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MINISTRY OF EDUCATION



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Inspire Science

UAE Edition
Grade 1 • Unit 4
Student Edition



**Mc
Graw
Hill**

Grade 1 • Unit 4



Inspire **Science**

Sky Patterns

**Mc
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Observe the Sky

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DISCOVER THE PHENOMENON

What time of
day is it?



 **GO ONLINE**

Check out *Sky* to see the phenomenon in action.



Talk About It

Look at the photo.

Explore the digital activity.

What do you observe?

What questions do you have?

Did You Know?

Sometimes our Moon moves in front of the Sun. This causes a solar eclipse!

What Does an Astronomer Do?



Astronomers study outer space. Edward Gomez is an astronomer. He works at Las Cumbres Observatory. He uses science and math to hunt and track asteroids. He takes photos of asteroids with telescopes. He learns how asteroids move and what materials they contain.

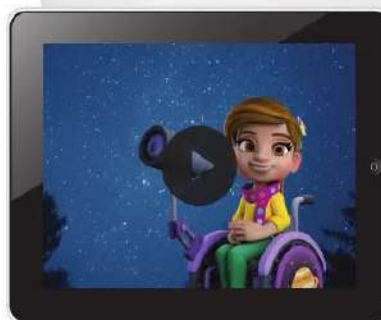


Talk About It

What do you think astronomers need to know about outer space? *telescopes.*
Tell a partner.

GO ONLINE

Learn about an astronomer.



Copyright © McGraw-Hill Education (i) Las Cumbres Observatory/Doug Shobbrook, (i) Las Cumbres Observatory/air Arcavi, (i) nmltd/Creas Video/Getty Images

1. Why do you think it is important to study objects in outer space?

1) Understanding our origin

2) Searching for life

3) protecting the planet.

2. Draw a picture of something an astronomer could study in outer space.



HALEY
Astronomer



WORD WALL

Observe the Sky

Look and listen for these words.

Earth



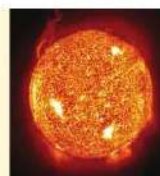
Moon



star



Sun



Words to Know

pattern

predict

season

Here are some words you will use in the lessons.

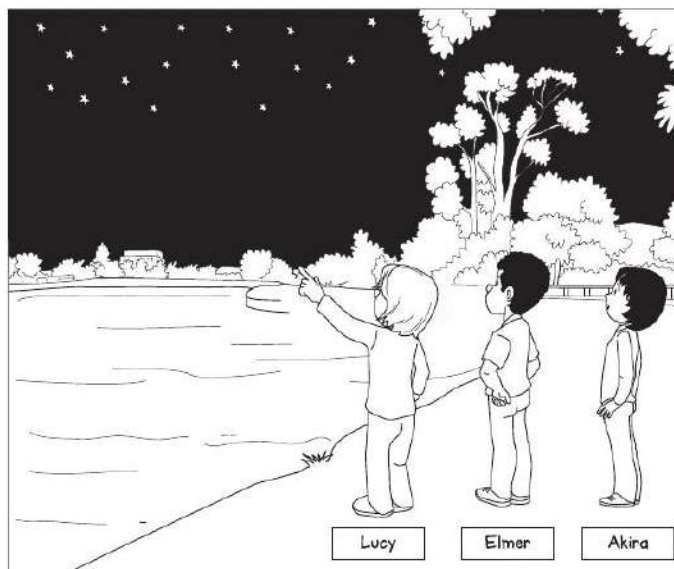


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LESSON 1 LAUNCH

Seeing Stars

Which friend has the best idea about when we see stars?



Elmer: I think we see stars only in the daytime.

Lucy: I think we see stars only in the nighttime.

Akira: I think we see stars in the daytime and in the nighttime.

Explain your thinking.

Beause the sun is star



LESSON 1

Objects in the Sky

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DISCOVER
THE PHENOMENON

What do you observe in the night sky?



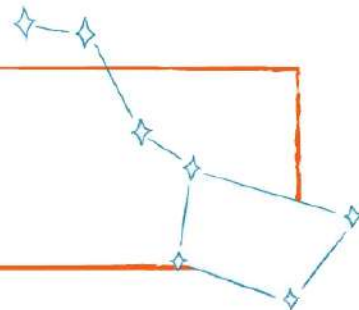
Check out *Night Sky* to see
the phenomenon in action.

Look at the photo. Watch the video.
What do you see in the night sky?
What do you observe?

Stars and a shooting star are
visible in the photo.

Did You Know?

Some of the light in the night
sky comes from stars that no
longer exist!



INQUIRY ACTIVITY

Hands On

Day and Night Sky

You saw pictures of the sky. Observe and compare the day and night sky.

Make a Claim How are the day and night sky alike and different?

I think the sun is in the day sky.

Sometimes the moon is visible in the day
and night sky

Investigate

BE CAREFUL Do not to look at the Sun.

1. Go outside. Observe the day sky.
2. **Record Data** Draw the objects you see in the day sky.



Copyright © McGraw-Hill Education

3. Observe the night sky.
4. Draw the objects you see in the night sky.



Communicate

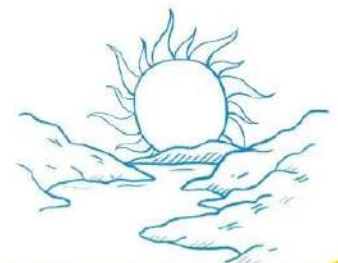
5. Did your observations match your claim? Explain.

Yes. I think the sun is visible
in the day sky.



Talk About It

Compare your data with a partner.
Which observations are similar?



The Sun Is a Star

You observed the sky during the day and night. You can see stars in the sky.



Listen to *Another Sun*.

1. All stars make their own light.
2. Compare the star in this story to our Sun. Use details to describe how it is similar.

They both make their own light and are made of hot gases

They both look like glowing balls in space.



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Make Your Claim

Are all stars visible during the day?

Write a claim that answers the question.

Claim

During the day:

Sun

Add evidence from this lesson to support your claim.

Evidence

My claim is supported by:

The Sun is much closer to Earth than other stars, which makes it look very bright

Discuss your reasoning as a class.

Reasoning



Talk About It How does your evidence support your claim?

Vocabulary

Look and listen for these words as you learn more about objects in the sky.

Earth

Moon

planet

star

Sun

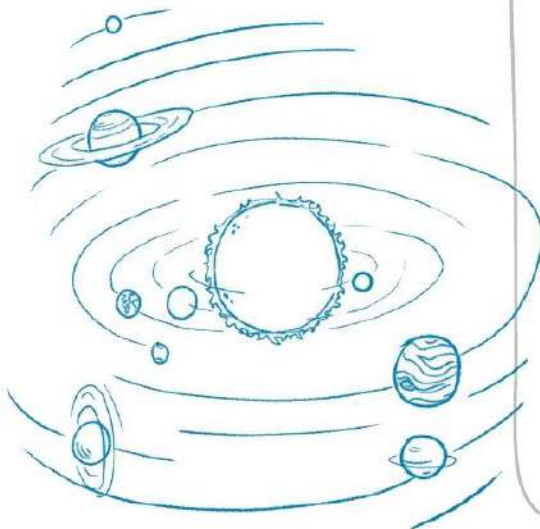
Daytime and Nighttime Stars

GO ONLINE

Watch the video *The Sun and Stars* to learn about the sky.

A **star** is an object in the night sky that makes its own light. The **Sun** is the closest star to Earth.

1. Draw a picture of a star you have seen.





Listen to *Lights in the Sky*.

2. *Lights in the Sky* is about star.

