Lesson 3

Essential Question

How Does Sunlight Affect Objects?

Engage Your Brain!

Find the answer to the following question in this lesson and record it here.

What are three things that can happen to sunlight when it strikes an object?

_____

_____

_____

Active Reading

Lesson Vocabulary

List the terms. As you learn about each one, make notes in the Interactive Glossary.

_____

_____

Compare and Contrast

Many ideas in this lesson are connected because they explain comparisons and contrasts—how things are alike and different. Active readers stay focused on comparisons and contrasts when they ask themselves, How are these things alike? How are they different?

Heating Up

Have you ever heard, "It's hot enough to fry an egg on the sidewalk?" What effect does sunlight have on things?

Active Reading As you read these two pages, circle signal words that identify cause and effect.

The sun gives off light and heat. On a cool day, you might enjoy standing in the sun. When sunlight shines on you, it gives some of its energy to you. As a result, you warm up. But on a hot day, you might prefer to sit in the shade with a cool drink.

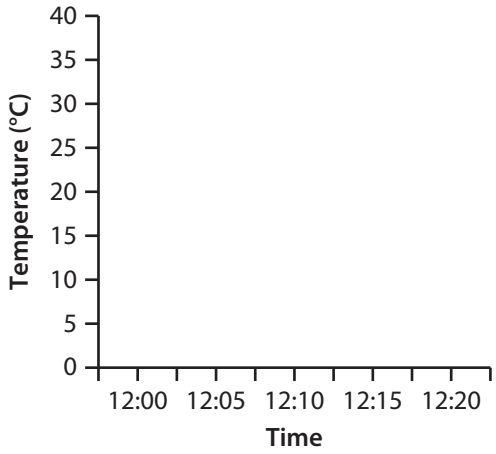
It is not an egg, but this fruit bar does not do well on a sunny sidewalk! Sunlight warms the fruit bar and the sidewalk. As a result, the fruit bar melts into a big, messy puddle.

Do the Math!

Make a Graph

The table shows the temperature of putty that was left in the sun. Graph these data.

Time	Temperature (°C)
12:00	26
12:05	28
12:10	31
12:15	33
12:20	35



Explain what the graph shows about the effect of sunlight.

Sunlight Hits It, and Then ...

The cat casts a shadow, but the glass in the window doesn't. What's going on?

Whether an object casts a shadow depends on how sunlight interacts with it.

Sunlight Passes Through

The window lets sunlight pass through. The light shines into the house. It will warm objects that it shines on, including the cat! Light also passes through the air on each side of the window.

Active Reading As you read these two pages, underline three ways that sunlight interacts with objects.

When you "soak up some rays," you absorb sunlight.

Sunlight Is Absorbed

The cat makes a shadow. The sunlight does not pass through the cat! Some of the sunlight hitting the cat is **absorbed**, or taken in, by the cat. This transfers energy to the cat and warms it. The more energy that is absorbed by an object, the faster it can warm up.

Sunlight Is Reflected

Some of the sunlight hitting the cat **reflects** or bounces off of the cat. This reflected light is what lets you see the cat. But to reflect most of the light requires something smooth and shiny, such as a mirror.

These mirrors reflect sunlight to heat sodium metal until it melts.

▶ Identify how light interacts with each material.

plastic wrap

aluminum foil

Cool Colors, Hot Hues

Does color make a difference in how sunlight affects objects?

Look at the road and the sidewalk. Which would you rather walk on when it is hot and sunny? The black surface of the road can become much hotter than the sidewalk. Darker colors absorb more sunlight that shines on them. Lighter colors reflect more sunlight than darker colors. So, they absorb less sunlight than darker colors.

In the summer, lighter-colored clothes help keep you cooler. In the winter, darker colors can help you stay warmer.

Active Reading As you read these two pages, underline two sentences that state the main idea.

Using a light-colored roofing material helps reduce the heating effect of sunlight. More light is reflected. Less light is absorbed.

Black plastic materials are used to increase the heating effect of sunlight in this solar water heater.

▶ Explain why black materials increase the heating effect of sunlight compared with white materials.

Sum It Up!

When you're done, use the answer key to check and revise your work.

Read the summary statements. Then match each statement with the correct image.

1. Some materials reflect sunlight, so the light bounces off.

   _____

2. Dark-colored clothes are better to wear in winter than in summer. Dark colors absorb more energy from sunlight.

   _____

3. Sunlight heats up an object that it shines on. There are ways to increase or decrease this warming effect.

   _____

4. Some materials allow sunlight to pass through and warm things on the other side.

   _____

A

B

C

D

Answer Key: 1. B 2. D 3. A 7 4. C

Name _____

Word Play

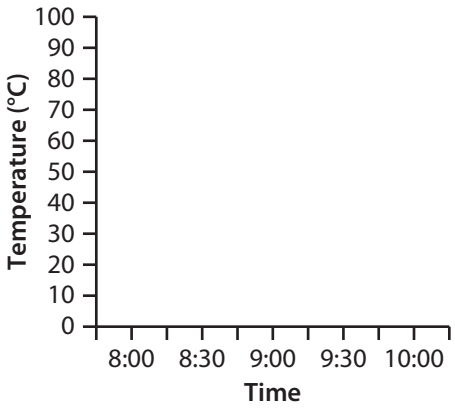
1 **Use the clues to help you unscramble the words below.**

1. lectrefs	_____	What an object does to light when light bounces off
2. mortertheme	_____	The tool that lets you measure the heating effect of the sun
3. robsbas	_____	What an object does to light when light gets soaked up
4. thiew	_____	A color that can help reduce the heating effect of the sun
5. ptuemrareet	_____	This increases when something is sitting in a sunny spot
6. thusling	_____	Has a heating effect when it shines on things

Apply Concepts

2 **The data table shows the temperature of a picnic table in a park in the evening. Make a graph of these data.**

Time	Temperature (°F)
8:00	95
8:30	91
9:00	86
9:30	80
10:00	73



Explain what the graph shows about the effect of sunlight.

_____

_____

3 **Four houses are on the same street. Circle the house that will get hot fastest in the morning.**

4 **Explain why you chose the house you circled. Why do you expect it to get hot fastest?**

_____

_____

Take It Home!

Plan and carry out an investigation on the effect of sunlight in your home. Use a thermometer, several different objects, and a sunny spot. Record the temperature over time and graph it. Share what you find with a friend or family member.