21st CENTURY SKILLS

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STEAM Reading

Elementary

Science

Technology

Engineering

Arts

Math

3

Beginner

Elementary

High Elementary

Video Experiments

Matthew Broadhurst
Virginia Marconi

21st CENTURY SKILLS

STEAM Reading

Science Technology Engineering Arts Math

Elementary

3

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HOW TO USE THIS BOOK

STUDENT BOOK

1 STEAM

2 I will learn... about stars and constellations.

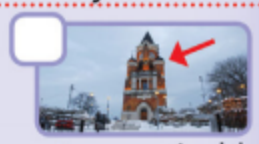
3 ALL THE STARS IN THE SKY

Scan for Audio

4 **KEY WORDS**

A Look, listen, and repeat. 31

adj. various

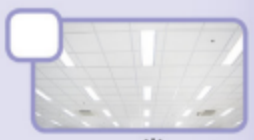


adj. recognizable

n. constellation

n. light box

v. shine



n. ceiling

B Listen and number the words. 32

5 **READING**

Listen and read. 33

Scan for Video

WARM-UP

Do you know of any constellations? Can you name them?

There are various stars in the night sky. People group the bright stars together into recognizable shapes called constellations. Some of them look like people or animals.

Let's make a light box and see the constellations at home.

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1 STEAM

Units are grouped together in pairs. Each pair of units has lessons on the same subject. Every unit focuses on one or more aspects of STEAM (Science, Technology, Engineering, Arts, Math).

2 I WILL LEARN...

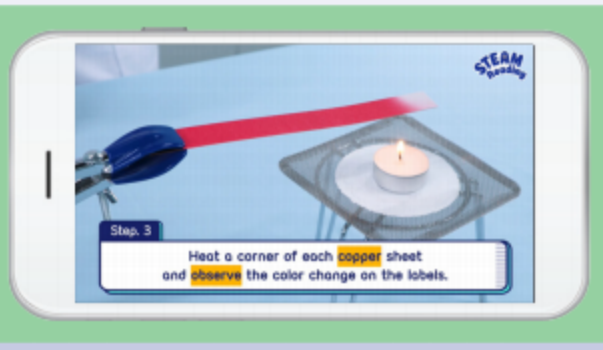
The academic objective of the unit is introduced to get students thinking.

3 QR CODES

Scan the audio QR CODE to listen to the key words and reading passages. In the experiment units, scan the video QR CODE to watch a video of a real experiment.

Video Experiments

Live-action videos take students step-by-step through all science experiments. This visual aid enhances their learning experience and makes the topic come alive.



Look at a map of the stars. Make holes in the lid of a box to match one constellation.

Make a large hole in the bottom of the box. Put a flashlight in the hole.

Show your friends the constellation light box that you made. Go to a dark room, shine the flashlight at the ceiling or the walls, and enjoy the constellation show.

Constellations are different in summer and winter.

This is because Earth moves around the sun. As Earth moves in space, we can see different stars.

WOW! I SEE!

There are twelve zodiac* constellations. They are: Aquarius, Pisces, Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, and Capricorn.

Go to page 87 for the meaning of difficult words (*).

C Circle the key words in the reading.

D Read and choose.

1. What does various mean in the reading?
   a. two equal things b. many different things c. only one thing
2. What does show mean in the reading?
   a. display b. film c. light

6

7

8

4 KEY WORDS
Every unit introduces new KEY WORDS that are necessary to understand the unit's topic. All key words are found in the READING and are illustrated with a photograph.

5 READING
Each READING is an introduction to the topic of the unit. The first unit in a pair introduces the subject through an experiment. The experiment is illustrated and easy to follow. The second unit features an engaging short story on the same topic.

6 WOW! I SEE!
This section goes into further detail on the concepts introduced in the READING.

7 WORDS WITH AN ASTERISK (*)
Difficult words in the unit are marked with an asterisk (*) and are explained in a word list at the back of the book.