3. Why is the Sun important to Earth?

The sun give us

Heat: It keeps our planet warm enough for living
things to survive.

Light: It provides the light that plants need to grow.

Energy: It drives Earth's weather and water cycles.

4. Why is the Sun called a daytime star?

Because it is the only star we can see
during the day.



 GO ONLINE

Explore *The Night Sky* to learn about the sky.

Inspect

Read the text.

Underline the objects you could observe with a telescope.

Find Evidence

Reread Highlight text that helps you know what “observe” means.

Notes

PRIMARY SOURCE



This is a lithograph of the James Lick Telescope. This telescope was built in 1888.

Telescopes and the Night Sky

Telescopes help us observe things that are far away. We use telescopes to see other planets. A **planet** is a very large object that moves around the Sun. **Earth** is the planet on which we live.

Telescopes also help us observe stars. Stars are always in the sky. It is hard to see stars during the day because the Sun is so bright.

The Sun is so bright that it lights up other things in the sky. The Moon is something that is lit up by the Sun. A **moon** is a ball of rock that moves around a planet. Earth has one moon. We call it the Moon.



What is a **pattern** you observe about **stars**? **Explain** using details from this reading. Draw or write your answer.

Make Connections



Talk About It

Which objects in the night sky do not have their own light?

Find text evidence and discuss with your partner.

Notes

Stars are always in the sky
We can't see stars during the day
because the Sun is so bright that its light hides them.



INQUIRY ACTIVITY

Research

OPEN INQUIRY

Up in the Sky

You have learned about some objects in the sky. Research a different object in the sky. Teach your classmates about the object.



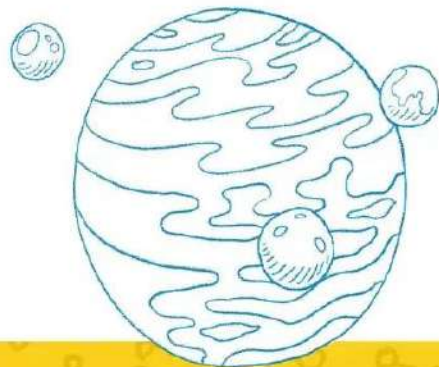
يَسْتَطِيعُ الْغَالِبُ مَرَحَ أَيِ
سَوْأَلٍ وَالْأَجَابَةَ عَنْهُ وَتَصَمِيمِ نَمُودِ؟

Ask a Question Write a question you will research.

Why does the moon appear to
change its shape over the month?

Investigate

1. Find the answer to your question.
2. Make a model or drawing of your object.
3. Present what you learned to your classmates.



Copyright © McGraw-Hill Education ESA/Hubble/NASA

Communicate

4. **WRITING Connection** Write about what you learned. Write the answer to your question.

Because it moves around the
Earth and we see different
amounts of the side lit by
the Sun.



Time to Move

Move around the classroom to show how your object appears to move in the sky.

Be an Astronomer

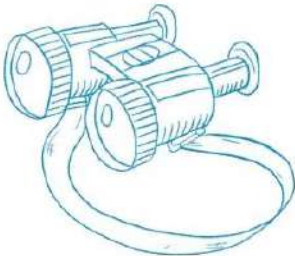
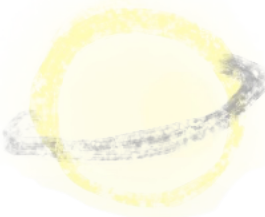
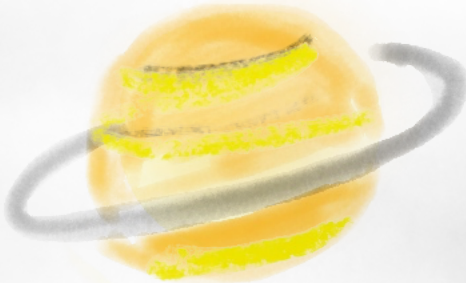
Astronomers use different tools to observe the sky. They can record and describe the patterns they observe.



Use *Be an Astronomer* to explore the tools astronomers use.



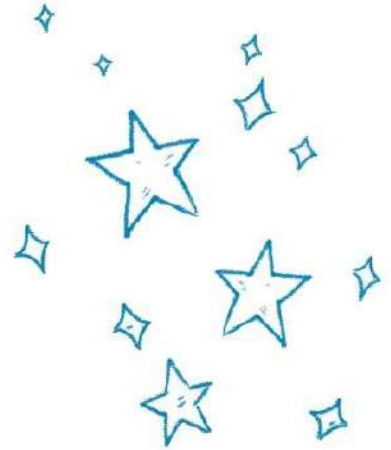
Choose one of the objects in the sky.
Draw how it looks when you use
each tool.

Sky Patterns

SOCIAL STUDIES Connection

The Maya people lived thousands of years ago in what is now Mexico and Central America. The Maya carefully observed how the Sun, the Moon, planets, and stars moved. They recognized patterns over many years. They made calendars using this information. They used this information to know when to plant and harvest crops.



The Maya built the Pyramid of El Castillo in Chichén Itzá. This pyramid has four sides. Each side has 91 steps. There is a platform at the top. This is a total of 365 steps. There are 365 days in a year.



El Castillo Chichén Itzá, Yucatan, Mexico

LESSON 1

Review

EXPLAIN

THE PHENOMENON

What do you observe
in the night sky?

Summarize It

You observed the day and night sky.
What objects are in the sky?

I think the sun, the moon and
stars are in the sky.

REVISIT



Look at the Page Keeley Science Probe
on page 7. How has your thinking
changed about when we can see stars?



Three-Dimensional Thinking

Use what you have learned to answer these questions.

1. Put a ✓ next to the objects visible at night.

☒

the Moon

☒

stars

☐

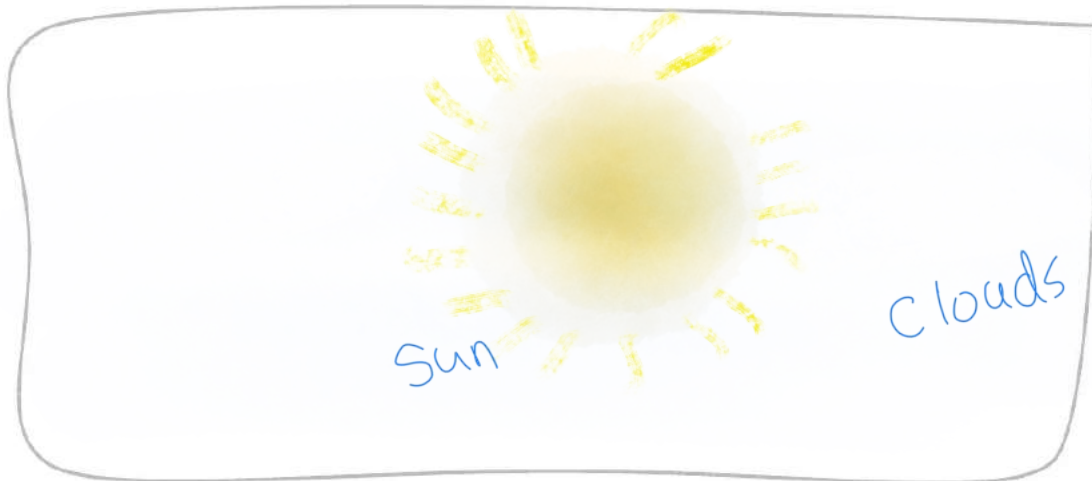
the Sun

2. Why don't we see many stars during the day?

a. The Sun is close to Earth and outshines other stars.

b. The stars set during the day and rise at night.

