

Ask®

Sun Surprise

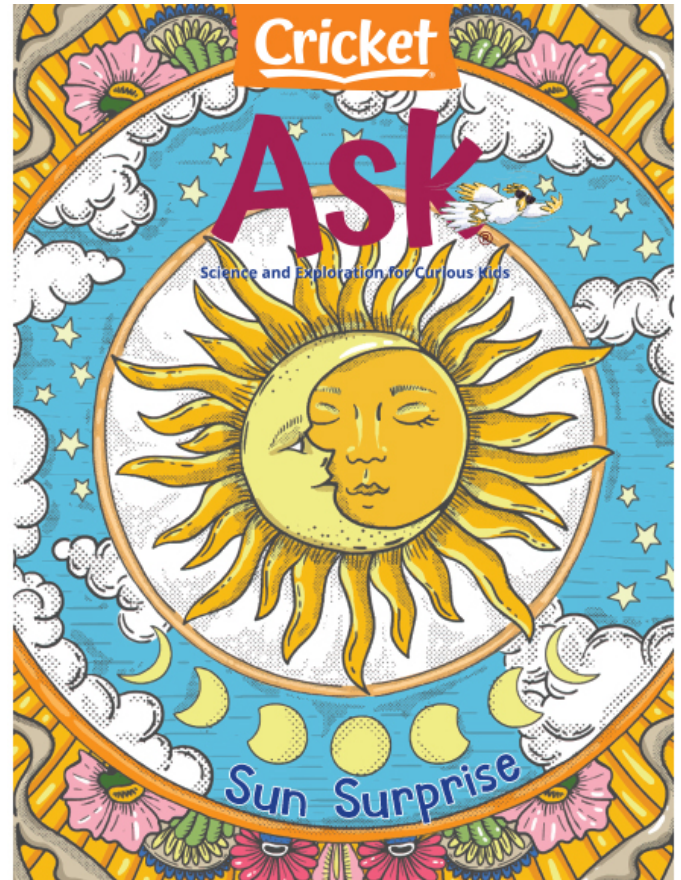
Many ancient people believed that the sky was the gateway to the heavens, and thus made-up stories accordingly. As civilizations advanced, the skies were mapped more scientifically to mark the passage of time, to distinguish seasons, and to provide reliable navigation. This issue of ASK magazine examines the past and present knowledge of the dominant body at the center of our solar system—the sun.

CONVERSATION QUESTION

What have we discovered about the sun?

TEACHING OBJECTIVES

- Students will learn a multitude of facts about the sun.
- Students will learn how time, experience, and technology helped to unlock many mysteries of the sun.
- Students will learn how eclipse legends vary by culture.
- Students will obtain information from a nonfiction text.
- Students will explain and sequence events that contribute to our current understanding of the sun.
- Students will compare and contrast legends.
- Students will use a mathematical process to solve a theme-related word problem.
- Students will create a theme-related comic strip.
- Students will research an example of a legend that was created to explain a natural phenomenon.



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

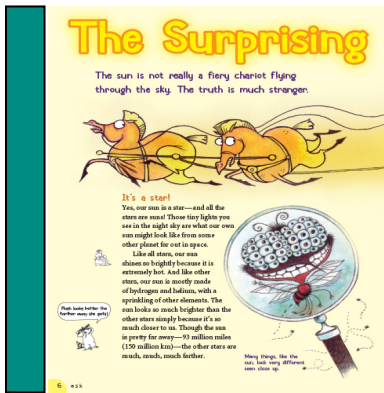
SELECTIONS

- **The Surprising Sun**
Expository Nonfiction
- **Where Does the Sun Get Its Shine?**
Graphic Nonfiction
- **Hey! Bring Back Our Sun!**
Folklore

The Surprising Sun

pp. 6–11, Expository Nonfiction

What is that glowing hot spinning ball of gases, giving light, heat, and energy to our planet? The pages of this article are “ablaze” with interesting facts about the spectacular star at the center of our solar system—the sun!



RESOURCES

Obtaining Information: SUNsational

OBJECTIVES

- Students will learn a multitude of facts about the sun.
- Students will obtain information from a nonfiction text.
- Students will use a mathematical process to solve a theme-related word problem.

KEY VOCABULARY

- colossal** (p. 7) extremely large
- particle** (p. 8) the least possible amount; a small piece of anything, usually invisible to the naked eye
- curtain** (p. 10) a thick layer of something that makes it difficult to see anything behind it

ENGAGE

Conversation Question: What have we discovered about the sun?

Entice students into a game of “20 Questions” in which they try to guess the topic of the article (the sun). Players are allowed to ask yes/no questions one by one in order to unravel the mystery. Instead of calling out the answer, have students write their guess on a piece of paper after each question. At the end of the questions, did all students write the word “sun”?

