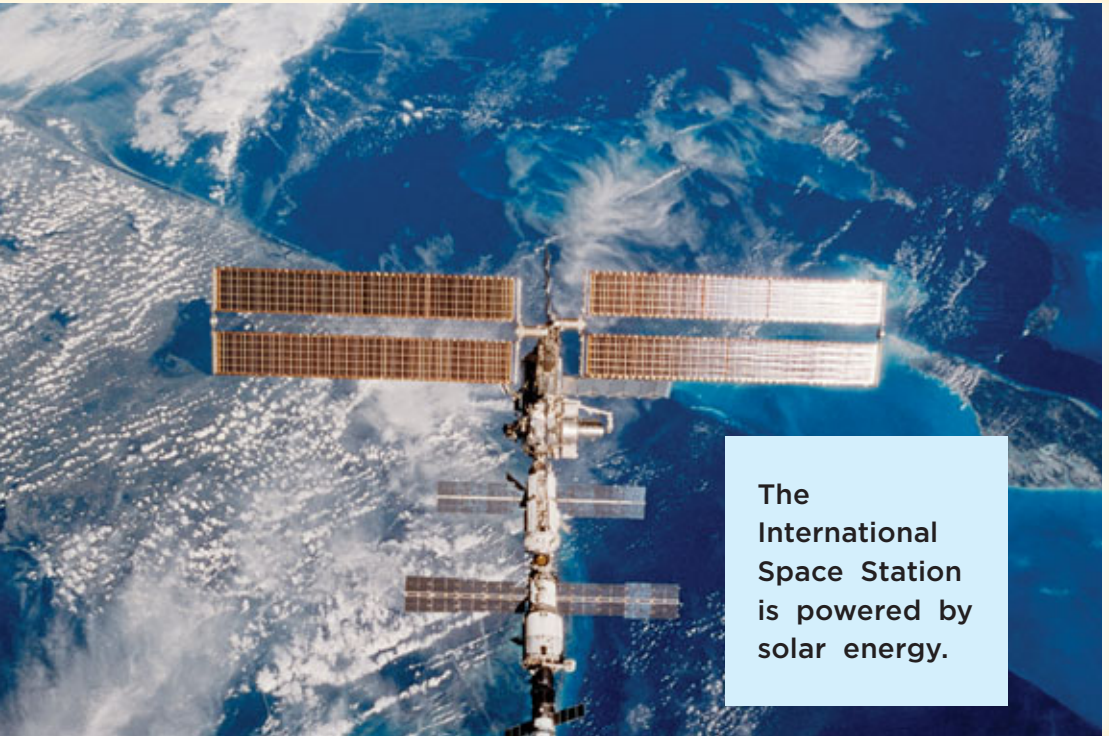


The *Solar Challenger* set a world record for the longest solar-powered flight.

Engineer Paul MacCready helped make an aircraft that was powered by the sun. It was called the *Solar Challenger*.

In 1981, the *Solar Challenger* flew from France to England nonstop. That is 163 miles (262 kilometers). The flight took five and a half hours. The aircraft was powered by energy from solar panels. The solar panels were on the aircraft's wings.

Since then other solar aircraft have been built. These aircraft collect information, which helps scientists study the weather. The aircraft don't have a pilot.



The  
International  
Space Station  
is powered by  
solar energy.

Sometimes we need to use machines that we can't plug into a power supply. In 1998, the International Space Station was launched.

The station isn't plugged into a regular power supply. It runs on solar energy. It has eight sets of solar panels. These panels generate all of the electricity that is needed to run the station.

Scientists are exploring the idea of using solar panels in space to generate energy that can be used on Earth. Solar panels on Earth only work during the day. Solar panels in space could generate solar energy 24 hours a day. Scientists are trying to figure out how to send solar energy back to Earth in a safe and affordable way.

**STOP AND CHECK**

How can we use solar energy?

## ***THE RACE IS ON!***

The Department of Energy runs the Solar Decathlon challenge every two years. Teams of students compete to build the best solar-powered house. The students work hard to find new ways to use renewable energy.

