Topic 3

Sunlight

Next Generation Science Standards

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Go online to access your digital course.

- VIDEO
- eTEXT
- INTERACTIVITY
- SCIENCE SONG
- GAME
- ASSESSMENT

The Essential Question

How does sunlight help us?

Show What You Know

Tell how the picture shows it is warm.

Quest Kickoff

Keep It Cool

What can you design to keep sunlight off of a dog?

Hi, I'm Mr. Henry! I'm an architect. I want to build a doghouse for my dog, Sam. I need your help.

How can I keep Sam cool on sunny days? Help me plan and design the doghouse. Look for ideas as you read. Follow the path. Do each lesson to plan a doghouse. Check off each one in the QUEST CHECK OFF .

Next Generation Science Standards

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Quest Check-In 1

Lesson 1

Use what you learned about the sun to tell how to protect the dog.

VIDEO

Watch a video about an architect.

Quest Check-In Lab 2

Lesson 2

You learned how the sun warms Earth. Test how different materials reduce the effects of sunlight.

Quest Findings

Finish your Quest. Find a fun way to show and tell about your doghouse.

uConnect Lab

HANDS-ON LAB

K-PS3-1, SEP.3

What can you observe about the sun?

Materials

- Sunlight Chart

Scientists observe by using their senses. How does sunlight feel on your body?

Science Practice

You **make observations** when you use your senses.

Procedure

- ☐ 1. Find ways to test how sunlight feels.
- ☐ 2. Tell your teacher about your ideas before you start.
- ☐ 3. Fill in the chart.

Never look directly at the sun.

Analyze and Interpret Data

4. **Explain** where you felt warmer. Tell why.

Picture Clues

Scientists ask questions and look for answers. Sometimes they get clues from pictures.

GAME

Practice what you learn with the Mini Games.

Stay Cool

The sun keeps animals warm. It can make some animals too warm.

Reading Check Picture Clues

Look at the pictures. Write the missing word in the sentences.

1. The goats are trying _____ to stay _____ under the tree.

2. The snake warms itself by _____ staying in the _____.

Lesson 1

The Sun

VIDEO

Watch a video about the sun.

Vocabulary

star

I can describe the sun.

K-PS3-1

Jumpstart Discovery!

Look at the picture of the forest on a sunny winter day.

You are snow. Act like snow in the sunlight.

uInvestigate Lab

HANDS-ON LAB

K-PS3-1, SEP.4

What can the sun do?

Scientists analyze and interpret data to answer their questions. How can you use the data from this lab to answer the question, "What can the sun do?"

Materials

- ice cubes
- 2 containers

Science Practice

Compare data you collected in a chart.

Procedure

☐ 1. Use the materials to show what the sun can do.

☐ 2. Record your data in the chart.

Container	Sun	Shade	What happened?

Analyze and Interpret Data

3. **Explain** how you used observations to learn about the sun.

The Sun and Earth

A **star** is a big, hot ball of gas.

The sun is a star.

The sun gives Earth light.

The sun gives Earth heat.

Literacy ▸ Toolbox

Picture Clues Look at the picture.

What kind of day do you see? Tell how you know.

INTERACTIVITY

Learn how the sun seems to move in the sky.

The sun is the largest object in the daytime sky.

The sun is very big, but it looks small from Earth.

That is because the sun is so far away.

Ask a Question What would you like to know about the sun? Write a question.

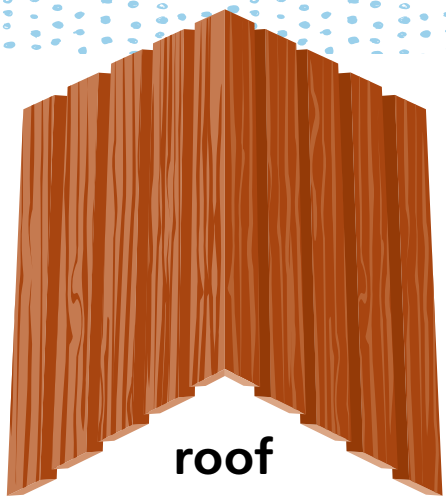
Quest Connection

Tell two ways a doghouse can protect Mr. Henry's dog.