INTRODUCE VOCABULARY

Post and review the three vocabulary words and definitions. Allow students to roll a dice to determine the vocabulary activities for each word.

- 1 = Use the word in a sentence.
- 2 = Draw a picture that demonstrates the word.
- 3 = List two antonyms for the word.
- 4 = List two synonyms for the word.
- 5 = Break the word into syllables and list the part of speech.
- 6 = Make a connection between the word and your life, a book, or a movie.

READ & DISCUSS

Reinforce comprehension of the concepts presented in the article by using the following questions to direct discussion.

1. Why does the sun look so much brighter than all of the other stars?
2. Explain what is meant by the declaration on page 8 that the “sun is eating itself”?
3. Why does the light energy inside the sun take 10,000–15,000 years to work its way to the surface?
4. What is one of the sun’s biggest mysteries?
5. How do the northern and southern lights (auroras) appear in the sky?

SKILL FOCUS: Obtain Information

INSTRUCT: Guide students to obtain information from the text, captions, and photos in the article. Introduce the *SUNsational* worksheet and instruct students to unscramble the words in the word box and then correctly complete the sentences.

ASSESS: Review the worksheet with the class. Challenge students to scramble five additional words from the article for a partner to solve.

EXTEND

Mathematics Instruct students to review the article and to underline all of the mathematical information. Remind them that the disciplines of math and science are connected. Have students use the RDW process (Read-Draw-Write) to solve the following word problems. ***If light travels at a speed of 186,000 miles per second:*** A) How far does light travel in $\frac{1}{2}$ second? (Answer: 93,000 miles)

B) How far does light travel in one minute? (Answer: 11,160,000 miles)

SUNsational

Obtaining Information Reread the article and gather information to complete the worksheet.

PART I: *Unscramble the words in the boxes below.*

ticmao _____	oossremtanr _____	ruorsaa _____	postnuss _____	muleih _____
slipcee _____	orce _____	gyeern _____	thospreeam _____	smaalp _____

PART II: *Use the unscrambled words to correctly complete the sentences below.*

- At its _____, the sun reaches 27 million degrees Fahrenheit.
- Our sun is mostly made of hydrogen and _____, with a sprinkling of other elements.
- _____ look dark because they are cooler than the rest of the sun.
- Light starts as _____ deep inside the sun.
- The sun is made of _____, the fourth state of matter.
- Stars make energy by _____ fusion, releasing huge amounts of light and heat.
- A solar _____ happens when the moon temporarily passes in front of the sun.
- _____ are rippling, glowing curtains of light that appear in the sky around the Earth's magnetic poles.
- _____ were extremely surprised to discover that the corona is much hotter than the sun's surface.
- Different gases in the Earth's _____ make the auroras' different colors.

Where Does the Sun Get Its Shine?

pp. 14–17, Graphic Nonfiction

Ancient scholars and modern scientists alike have always been interested in studying the sky. Readers will learn how historic advancements and curious astronomers have solved many of the mysteries of the sun.



RESOURCES

Sequence of Events: Shine on Me

OBJECTIVES

- Students will learn how time, experience, and technology helped to unlock many mysteries of the sun.
- Students will explain and sequence events that contribute to our current understanding of the sun.
- Students will create a theme-related comic strip.

KEY VOCABULARY

- **burning (p. 14)** intense
- **gravity (p. 15)** the force that attracts a body toward the center of the earth, or toward any other physical body having mass
- **mass (p. 17)** the amount of matter or substance that makes up an object

ENGAGE

Conversation Question: What have we discovered about the sun?

Introduce the graphic article, “Where Does the Sun Get Its Shine?” and allow time for students to share their answers to the title question. Tell the class that the article reveals that scientists figured out how to measure the sun’s temperature, size, distance, and gravity in the 1800s...but those discoveries only left them with more questions. Have students discuss real-life experiences in which finding an answer led to more questions.

INTRODUCE VOCABULARY

Remind students that *homographs* are two or more words spelled alike but have different meanings or pronunciations. (Example: *ring* as in a piece of jewelry or *ring* as in the sound of a phone) Post the vocabulary words (**burning, gravity, mass**) and their definitions. Tell the class that the words are homographs. Discuss the given definitions as they pertain to the article, and then have students share other meanings.

READ & DISCUSS

Post and discuss questions prior to reading. Have students read the article independently and answer the questions in full sentences.

1. What puzzled scholars most about the sun?
2. Why did scientists think that the sun must be made up of gases?
3. How did astronomers discover a way to tell what elements something is made of?
4. How did Einstein’s formula, $E=mc^2$, contribute to an understanding about the sun?
5. Explain what was ultimately discovered about how the sun shines.

