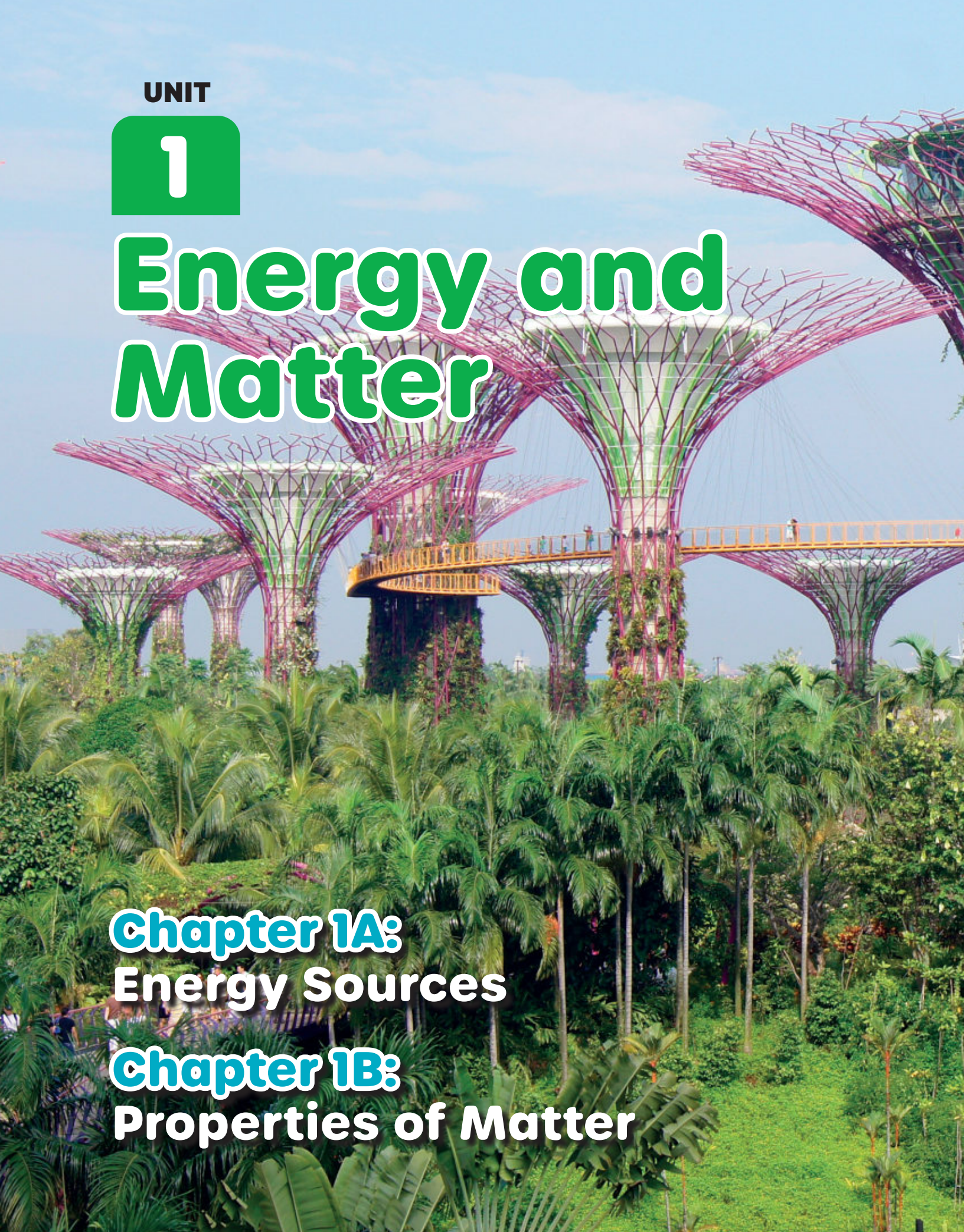


UNIT

1

Energy and Matter

Chapter 1A:
Energy Sources

Chapter 1B:
Properties of Matter

Gardens by the Bay is a nature park in Singapore. It houses tree-like structures called Supertrees, which act as vertical gardens. The Supertrees are installed with systems that convert energy from the Sun to electricity. This is one way of using environmentally friendly energy sources. In what other ways can different countries do that?

Unit Phenomenon Project

Design and build a toy car that converts energy from the Sun to another form of energy. How would you make the toy car move farther?

Scan this page!

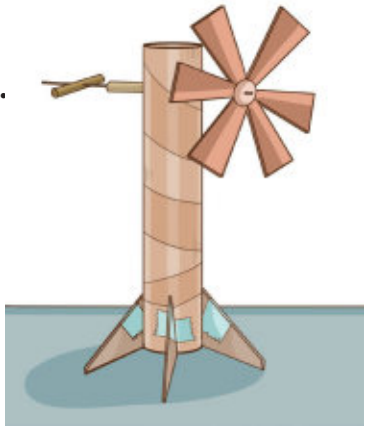
Chapter

1A Energy Sources

Essential Question
How do the energy sources we use affect the environment?

Chapter Project

Energy from wind can make a wind turbine turn like a fan. Build a wind turbine using the steps below.