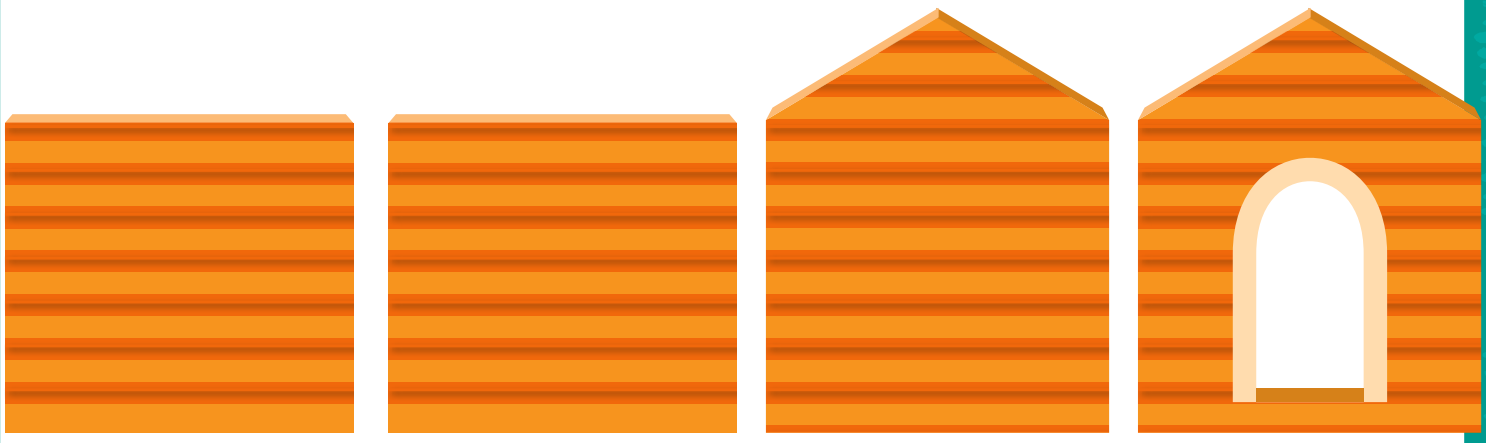
Quest Check-In

Staying Cool

Look at the parts of a doghouse.



roof

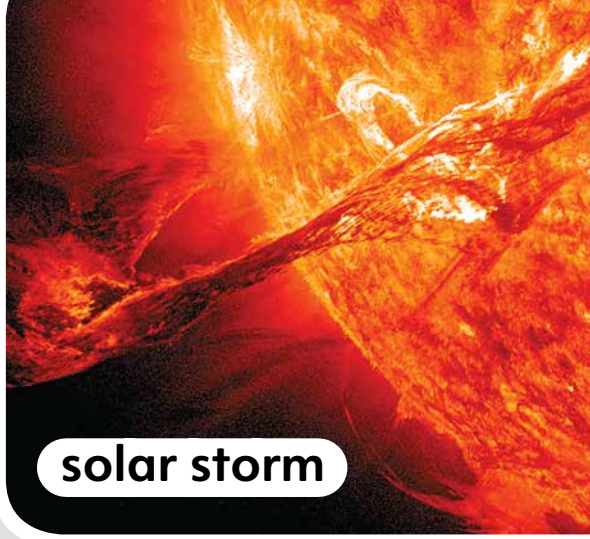


side side back front

Draw Draw a plan for your dog house.
Copy the labels on to each part.
Explain all of the parts.

QUEST CHECK OFF

Storms on the Sun


solar storm

The sun has storms!
These storms can cause
many problems on Earth.
Your computer might not work.
The internet might not work!

Scientists are working now to
try to solve these problems.
They try to predict when these
storms might reach Earth.
Scientists want everyone to
be prepared.

Describe What does a solar storm look like?