3. Use your observations to draw the daytime sky. Add labels.

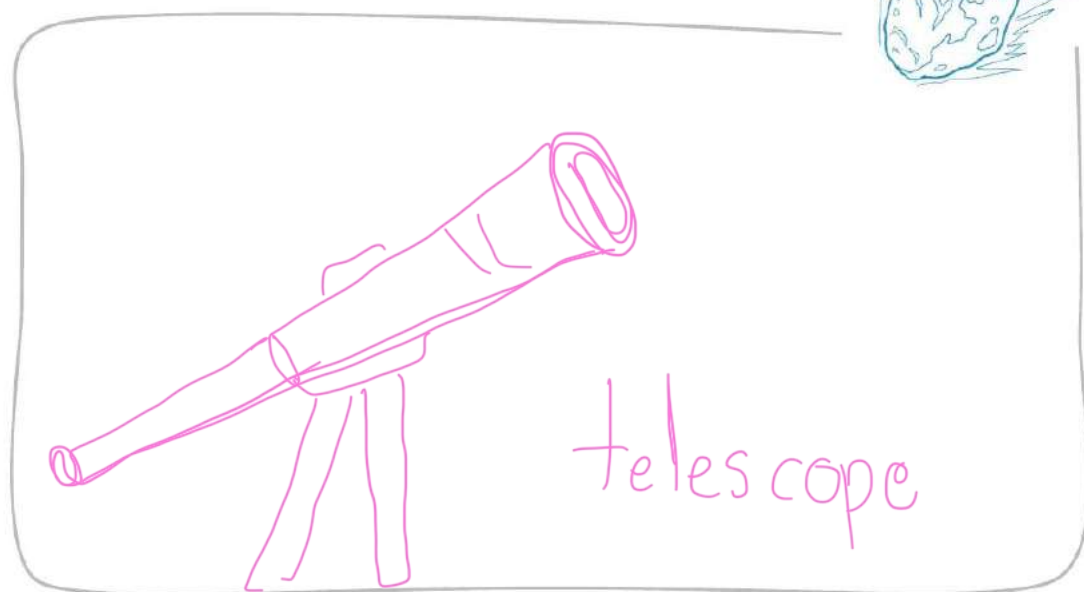


Extend It

OPEN INQUIRY

You would like to see the night sky more clearly. Research tools that help you see objects in the night sky.

1. Draw a picture of the tool you researched.



2. How does your tool help you see the night sky? Include two facts.

1. A telescope makes far-away objects in space like planets and the moon look much larger and closer

LESSON 2 LAUNCH

Day and Night

Which friend has the best idea about why we have day and night?



Maribel



Benito



Hoshi



Dave

Dave: I think it is *because Earth spins all the way around each day.*

Benito: I think it is *because Earth goes around the Sun once each day.*

Hoshi: I think it is *because the Sun goes around Earth once each day.*

Maribel: I think it is *because the Sun goes up and down once each day.*

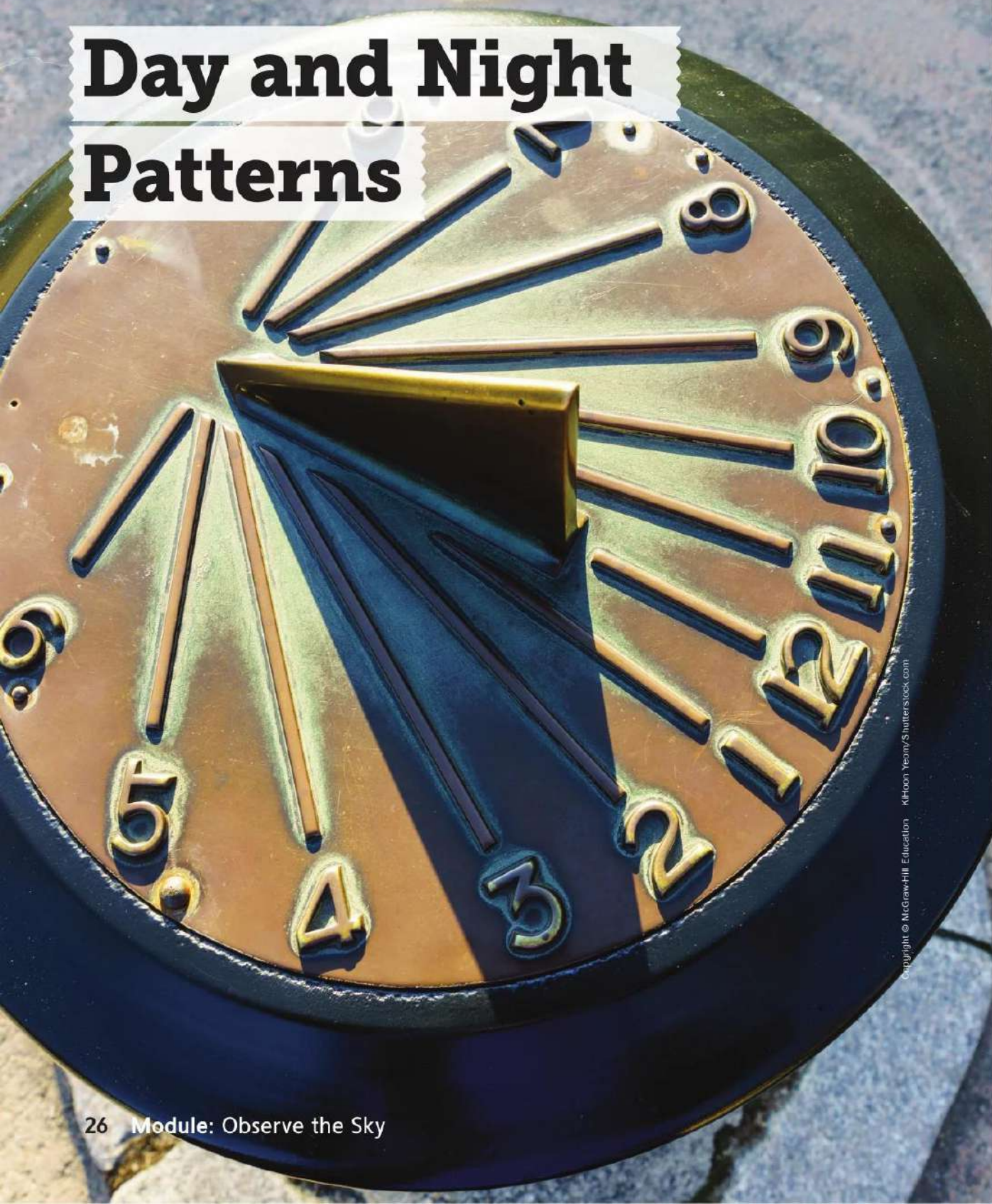
Explain your thinking.

I think it is day when my part of Earth faces the sun.

it is night when my part of Earth faces away from the sun.

LESSON 2

Day and Night Patterns



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DISCOVER THE PHENOMENON

What is this tool used for?



GO ONLINE

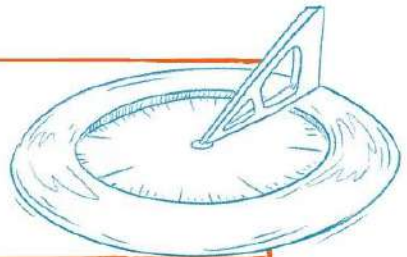
Check out *Sundial* to see the phenomenon in action.

Look at the photo. Watch the video.
What do you think it means when the
shadow moves? What did you observe?