1. Cut two cardboard circles, each with a diameter of 4 centimeters. Glue the circles together.
2. Cut six identical cardboard blades. Glue them around the cardboard circles to form the "head" of the wind turbine.
3. Insert a skewer through the cardboard circles.
4. Cut four identical right triangles from cardboard. Tape the triangles onto a cardboard roll to form a base.
5. Make a hole through the top of the cardboard roll using scissors. Insert a straw through the hole.
6. Insert the skewer through the straw. Ensure that the wind turbine is able to spin.
7. Insert the end of the skewer through the middle of a short straw. The short straw should be perpendicular to the straw in step 6.
8. Test the wind turbine by blowing a fan or a hairdryer in front of it.

Lesson 1 Nonrenewable Energy Sources

Key Terms

nonrenewable fossil fuels combustion
fission nuclear energy

Recall

1. What happens when a moving object collides with a stationary object?

2. What energy conversions take place in an electric car?

Engage

Cooking on Fire

1. What is happening in the picture?
2. How is natural gas from the stove useful?
3. What would happen if there was no natural gas?

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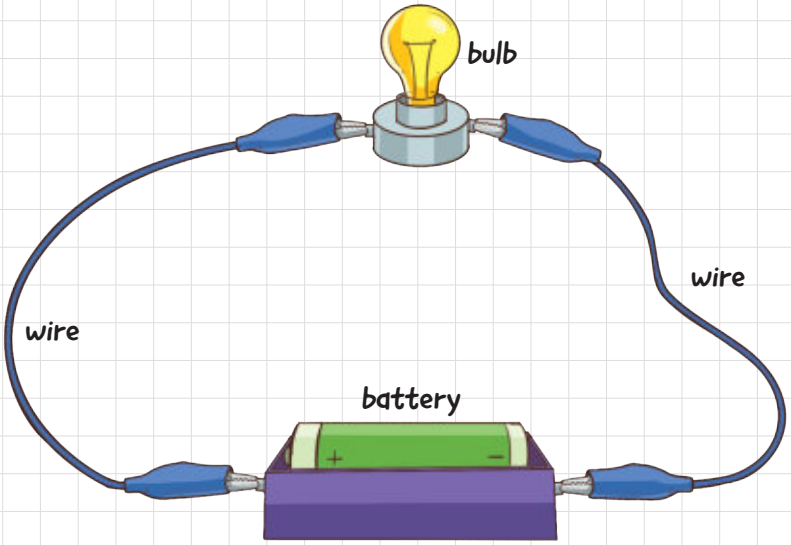
Explore

Energy Sources Around Us

In **Engage** on page 5, you learned that natural gas can be used to produce heat for cooking. Now, you will **Explore** different energy sources.

1. Work in pairs.
2. Connect a bulb to a battery using wires.



What do you observe? Why does this happen?

_____

_____

3. Think about what you had for breakfast. Draw the food item(s) in the space below.

4. Why do you need to eat?

5. Think about the vehicle that sent you to school. Why was it able to move?

6. Fill up the table below based on the questions you have answered.

What is energy needed for?	What is the source of energy?	What energy conversion(s) take(s) place?

What other activities need energy and where does the energy for each activity come from?

Explain

What Are Nonrenewable Energy Sources?

You have learned about different types of energy and that energy can be transferred.

In **Explore**, you looked at a few energy sources that are used in daily life. Energy sources provide the energy that is needed to carry out activities. In this lesson, we will look at some energy sources that are **nonrenewable**. Such energy sources are limited and cannot be replaced easily when they are used up.

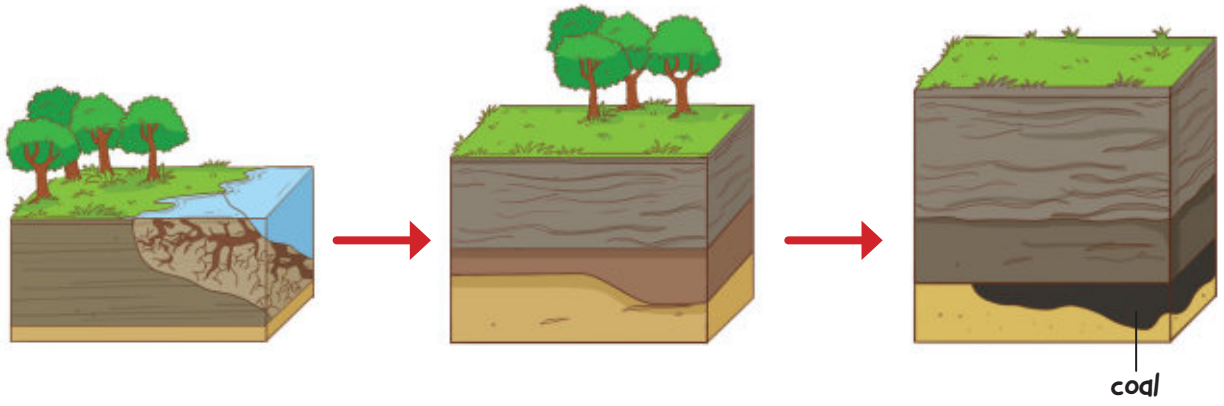
What Are Fossil Fuels?

Fossil fuels are formed from the remains of plants and animals that were buried millions of years ago. They include coal, crude oil, and natural gas.



Coal

Coal is formed from dead plants that are buried underground over millions of years. Eventually, under high pressure and temperature, the dead plant matter is converted into coal.



Coal is extracted, or removed, from the ground by mining.

Open-pit mining involves digging a very large hole and extracting the coal in the process.

Underground mining involves the extraction of coal from underground tunnels.