uEngineer It! Model STEM

INTERACTIVITY

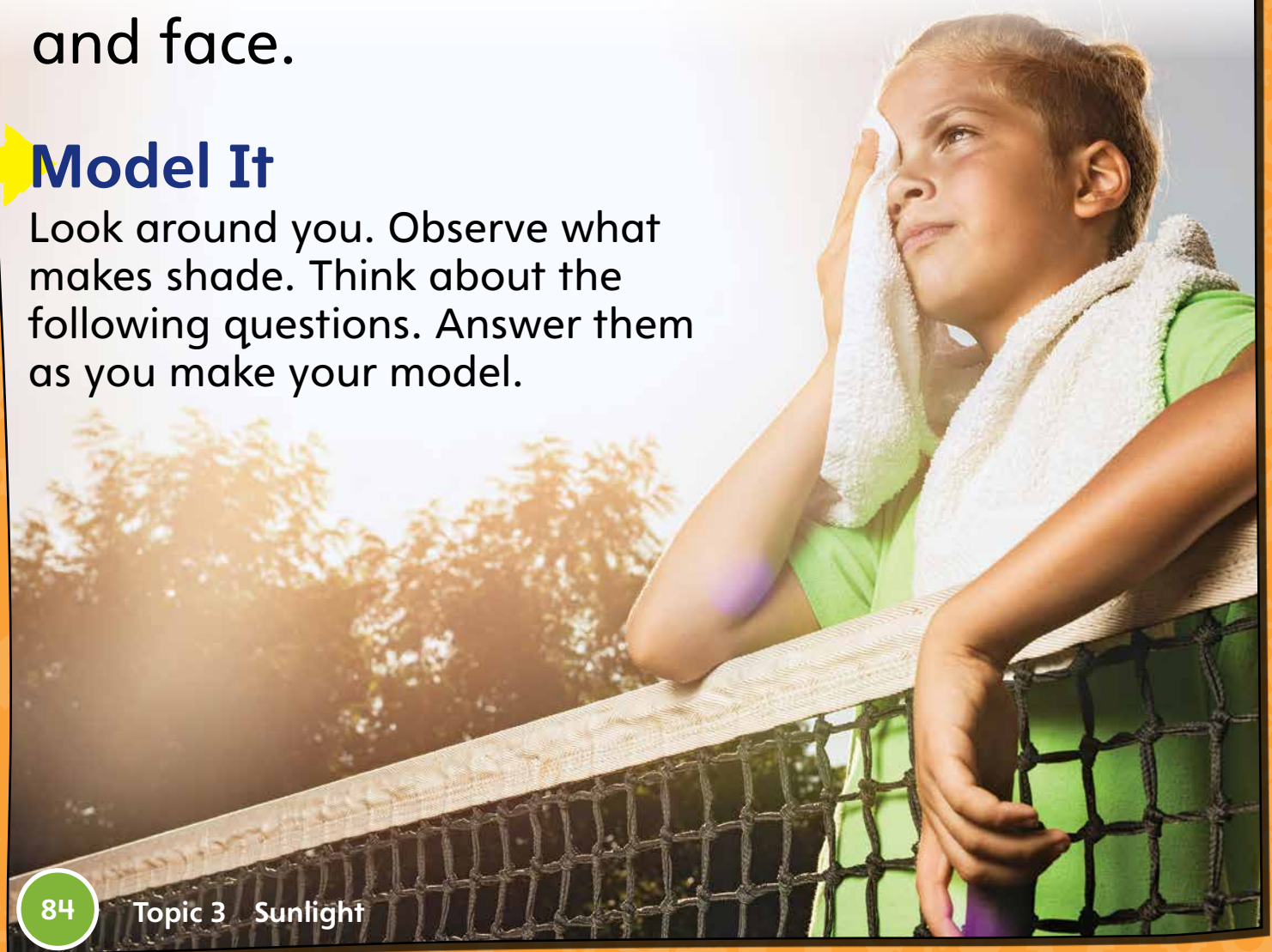
Go online to learn more about how engineers solve problems.

Sunny Days

It is a very warm, sunny day outside.
You are very hot!
You need to make something to keep sunlight off your head and face.

Model It

Look around you. Observe what makes shade. Think about the following questions. Answer them as you make your model.



- [ ] How can you make something to keep sunlight off your head?
- [ ] What will you use to block sunlight?
- [ ] What materials will you need?

1. Draw a plan.

2. Explain your model.
   Tell how it will work in sunshine.

Lesson 2

Sunlight and Earth's Surface

Vocabulary

Earth

I can observe how sunlight warms everything on Earth's surface.

K-PS3-1, K-PS3-2

Jumpstart Discovery!

Choose an animal. Act out what the animal does in the sun. Act out what the animal does in the shade.

uInvestigate Lab

HANDS-ON LAB

K-PS3-1, SEP.3

Which objects change in the sun?

What happens when sunlight shines on objects on Earth's surface? How can you find out?

Materials

- Objects in the Sun chart

Suggested Materials

- crayon
- clay
- ice cube
- black fabric
- white fabric
- metal object
- wood object
- dark-colored trays
- rocks
- sand
- soil

Procedure

- ☐ 1. Choose 3 objects to test.
- ☐ 2. Make a plan to test them.
- ☐ 3. Show your plan to your teacher.
- ☐ 4. Observe what happens.
- ☐ 5. Fill in the Objects in the Sun chart.

Analyze and Interpret Data

6. **Explain** Tell how the objects that changed are alike.

Science Practice

You **collect data** when you make observations.

VIDEO

Watch a video about sunlight and Earth's surface.

The Sun Warms Earth

The sun helps us stay alive.

It warms everything on Earth.

Earth is the planet where we live.

Reading Check **Picture Clues**

Write a caption for the picture. Tell about how the sun warms Earth.