This device is a sundial. It tracks the
movement of the sun and casts a shadow
to show the time.

Did You Know?

The earliest examples
of sundials were found
in Egypt.





INQUIRY ACTIVITY

Hands On

Sundial Patterns

You observed a sundial. Explore the movement of the Sun with a sundial.

Make a Prediction What do you think will happen as the day goes on?

I think the shadow will move around the dial as the sun
moves from east to west across the sky

Materials



paper
plate



straw



modeling
clay

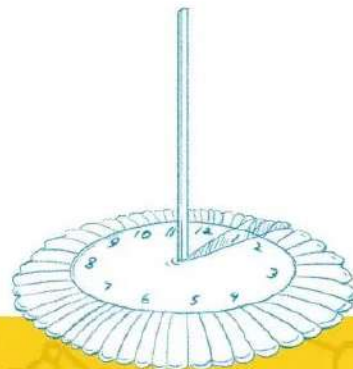


markers

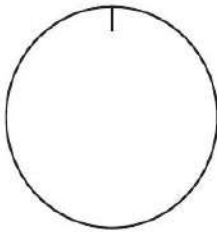
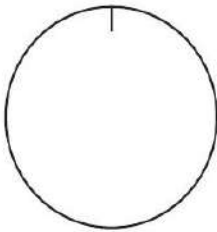
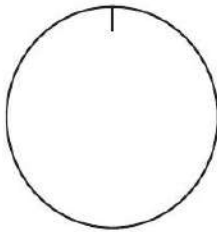
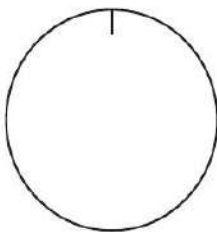
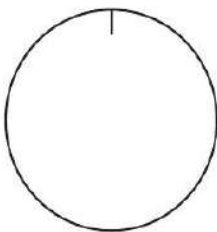
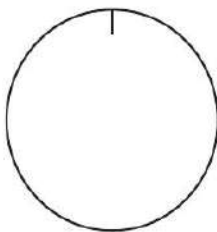
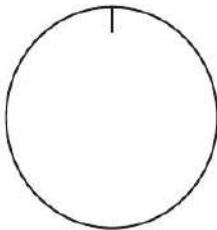
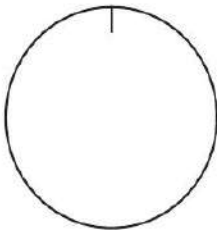
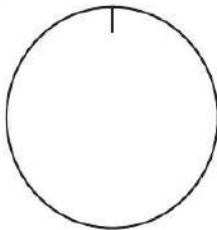
Investigate

Be Careful Listen to your teacher.

1. Build your sundial.
2. Place your sundial outside.
3. View your sundial three times each day.
4. **Record Data** Draw a picture of what you observe.
5. **MATH Connection** Write the time of your observation.

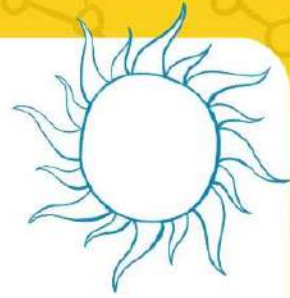


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(others) Ken Cavanagh/McGraw-Hill Education

	Morning	Noon	Afternoon
Day 1	 time:	 time:	 time:
Day 2	 time:	 time:	 time:
Day 3	 time:	 time:	 time:

INQUIRY ACTIVITY

Communicate



6. Why do you think the shadow is moving?

The shadow moves as the sun appears to move
across the sky.

7. What pattern do you observe?

The shadow moves in the same direction around the
dial each day.

8. Did your findings support your prediction?

Yes. The shadow moved around the sundial.



Talk About It

When might it be hard to tell time using a sundial? Tell a partner.

Earth Moves

GO ONLINE

Watch the video *Patterns of the Sun, Moon, and Stars* to learn about the sky.

Earth moves around the Sun.
The Moon moves around Earth.
It takes Earth about 365 days
to move all the way around the
Sun. That is one whole year!

Vocabulary

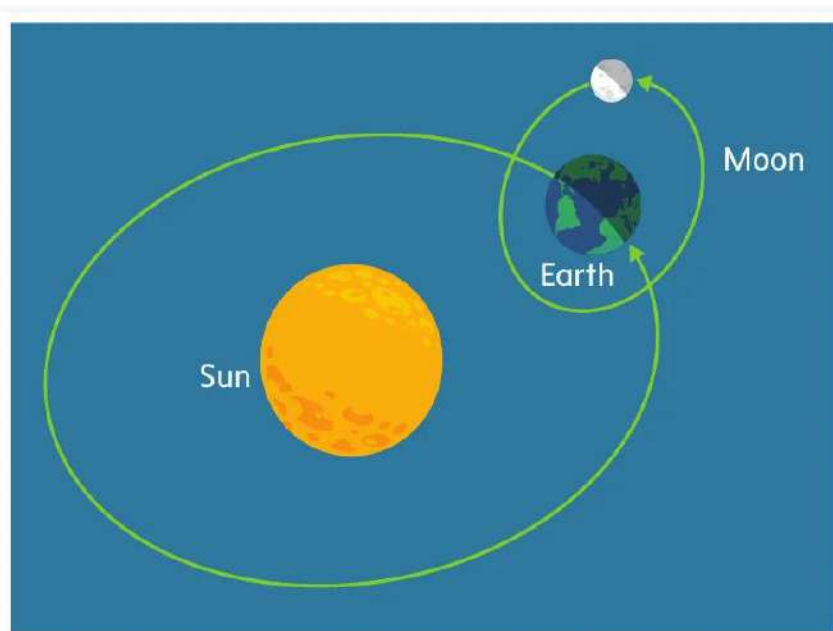
Look and listen for
these words as you
learn about the sky.

horizon

Moon phases

sunrise

sunset



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Time to Move

Act out how Earth and the Moon move
around the Sun.



Different Times of Day

The sky changes as Earth spins. Earth makes one complete turn every day. The **horizon** is the line where Earth and sky seem to meet.

You see the sunrise in the morning.

Sunrise is the time of day when the Sun appears to rise above the horizon. You see the sunset in the evening. **Sunset** is the time of day when the Sun appears to sink below the horizon.



Moon Phases

The Moon does not make its own light. Sunlight reflects off the Moon. This makes the Moon appear to change shapes in the sky. **Moon phases** are the different Moon shapes we see each month. The phases of the Moon change as it moves around Earth each month.

Talk About It

How are phases of the moon like the patterns you saw with the sundial? How are they different?

INQUIRY ACTIVITY

Hands On

Moon Phases

Observe how the shape of the Moon changes over one week.

Make a Prediction What do you think the Moon will look like on day seven?

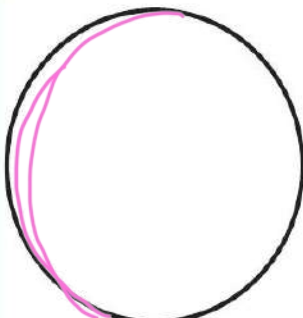
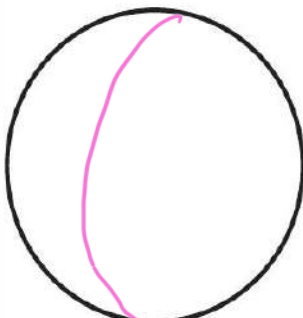
I think the moon will look similar to how it appeared on the fifth night

Investigate

Be Careful Only go outside at night with an adult.