SKILL FOCUS: Sequence of Events

INSTRUCT: This article presents the reader with detailed information regarding how the knowledge of the sun increased with each passing century due to specific events and hardworking scientists. Present the *Shine on Me* graphic organizer and tell students that they will record relevant details throughout each century, chronicling the human journey toward understanding the sun. Include the significant events as well as specific scientists’ contributions.

ASSESS: Review the worksheet with the class. Challenge students to make a horizontal timeline to post specific dates and corresponding events.

EXTEND

Graphic Art: Have students use information from the article to create a comic strip featuring one of the discoveries about the sun. The text can be humorous or strictly informational but must contain at least two important facts presented in the article. Encourage students to be creative, to use clear text and interesting illustrations. They should brainstorm ideas and create a draft sketch before transferring their ideas onto a five-panel strip. Display finished strips in your science center or combine into a class book.

Shine on Me

Explain Sequence: Provide events and details from each century that led to our current understanding of the sun.

1600s & 1700s

1800s

1900s

Ask® Teacher Guide: March 2024

Hey! Bring Back Our Sun!

pp. 24–27, Folklore

Long before the explanations of modern science, many cultures created stories to explain the mysteries of the sky. This article retells eclipse legends from different parts of the world.



RESOURCES

- Compare and Contrast: Eclipse Legends
- Mini-Research Outline

OBJECTIVES

- Students will learn how eclipse legends vary by culture.
- Students will compare and contrast legends.
- Students will research an example of a legend that was created to explain a natural phenomenon.

KEY VOCABULARY

- **supernatural** (p. 24) unexplainable by natural law; caused by forces that cannot be explained by science

ENGAGE

Conversation Question: What have we discovered about the sun? Discuss with students the fact that humans have always looked at the sky and wondered about what they saw. Since ancient times, people have used primitive science and folklore to explain natural occurrences in an effort to make sense of their world. Invite students to share what they wonder about the universe and space. If necessary, share a few thoughts of your own. Use students' ideas to create a web of questions.

INTRODUCE VOCABULARY

Post and discuss the key word and definition. As this article uses simple text to weave the lore, there is only one key word. Take the opportunity to do a primary word study using the word **supernatural** as follows: *How many letters does the word have? How many letters are vowels and consonants? How many syllables is it? Is it a thing (noun), action word (verb), or a describing word (adjective)? Can you name a synonym and an antonym for the word? How can you use the word in a sentence? Do you know another word that has a similar meaning?*

READ & DISCUSS

As a post-reading activity, lead a discussion based on the following questions.

1. Where was Sky Bear headed when he bumped into the sun?
2. How were Amaterasu and Susanoo related?
3. Why did Gamag Nara summon his gigantic Fire Dogs?
4. Why did La'a and Marama go walking in opposite directions?
5. Why aren't there any modern-day legends involving eclipses?

SKILL FOCUS: Compare and Contrast

INSTRUCT: Students will compare and contrast three different legends from the article. Instruct pairs of students to revisit the text and to underline information that will be helpful for this purpose. Introduce the graphic organizer, *Eclipse Legends*, and have the partners use information from the article to complete the organizer. The activity in the THINK TANK will be completed independently.

ASSESS: Review the worksheet. Have students use the chart to compare and contrast two of the legends in paragraph form.

EXTEND

Social Studies: Review with students that legends were often created to explain the unknown in the days predating modern science. (Example: In Inuit folklore, the sun and moon are said to be a pair of siblings chasing each other across the sky.) Have students research an example of sky lore to share with the class. Use the mini-research outline provided. To avoid repetition, have students seek your approval for their legend choice. Encourage them to present their findings, and then bind finished work and offer your *Book of Legends* to other classes as a pre-reading activity for this article.

Eclipse Legends

Compare and Contrast Choose three legends from the article and complete the chart below. Use details to fill in the chart, and then complete the activity in the **THINK TANK** independently.

Geographical Location	Characters	Supernatural Elements	Events	Theme
1.				
2.				
3.				

THINK TANK: Choose **two** of the legends above. Using information from the chart, compare and contrast the two legends in paragraph form.

Mini-Research: Outline

Choose a legend about the sky and then complete the mini-research outline below.

1. What location is the legend from? _____
2. What is the legend attempting to explain? _____

3. Who are the characters? _____
4. Describe the characters. _____

5. Explain how the legend explained a particular phenomenon in the sky.

6. Was the legend believable at the time? Why/why not? _____

7. Is the legend believable now? Why/why not? _____

8. How and why did the explanation change as science advanced? _____