8 SHORT ACTIVITIES
Short activities focus attention on the KEY WORDS and check understanding.

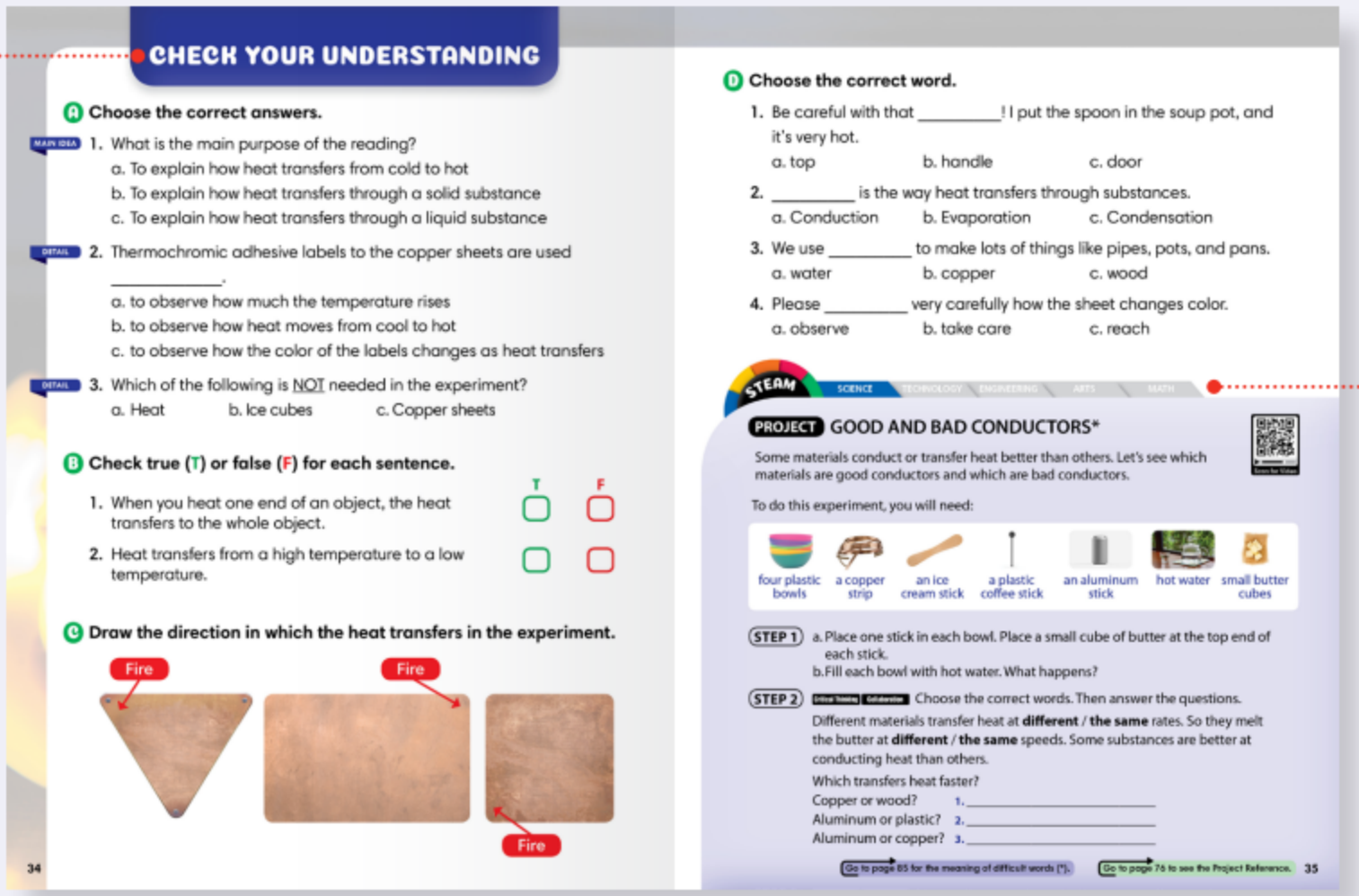
HOW TO USE THIS BOOK

CHECK YOUR UNDERSTANDING

This section features a range of activities to check both reading comprehension and understanding of the unit vocabulary.

STEAM PROJECT

The STEAM PROJECT ends the unit with a fun and interactive project that encourages individual creativity as well as collaboration. Project types include experiments, math problems, and arts & crafts. Experimental projects have a video available via QR code. Further explanation for certain projects can be found in the PROJECT REFERENCE at the end of the book.



CHECK YOUR UNDERSTANDING

A Choose the correct answers.

MAIN IDEA 1. What is the main purpose of the reading?
a. To explain how heat transfers from cold to hot
b. To explain how heat transfers through a solid substance
c. To explain how heat transfers through a liquid substance

DETAIL 2. Thermochromic adhesive labels to the copper sheets are used _____.
a. to observe how much the temperature rises
b. to observe how heat moves from cool to hot
c. to observe how the color of the labels changes as heat transfers

DETAIL 3. Which of the following is NOT needed in the experiment?
a. Heat b. Ice cubes c. Copper sheets

B Check true (T) or false (F) for each sentence.

	T	F
1. When you heat one end of an object, the heat transfers to the whole object.	☐	☐
2. Heat transfers from a high temperature to a low temperature.	☐	☐

C Draw the direction in which the heat transfers in the experiment.