1. Look at the Moon on three clear nights.
2. Observe the shape of the Moon.
3. **Record Data** Draw a picture of what you observe each night.
4. Notice if the shape becomes larger, smaller, or stays the same each night.

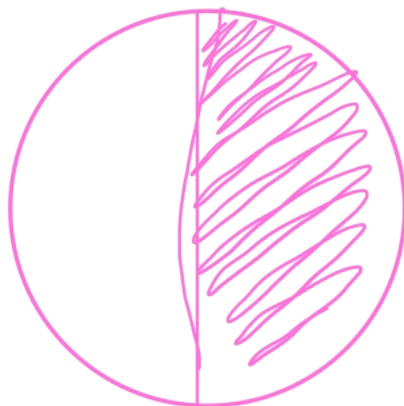


Night 1	Night 3	Night 5
		

Communicate



The Moon phases follow a **pattern**.
Predict what the **Moon** will look like
on the seventh night.





LESSON 2

Review

EXPLAIN

THE PHENOMENON

What is this tool used for?

Summarize It

You observed different patterns of objects in the sky. How can you use sky patterns to tell the time?

I think the sun appears to move across the sky from east to west. It rises higher until noon and then it goes lower until sunset

REVISIT



Look at the Page Keeley Science Probe on page 25. How has your thinking about day and night changed?



Three-Dimensional Thinking

Use what you have learned to answer these questions.

1. ✓ the patterns that can be predicted.



the path of the Sun across the sky



sunrise and sunset



Moon phases

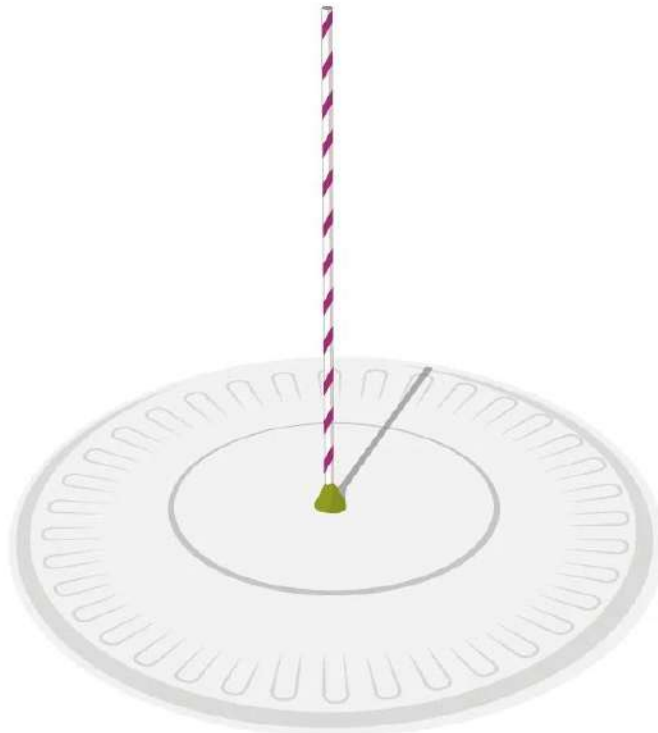
2. Circle the statement that is true.



a. Sundials work using the pattern of the Sun.

b. Sundials work using the pattern of the Moon.

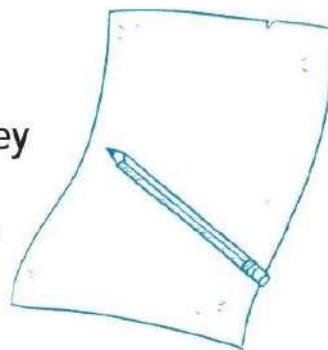
c. Sundials do not need a pattern to work.





Extend It

WRITING Connection Write a letter to Haley sharing your opinion about the best time of day. Use this page to brainstorm. Write your letter on a separate sheet of paper.



Greeting: Dear Haley

Write your opinion about the best time of day.

In my opinion, the afternoon is the best time of day.

Write two reasons.

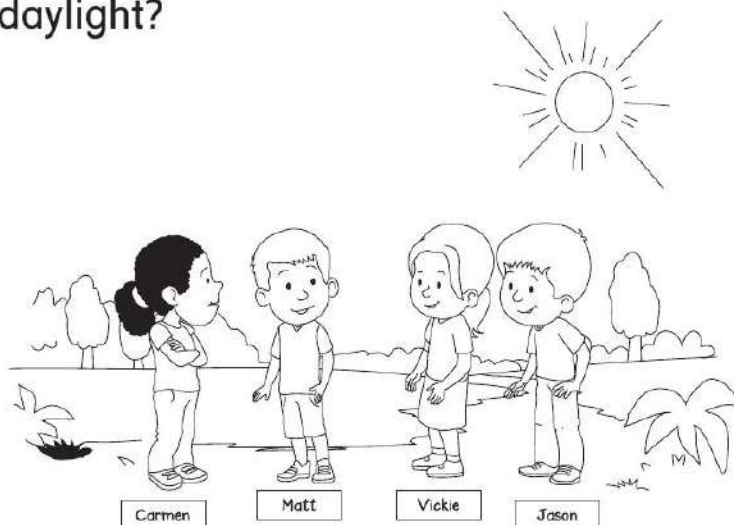
1. The sun is high and bright, which makes it the perfect time to play outside with my friend.
2. I usually finish my schoolwork during this time so I feel relaxed and happy.

Closing: Your friend (اكتب اسمك)

LESSON 3 LAUNCH

Daylight Hours

Which friend has the best idea about hours of daylight?



Jason: I think daylight is longest in the spring.

Vickie: I think daylight is longest in the summer.

Matt: I think daylight is longest in the fall.

Carmen: I think daylight is longest in the winter.

Explain your thinking.

I think it is day when my part of Earth
faces the sun. It is night when my part of Earth
faces away from the sun

A satellite image of Earth from space, showing the Arctic region and parts of North America. The Arctic is covered in white ice, and the surrounding landmasses are visible in shades of green and brown. The ocean is a deep blue. The text 'LESSON 3' is overlaid in a blue box in the top left corner.

LESSON 3

Patterns During the Year

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DISCOVER
THE PHENOMENON

What time of year do you think it is?



 **GO ONLINE**

Check out *Earth* to see the phenomenon in action.

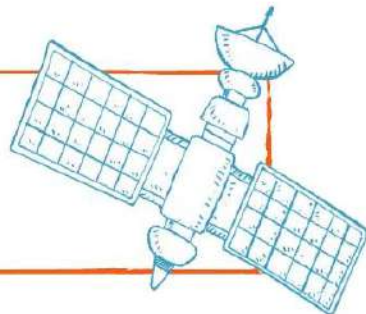
Look at the photo. Watch the video.
How does the Earth change during the year? What do you observe?

I think the white color on Earth
represents snow. So its winter in this part
of Earth.

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Did You Know?

This photo was taken
from outer space with
a satellite!



INQUIRY ACTIVITY

Simulation Sunlight



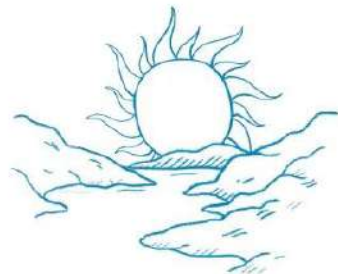
Use the simulation *Sunlight* to explore the differences in sunlight on Earth during the year.

Make a Prediction How will the amount of sunlight change during the year?

I think Summer has the most sunlight,
and the winter has the least sunlight.