The sun warms the land.

The sun warms the water.

The sun warms the air.

Land cools when it is not in sunlight.

Water cools when it is not in sunlight.

Air cools when it is not in sunlight.

Engineering Practice ▸ Toolbox

Design a Solution
Stand by a window. Think of ways to block sunlight. Tell your ideas to a partner.

Identify Fill in the chart. List two things the sun warms in each place.

What Sunlight Warms on Earth		
On Land	**In Water**	**In Air**

INTERACTIVITY

Learn how the sun changes the temperature on Earth.

Sunlight and Earth

Sunlight causes many changes on Earth.

Reading Check **Picture Clues**

What happens to water, rocks, and sand in sunlight?

Sunlight warms water.

Sunlight warms sand.

Sunlight warms rocks.

Quest Connection

Tell how sunlight warms everything on Earth.

Sunlight warms soil.

STEM Quest Check-In Lab

Which material makes the best roof?

Which materials reduce the warming effect of sunlight?

Test Your Design

- [ ] **1.** Make a plan to test which materials reduce the warming effect of sunlight. Use the thermometer. Choose three materials to build three model roofs.
- [ ] **2.** Show your plan to your teacher.
- [ ] **3.** Test your materials.

Suggested Materials

- thermometers
- sheets of clear plastic wrap
- sheets of aluminum foil
- shingles
- pieces of plywood
- squares of canvas

Engineering Practice

Engineers use **tools** to solve a problem.

K-PS3-1, K-PS3-2, SEP.3, SEP.6

Observations

Material	Time in the Sun	Temperature

Evaluate Your Design

4. Tell which materials kept the thermometer cooler?
5. Tell which materials made the thermometer heat up?
6. **Explain** Tell what you learned to a partner.

INTERACTIVITY

Apply what you learned in the Quest.

Keep It Cool

What can you design to keep sunlight off of a dog?

What materials and design will you use for Sam's doghouse?

It should keep Sam cool when it is hot and sunny outside.

Show What You Found

Gather your materials and build a doghouse. Then look at other doghouses. How can you improve your design?

QUEST CHECK OFF

Career Connection

Architect

Architects plan buildings.

They draw rooms, walls, and a roof for their buildings.

They choose materials to use.

What if all the walls in your home were made of glass?

Tell if this is a good idea. Why or why not?

The Essential Question

What does sunlight do on Earth?

Show What You Learned

Tell a partner what you learned about how the sun warms Earth.

1. What is the sun?
   - **a.** a moon in the night sky
   - **b.** a planet in the sky
   - **c.** an object that is close to Earth
   - **d.** a star in the sky

2. What do we get from the sun?
   - **a.** heat and light
   - **b.** food and water
   - **c.** hot and cold rays
   - **d.** rocks and soil

3. What is one effect that sunlight has on Earth?
   - **a.** Sunlight brings snow.
   - **b.** Sunlight warms the land.
   - **c.** Sunlight brings cold air.
   - **d.** Sunlight helps new rocks grow.

4. Why does the sun look small in the sky?
   - **a.** The sun is closer to Earth than the moon.
   - **b.** The moon and the sun are the same size.
   - **c.** The sun is far away.
   - **d.** The sun is smaller than Earth.

Read and answer questions 1–3.

Zac works at an animal shelter.

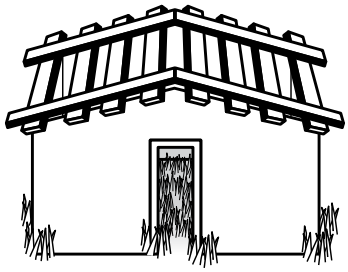
The dogs have an outdoor play area.

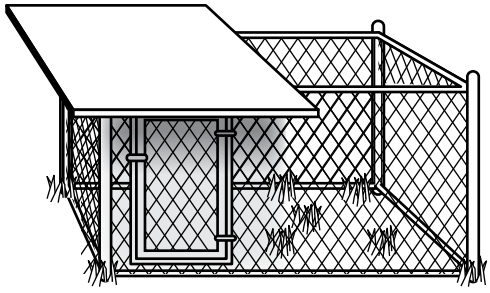
But it gets very hot in the sun.

How can Zac keep the dogs cool on a bright, sunny day?

Zac drew four ideas to help.