Fire Fire Fire

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D Choose the correct word.

1. Be careful with that _____! I put the spoon in the soup pot, and it's very hot.
a. top b. handle c. door
2. _____ is the way heat transfers through substances.
a. Conduction b. Evaporation c. Condensation
3. We use _____ to make lots of things like pipes, pots, and pans.
a. water b. copper c. wood
4. Please _____ very carefully how the sheet changes color.
a. observe b. take care c. reach

STEAM SCIENCE TECHNOLOGY ENGINEERING ARTS MATH

PROJECT GOOD AND BAD CONDUCTORS*

Some materials conduct or transfer heat better than others. Let's see which materials are good conductors and which are bad conductors.

To do this experiment, you will need:

four plastic bowls | a copper strip | an ice cream stick | a plastic coffee stick | an aluminum stick | hot water | small butter cubes

STEP 1 a. Place one stick in each bowl. Place a small cube of butter at the top end of each stick.
b. Fill each bowl with hot water. What happens?

STEP 2 Critical Thinking Collaboration Choose the correct words. Then answer the questions.
Different materials transfer heat at **different** / **the same** rates. So they melt the butter at **different** / **the same** speeds. Some substances are better at conducting heat than others.
Which transfers heat faster?
Copper or wood? 1. _____
Aluminum or plastic? 2. _____
Aluminum or copper? 3. _____

Go to page 85 for the meaning of difficult words (*).
Go to page 76 to see the Project Reference.
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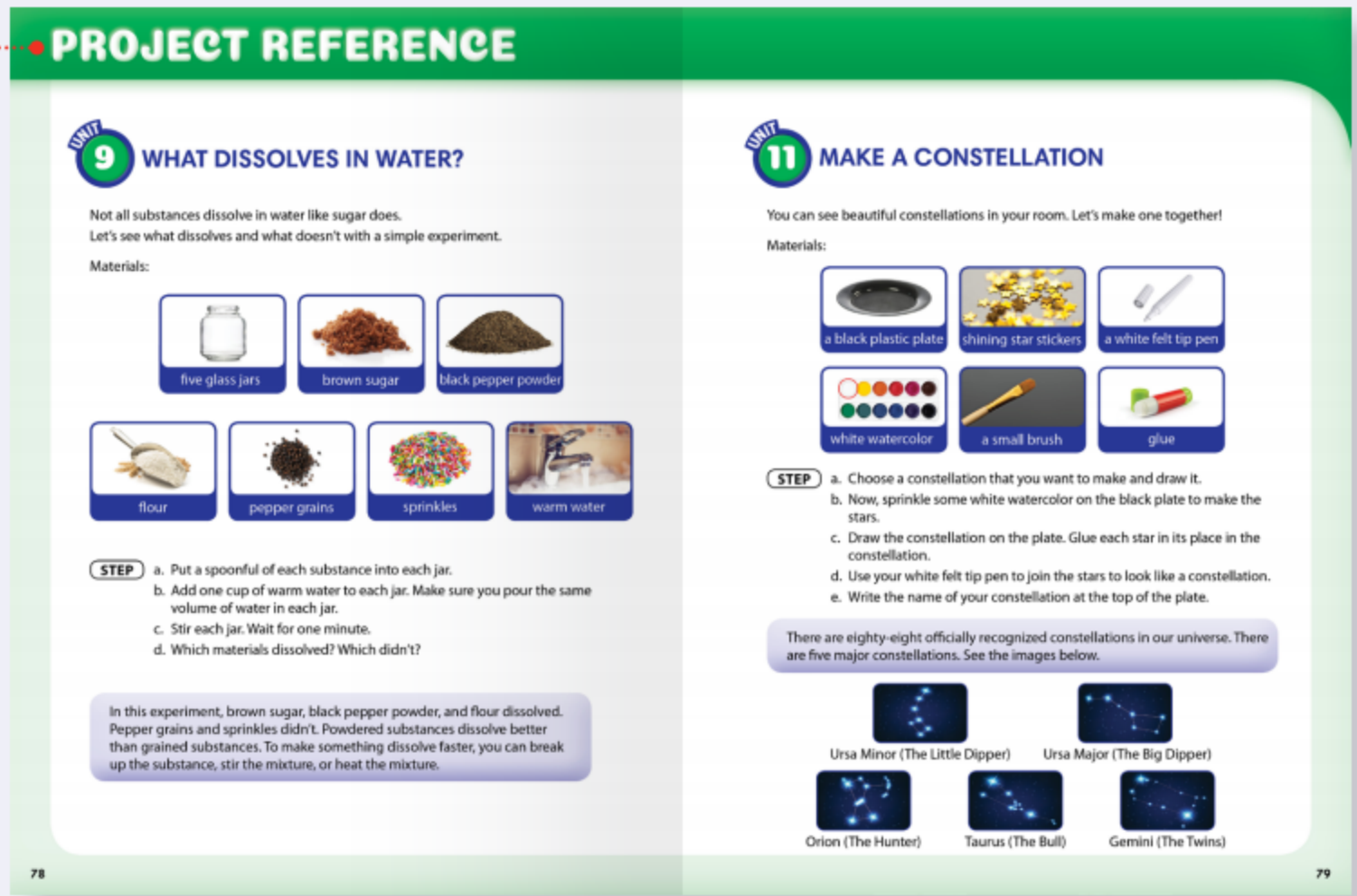