Investigate

1. Choose Lebanon, Kansas.
Choose January.
2. **Record Data** Press play.
Press pause when you see the Sun rise.
Record the time and temperature.
3. Press play. Press pause when you see the Sun set. Record the time.
4. Repeat steps 2 and 3 for April, July, and October.



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Lebanon, Kansas

Month	Sunrise	Sunset	Temperature
January	winte	5:00 pm	every cold
April	Spring	8:00 pm	Mid
July	Summer	8:00 pm	Hot
October	Autumn	6:00 pm	Mid

INQUIRY ACTIVITY

Communicate

5. What month did the Sun rise the earliest?

2 What month did the Sun set the latest?

1) Around June 21st .

2) June .

6. What month did the Sun rise the latest?

2 What month did the Sun set the earliest?

1) late December or early January .

2) mid -December .



What **pattern** do you think causes the differences in **daylight** during the year?



Talk About It

Did what you learned match your prediction? Tell a partner.



Sunlight During the Year

The amount of sunlight changes during the year.
Days are warmer when there is more daylight.
Days are colder when there is less daylight.



Listen to *The Other Half of the World*.

1. **READING Connection** Who is telling this story?

2. Which season is it in Chicago? Use the illustrations to explain how you know.

3. Why is Ethan packing summer clothes for his trip?

Because he is traveling to a place where it is currently summer.



Vocabulary

Look and listen for these words:

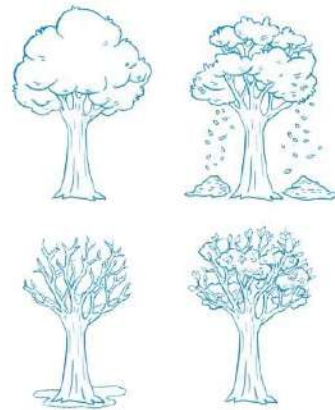
fall season spring summer
winter

Seasonal Patterns

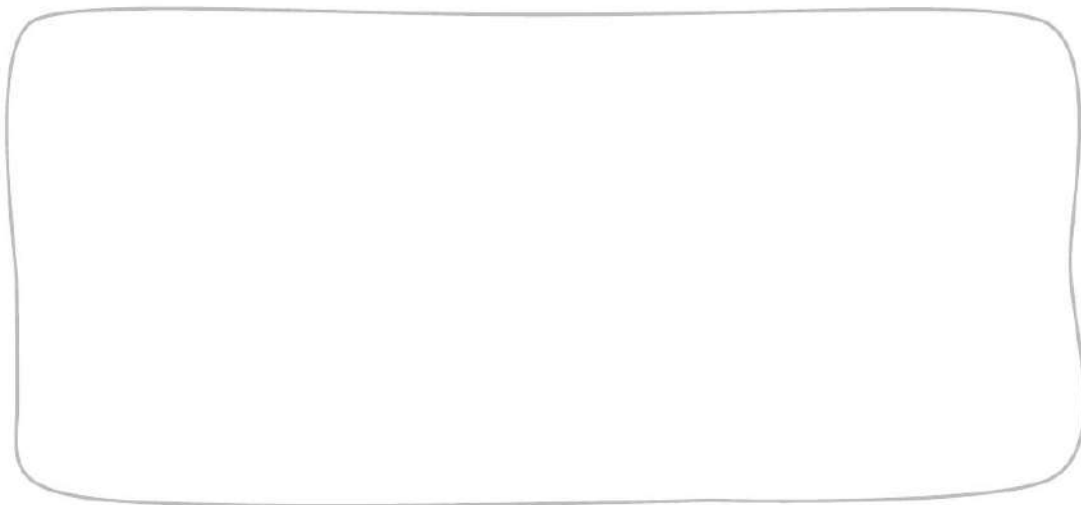
There are four seasons. A **season** is one of the four parts of the year with different weather patterns.



Watch the video *Seasonal Patterns* to learn about seasons.



1. Draw a picture of the current season. Add details about what it feels and looks like outside. Add labels to your drawing.



The amount of daylight during the year follows a pattern. Seasons also follow a pattern. The seasons are spring, summer, fall, and winter.

 Listen to *The Four Seasons*.

Match each photo of a season with its definition.



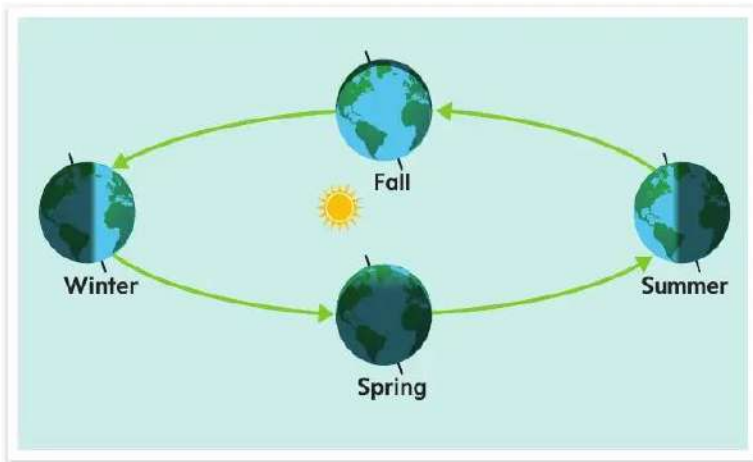
Summer is the season after spring.

Fall is the season after summer.

Winter is the season after fall.

Spring is the season after winter.

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Dmitry Rukhonenko/Hemera/Getty Images



Sunlight During the Year

The seasons are caused by the way Earth is tilted. Seasons are also caused by the way Earth moves around the Sun.

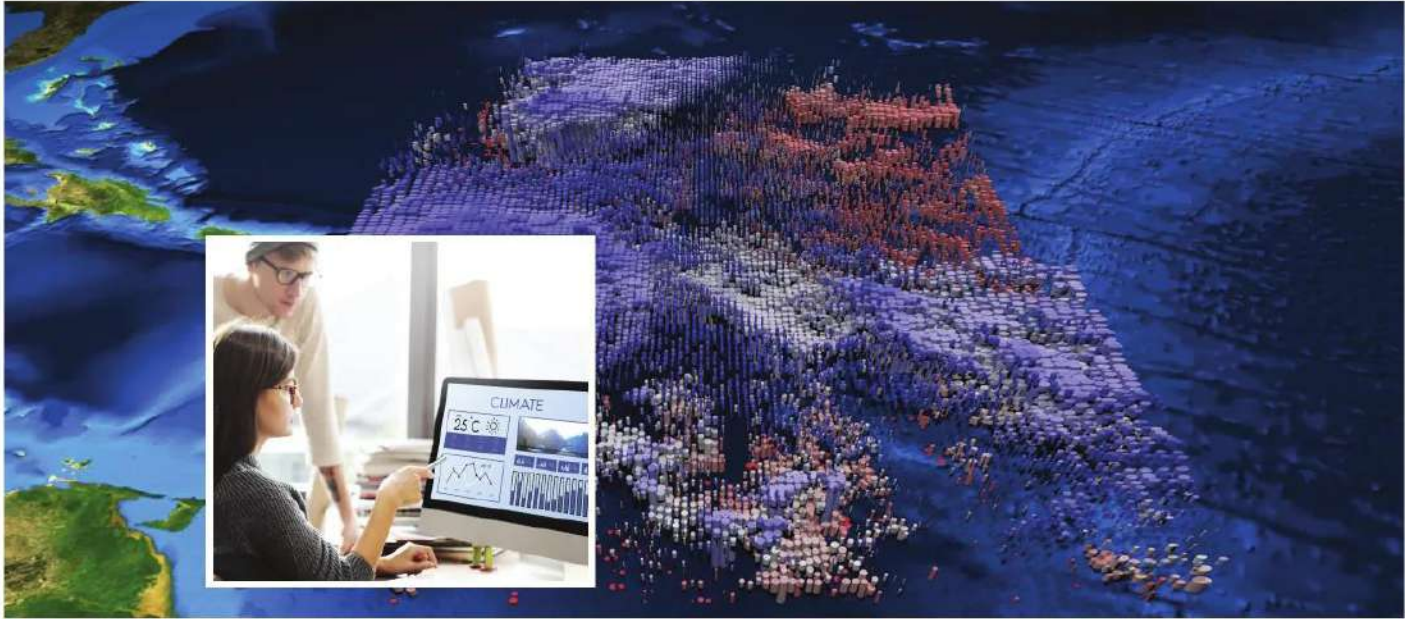
During summer, a place has more hours of sunlight. The summer Sun is higher in the sky. Temperatures are the warmest of the year. In fall, a place has sunlight for fewer hours and temperatures are cooler.