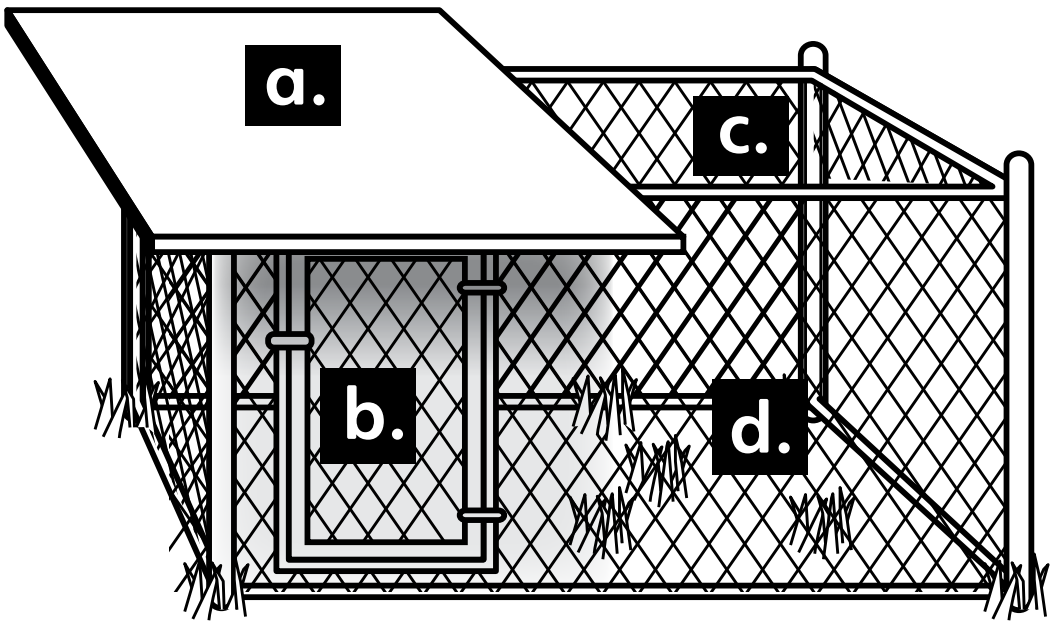
1. Which idea will work best?
   Circle the letter.

a. 

b. 

2. What is Zac trying to do?
   - **a.** stop the dogs from running away
   - **b.** keep the dogs in a safe place
   - **c.** give the dogs a shady place
   - **d.** build a climbing place for the dogs

3. Which part of this kennel will be coolest on a sunny day? Circle the letter.



uDemonstrate Lab

Where is it warmer?

Materials

- 2 thermometers

A scientist uses tools to make observations.

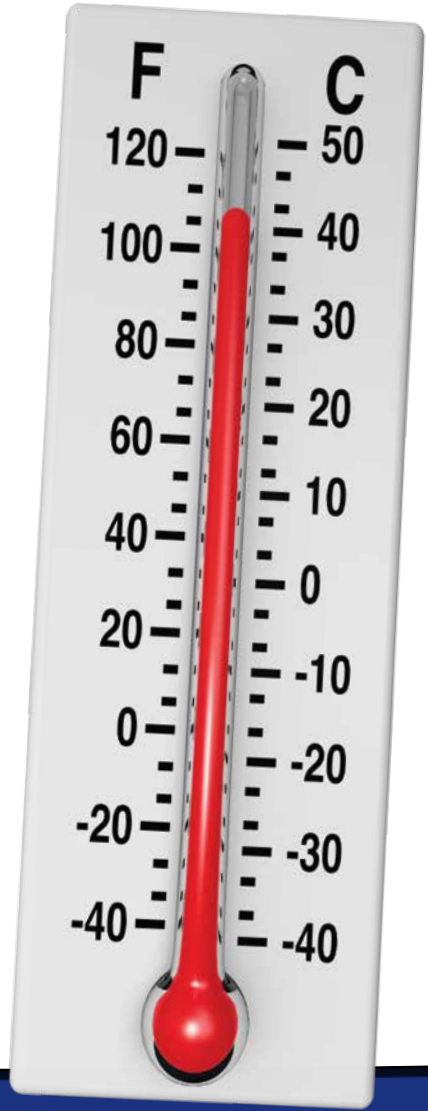
How can you use a thermometer to make observations?

Science Practice

You can use **tools** to help you make observations.

Procedure

- ☐ **1.** Use the thermometers to observe the effects of sunlight.
- ☐ **2.** Make a plan. Show it to your teacher.
- ☐ **3.** **Record** your observations.



Observations

Warmer or Cooler?			
Thermometer 1	**Starting**	**In the Shade**	**Warmer or Cooler?**
Thermometer 2	**Starting**	**In the Sun**	**Warmer or Cooler?**

Analyze and Interpret Data

4. **Explain** What do you observe about sunlight?

5. **Explain** What can you infer from your observations?