PROJECT REFERENCE

UNIT 9 WHAT DISSOLVES IN WATER?

Not all substances dissolve in water like sugar does.
Let's see what dissolves and what doesn't with a simple experiment.

Materials:

five glass jars | brown sugar | black pepper powder | flour | pepper grains | sprinkles | warm water

STEP a. Put a spoonful of each substance into each jar.
b. Add one cup of warm water to each jar. Make sure you pour the same volume of water in each jar.
c. Stir each jar. Wait for one minute.
d. Which materials dissolved? Which didn't?

In this experiment, brown sugar, black pepper powder, and flour dissolved. Pepper grains and sprinkles didn't. Powdered substances dissolve better than grained substances. To make something dissolve faster, you can break up the substance, stir the mixture, or heat the mixture.

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UNIT 11 MAKE A CONSTELLATION

You can see beautiful constellations in your room. Let's make one together!

Materials:

a black plastic plate | shining star stickers | a white felt tip pen | white watercolor | a small brush | glue

STEP a. Choose a constellation that you want to make and draw it.
b. Now, sprinkle some white watercolor on the black plate to make the stars.
c. Draw the constellation on the plate. Glue each star in its place in the constellation.
d. Use your white felt tip pen to join the stars to look like a constellation.
e. Write the name of your constellation at the top of the plate.

There are eighty-eight officially recognized constellations in our universe. There are five major constellations. See the images below.

Ursa Minor (The Little Dipper) Ursa Major (The Big Dipper)
Orion (The Hunter) Taurus (The Bull) Gemini (The Twins)

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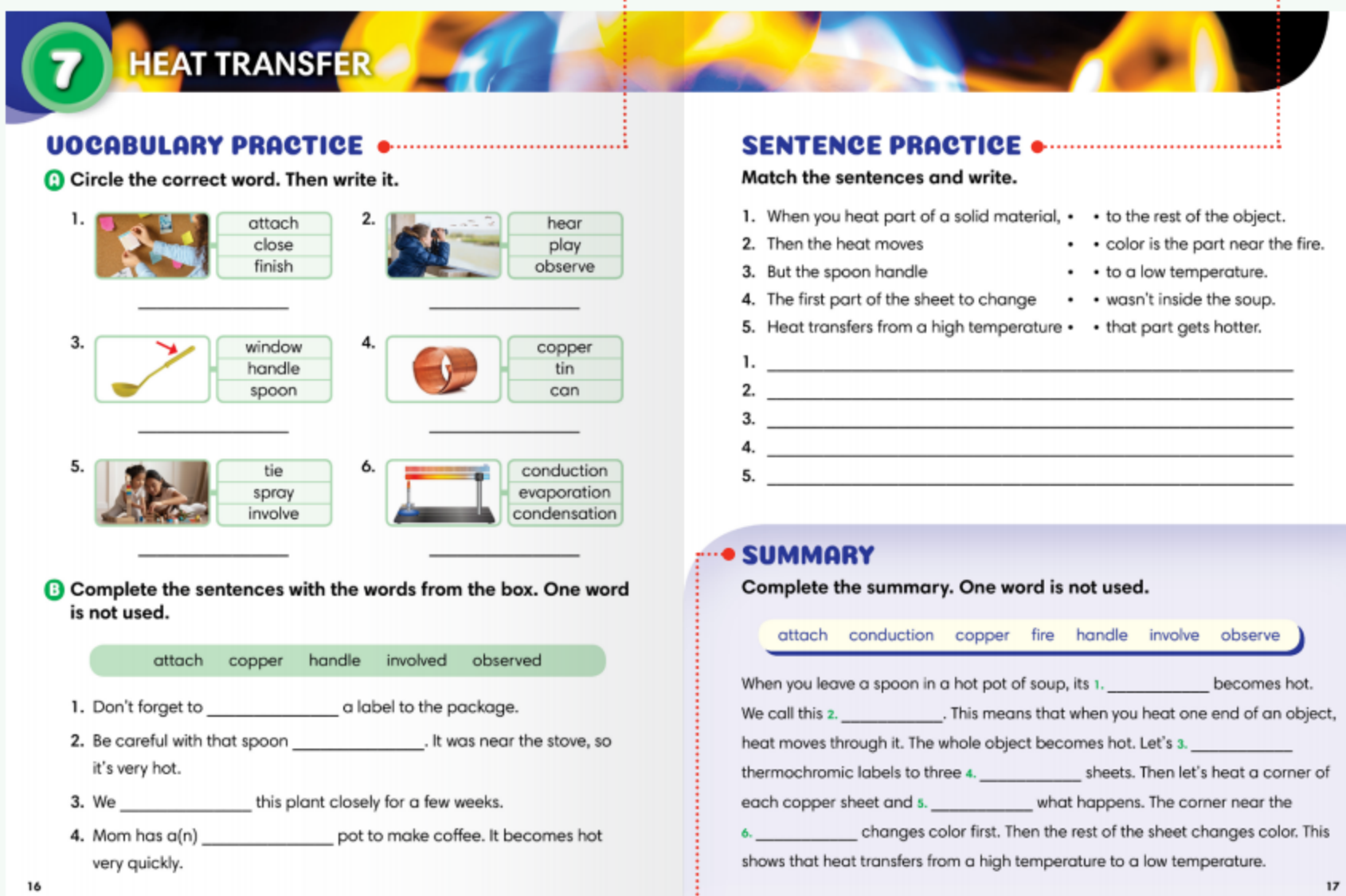
PROJECT REFERENCE