On the northern half of Earth, summer and fall last from about June to December.

Talk About It

What patterns do you notice in the amount of sunlight outside? Why? Tell a partner.

What Does a Climatologist Do?



Climatologists study weather over long periods of time. Climatologists look at patterns in seasons, weather, and temperatures. They use science every day. Climatologists analyze and interpret data.

1. Why is climatology important?

Planning for the future , Understanding
Changes , Preparedness for extreme
conditions .

INQUIRY ACTIVITY

Data Analysis

Seasons and the Sun

You have learned about different patterns. Look at the data to find out about patterns of sunlight throughout the year.



Make a Prediction What time of day will the Sun set in San Diego, California, during the winter?

Investigate

Month	Length of Day
June	14 hours
September	12 hours
December	9 hours
April	13 hours

- MATH Connection** Put the months in order from longest to shortest day.

2. What did you notice about the length of day during the winter?

The length of day is the during in winter

This table shows the sunrise and sunset times in San Diego, California.

Season	Sunrise	Sunset
Summer	5:41 a.m.	7:59 p.m.
Winter	6:47 a.m.	____ p.m.

3. Predict when the Sun will set in winter.

Circle your answer.

4:46 p.m.

8:36 p.m.

Communicate

WRITING Connection On a separate sheet of paper, explain how you predicted the sunset time in winter.

 **Talk About It** Does your answer support what you learned about seasons and sunlight? Tell a partner.



Lesson 3

Review

EXPLAIN

THE PHENOMENON

What time of year do you think it is?

Summarize It

Can you predict the amount of daylight if you know the season? Explain.

Yes, I think winter months usually have less daylight than summer months.

REVISIT



Look at the Page Keeley Science Probe on page 39. How has your thinking about daylight changed?



Three-Dimensional Thinking

Use what you have learned to answer the questions.

1. Think about where you live. Which month would have the least daylight?
✓ the box.



December has the least daylight.



August has the least daylight.

2. Look carefully at the details in the photo.
What season could it be in Lebanon, Kansas? Refer to your simulation if needed. ✓ the box.



This could be spring. The Sun is higher than it would be during the winter. The temperature is mild.



This could be winter. The Sun is low in the sky. The temperature is cold.

Extend It

Be a climatologist Use a national weather map to find the temperature of each area. Use the temperature chart to color in the map.

Temp. °F	Color
110	red
100	
90	orange
80	
70	yellow
60	
50	green
40	
30	blue
20	
10	purple
0	
-10	grey
-20	

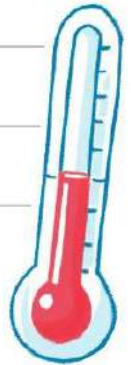
Turn your page
sideways to color
the map.



Seasonal Patterns

Think about the seasonal changes you observe during the year. You learned about how amounts of daylight and temperatures change.

Materials



Plan Your Project

- ☐ Over the next three months, record data. Use the table on the next page.
- ☐ Use your observations to describe patterns you observe.
- ☐ Make a poster, model, or diorama to communicate your observations.
- ☐ Make a list of the materials you will use.
- ☐ Share what you learned with your class.

Use your observations to make your project.





STEM Module Project

Science Challenge

Record Data

Month	Sunrise and Sunset Observations	Plant and Animal Observations

What I Wear	Temperature and Weather



Communicate

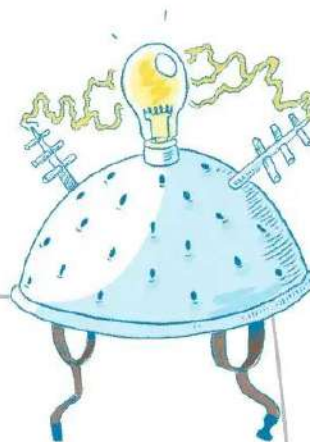
What patterns did you observe?

Design Your Project

Circle what you will make to show what you know.

poster model diorama

Use this area to brainstorm your idea.



Module Wrap-Up

REDISCOVER THE PHENOMENON

What time of
day is it?



Look at your project
to help you answer
the question.