# Conclusion

Today, we are facing an important problem. We have to find enough energy to meet our needs. There are negative consequences if we use energy sources that aren't renewable. Burning fossil fuels creates pollution. One day the fossil fuels will run out.

People are figuring out ways to use renewable energy sources. It will be a long time before we can use renewable energy for all our needs. However, people are inventing new things all the time. The future looks bright for renewable energy!

**This solar power plant in the Mojave Desert in California can provide electricity for thousands of people.**





# Respond to Reading

## Summarize

Summarize how energy resources have changed in *Planet Power*. Details from your graphic organizer may help you.

Main Idea
Detail
Detail
Detail

## Text Evidence

1. What features tell you this is informational text?

**GENRE**

2. Reread Chapter 2. What are some ways we can use geothermal energy?

**MAIN IDEA AND KEY DETAILS**

3. The prefix *hydro* means water. What does *hydropower* mean on page 4?

**LATIN AND GREEK PREFIXES**

4. Write about two forms of energy in the text that you would like to use. Describe each energy source and explain how you would use it and why.

**WRITE ABOUT READING**

## Compare Texts

Read a Greek myth about the sun and how it moves across the sky.

# Helios and Phaeton

Helios was very powerful. His body glowed with yellow, orange, and red light and energy. Helios was hot like a fire.

Helios had a golden chariot. Four horses pulled the chariot. The horses were bright and hot like Helios. Helios shone light over Earth as he rode across the sky each day.





One day, Helios's son Phaeton visited. Helios hadn't seen him in a long time. "Welcome, Phaeton!" Helios shouted. "What can I do for you?"

"I want to drive your golden chariot," replied Phaeton. Helios was horrified. He knew that not even Zeus, the ruler of all the gods, would drive his golden chariot. It was too hot. The horses were too wild. But Phaeton wouldn't listen.



Helios painted oil on his son's head. The oil would protect Phaeton from the heat. Phaeton got into the chariot, but he couldn't control the horses.

The horses took the chariot up into space. Earth began to freeze. Then the horses plunged toward Earth. This started fires. The oceans and rivers dried up.

King Zeus threw a lightning bolt to stop Phaeton. Phaeton fell out of the chariot. Helios was the only driver of the golden chariot after that.

Illustration: Dennis Juan Ma



## Make Connections

What does *Helios and Phaeton* tell you about the importance of the power of the sun to the ancient Greeks? **ESSENTIAL QUESTION**

Compare the importance of energy from the sun in ancient Greece to modern sources of energy. Why is the sun so important? **TEXT TO TEXT**

# Glossary

**fossil fuels** (*FAH-suhl fyewls*) fuels, including oil, natural gas, and coal, that were formed from living things a long time ago (**page 2**)

**generate** (*je-nuh-RAYT*) make or produce (**page 4**)

**harness** (*HAHR-nis*) to be able to control something (**page 4**)

**turbines** (*TUHR-buhns*) machines that are powered by water, steam, or air (**page 4**)

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# Focus on Science

**Purpose** To make a solar-powered oven

## Procedure

**Step 1** Use a ruler and a marker to draw a rectangle 1 inch in from the edge of a shoebox lid. Cut out the rectangle.

.....

**Step 2** Cover the shoebox lid with a sheet of clear plastic. This is your oven window. Use masking tape to seal the edges of the window.

.....

**Step 3** Use aluminum foil to line the box. Wrap the foil over the top edge of each side.

.....

**Step 4** Take the oven outside to a sunny spot. Place a thermometer inside and record the temperature. Leave the thermometer inside the oven and put the lid on. Record the temperature again after 20 minutes.

**Conclusion** How much did the temperature of your oven change? What do you think would happen to the temperature after an hour? Two hours? What kinds of things could you make with a solar oven?

## Literature Circles

### Nonfiction

# Thinkmark

### **Text Structure**

How does the author organize information in *Planet Power*?

What three forms of energy does the author describe in *Planet Power*?

### **Vocabulary**

What are the key words in this text that relate to the topic?

### **Conclusions**

What is the most important thing you learned in *Planet Power*?

### **Author's Purpose**

Why do you think ancient Greeks told the myth of Helios?

### **Make Connections**

What connections can you make between the ideas in *Planet Power* and sources of energy you know about?