PROJECT REFERENCE pages go into further detail of the concepts behind the project.

WORKBOOK

VOCABULARY PRACTICE
This checks students' understanding of the key words introduced in the Student Book unit.

SENTENCE PRACTICE
This is a sentence match activity featuring sentences taken from the unit reading.



7 HEAT TRANSFER

VOCABULARY PRACTICE

A Circle the correct word. Then write it.

1. attach / close / finish

_____

2. hear / play / observe

_____

3. window / handle / spoon

_____

4. copper / tin / can

_____

5. tie / spray / involve

_____

6. conduction / evaporation / condensation

_____

B Complete the sentences with the words from the box. One word is not used.

attach copper handle involved observed

1. Don't forget to _____ a label to the package.
2. Be careful with that spoon _____. It was near the stove, so it's very hot.
3. We _____ this plant closely for a few weeks.
4. Mom has a(n) _____ pot to make coffee. It becomes hot very quickly.

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SENTENCE PRACTICE

Match the sentences and write.

1. When you heat part of a solid material,	•	• to the rest of the object.
2. Then the heat moves	•	• color is the part near the fire.
3. But the spoon handle	•	• to a low temperature.
4. The first part of the sheet to change	•	• wasn't inside the soup.
5. Heat transfers from a high temperature	•	• that part gets hotter.

1. _____
2. _____
3. _____
4. _____
5. _____

SUMMARY

Complete the summary. One word is not used.

attach conduction copper fire handle involve observe

When you leave a spoon in a hot pot of soup, its 1. _____ becomes hot. We call this 2. _____. This means that when you heat one end of an object, heat moves through it. The whole object becomes hot. Let's 3. _____ thermochromic labels to three 4. _____ sheets. Then let's heat a corner of each copper sheet and 5. _____ what happens. The corner near the 6. _____ changes color first. Then the rest of the sheet changes color. This shows that heat transfers from a high temperature to a low temperature.

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SUMMARY
This is a recap of the unit's reading passage. Students are able to check their understanding of the ideas introduced in the unit.

TABLE OF CONTENTS

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STEAM 1

I will learn... about thermometers and how to measure temperature.

WHAT'S THE TEMPERATURE?

Scan for Audio

WARM-UP

What happens when you put a thermometer in the sun?

KEY WORDS

A Look, listen, and repeat. 01

n. thermometer

adj. exact

v. add

n. food coloring

adj. horizontal

v. show

B Listen and number the words. 02

READING

Listen and read. 03

Scan for Video

Thermometers tell us when it is hot or cold. They tell us the exact temperature. We use them in our daily lives.

How do they work?

Can we make our own thermometer?

Let's make a thermometer with everyday materials.

STEP 1

Pour water into a small bottle and add a few drops of food coloring.