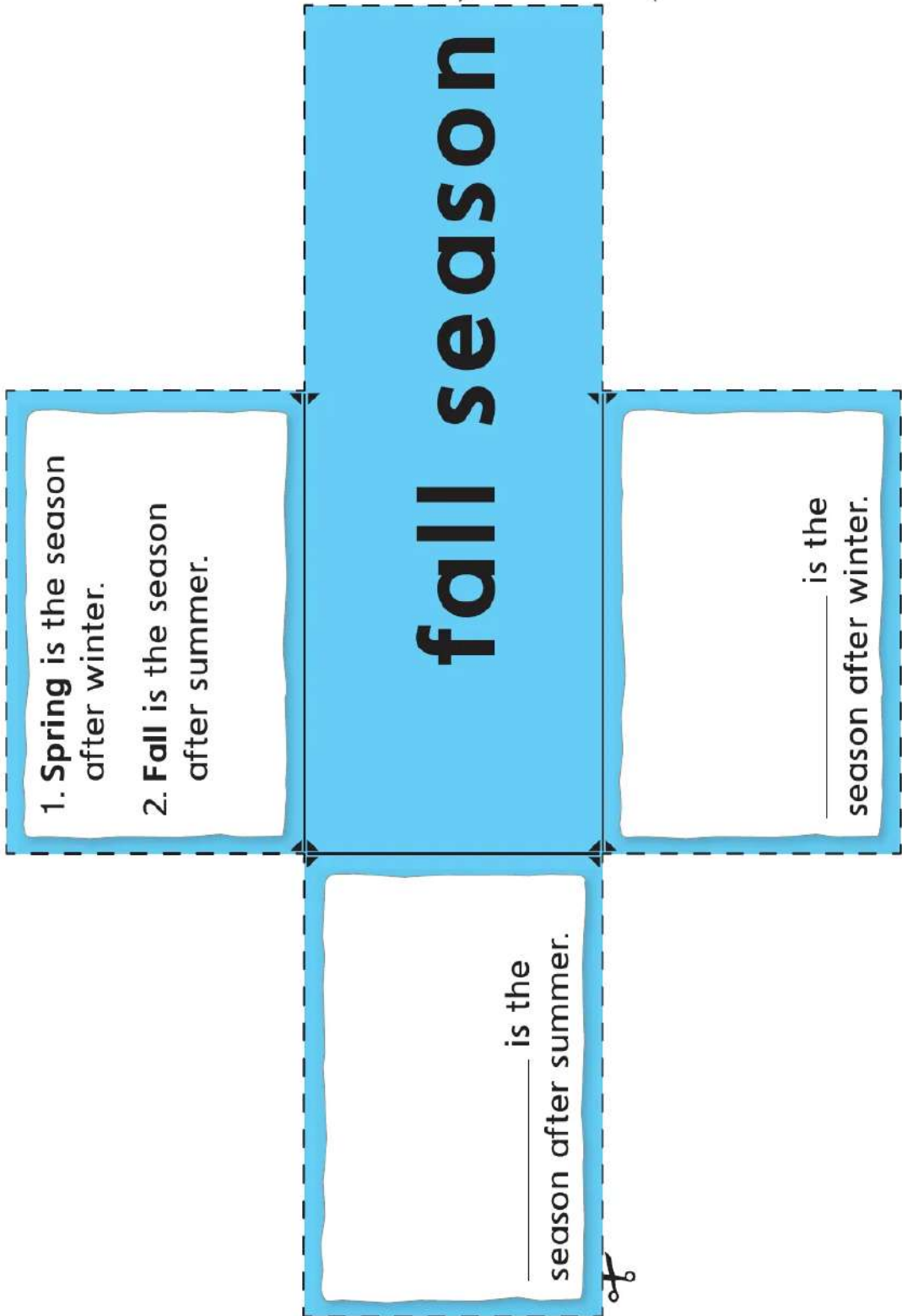




cut on all dashed lines



fold on all solid lines

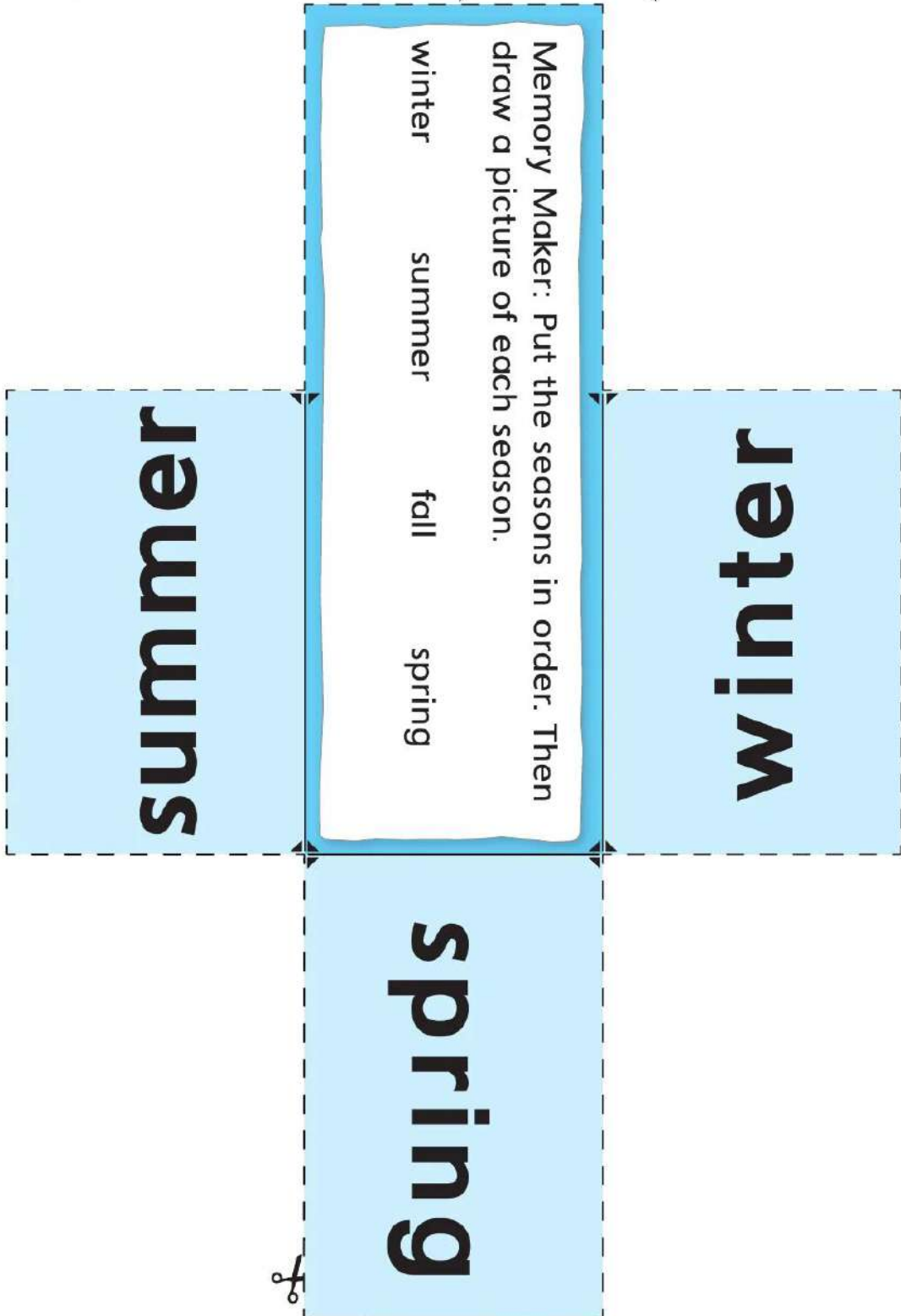




cut on all dashed lines



fold on all solid lines





Science Glossary

A



amphibian an animal that lives part of its life in water and part on land

B



behavior the way a person, animal, or thing acts or does something



bird an animal that has two legs, two wings, and feathers

C



communicate to give information about something

E



Earth the planet on which we live



energy the ability to do work

F



fall the season after summer



fish an animal that lives in the water and has gills and fins



flower plant part that makes seeds



fruit plant part that holds the seeds



function the purpose of something

H



horizon the line where the earth and sky seem to meet

I



illuminate to light up



inherit when something is passed from the parent to its young



insect an animal with three body sections and six legs

L



leaf plant part that makes food from sunlight



learn to gain knowledge or skill



light a form of energy that lets you see

M



mammal an animal with hair or fur that takes care of and usually gives birth to live young



material what objects are made of



mirror a smooth surface that reflects what is in front of it



Moon a ball of rock that moves around Earth



Moon phases the different Moon shapes we see each month

N



need something you must have in order to live

O



offspring young made by parents



opaque materials that do not let light pass through

P



parent a living thing that makes offspring



pitch how high or low a sound is



planet a very large object that moves around the Sun



pollen powder that helps make new plants



protection keeps things safe from harm

R



reflect give back an image



reptile an air-breathing animal that has dry skin covered with scales



root a plant part that keeps the plant in the ground, stores food, and absorbs water and nutrients

S



season one of the four parts of the year with different weather patterns



seed a part of a plant that can grow into a new plant



seedling a young plant



shadow a dark shape that is made when a source of light is blocked



signal a sound or movement that gives information



sound a form of energy that comes from objects that vibrate



spring the season after winter



star an object in the sky that makes its own light



stem plant part that holds up the plant



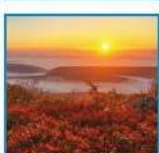
structure a part of something



summer the season after spring



Sun the star closest to Earth



sunrise the time of day when the Sun rises above the horizon

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sunset the time of day when the Sun descends below the horizon



survive to live and grow

T



trait a feature of a living thing



translucent when some light can pass through



transparent when light can pass through

V



vibrate to move back and forth



volume how loud or soft a sound is

W



wave a movement up and down or back and forth



winter the season after fall



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