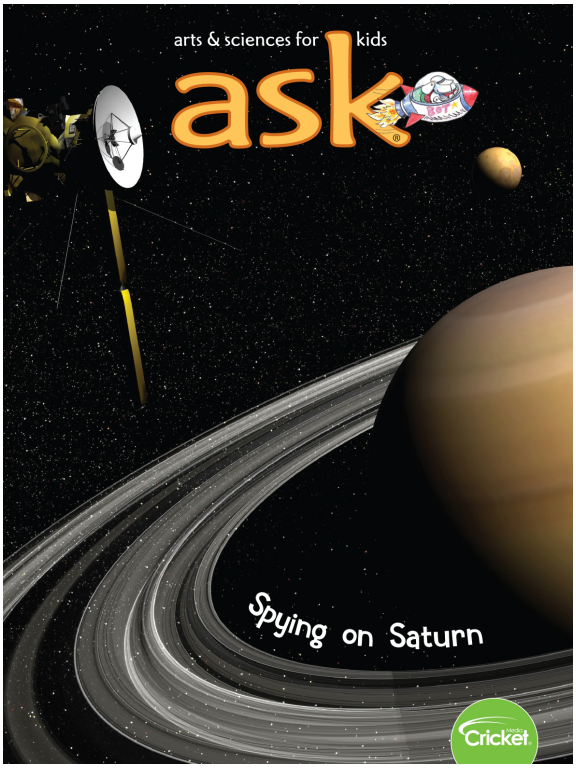
Ask® Teacher Guide: November/December 2019

Spying on Saturn

Students will be captivated as they zoom into outer space and travel over 50 million miles from Earth to study one of the solar system's most spectacular planets, Saturn. This issue of ASK explores the ringed gas planet using colorful graphic images and engaging text.



CONVERSATION QUESTION

What has scientific observation taught us about Saturn?

TEACHING OBJECTIVES

- **Students will learn scientific facts about Saturn.**
- **Students will learn how our knowledge about Saturn has increased over time.**
- **Students will learn about the possibility of life on two of Saturn's moons.**
- **Students will obtain and classify specific information from a nonfiction text.**
- **Students will sequence and examine information.**
- **Students will compare and contrast the characteristics of two different moons.**
- **Students will use mathematical information from the article to solve and create word problems.**
- **Students will create "Planetary Poetry."**
- **Students will research one of the moons that orbit a specific planet.**

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

• **Surprising Saturn**
Expository Nonfiction, ~750L
• **Seeing Saturn**
Expository Nonfiction, ~850L
• **Is There Life on These Moons?**
Expository Nonfiction, ~950L

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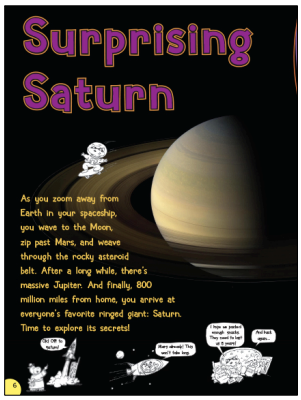
Surprising Saturn

pp. 6–11, Expository Nonfiction

Board your spaceship, weave through the Asteroid Belt, travel 50 million miles from Earth, and behold spectacular Saturn. Students will learn fun facts and surprising statistics about this ringed beauty.

Lexile Score: ~750L



RESOURCES

- Spectacular Saturn

OBJECTIVES

- Students will learn scientific facts about Saturn.
- Students will obtain and classify specific information from a nonfiction text.
- Students will use mathematical information from the article to solve and create word problems.

KEY VOCABULARY

- ***asteroids* (p. 10)** celestial balls of ice and rock
- ***comet* (p. 9)** a ball of ice and dust that often develops a long tail when near or in orbit around the sun
- ***hexagon* (p. 8)** a polygon of six sides and six angles
- ***massive* (p. 6)** large and heavy

ENGAGE

Conversation Question: What has scientific observation taught us about Saturn?

Tell students that they are going to be studying one of the planets in this month's issue of ASK. Give them clues so they can make educated guesses about which planet. Using information from the article, start with the most obscure clues first and work towards the most specific clues until they have identified the correct planet, Saturn. Distribute the article for reading.

INTRODUCE VOCABULARY

Invite pairs of students to find definitions for the key vocabulary terms. Then post the definitions provided so that students may check their work. Have the pairs choose six additional words from the article and procure definitions. They will then create a crossword puzzle using all ten words. Share puzzles with another class for use as a prereading activity for this article.

READ & DISCUSS

Reinforce the scientific Saturn facts presented in this article by posing the following questions for discussion.

- Where is Saturn located?
- How did the planet get the name Saturn?
- Why can't we land on Saturn?
- What important information was obtained from Voyager 1 and the Cassini spacecrafts?
- Describe Saturn's most notable feature, its spectacular rings.

CONCEPT/SKILL FOCUS: Obtain & Classify

INSTRUCT: Guide students to obtain information from the text, captions, and photos in the article. Remind students that the article was written to teach readers specific information about Saturn. Introduce the *Spectacular Saturn* graphic organizer and instruct students to record their findings in the appropriate sections.

ASSESS: Review the information that the students recorded on their charts. If any errors are noted, redirect the students to the text to make corrections. Encourage peer remediation.

EXTEND

Mathematics The article states that one year on Saturn is 29.5 Earth years long. How many Earth years is 3 Saturn years? 5? 12? Challenge students to use mathematical information from the article to create their own word problems.

Obtain & Classify

Spectacular Saturn

Use information from the article, "Surprising Saturn," to record specific information about Saturn.

LOCATION	APPEARANCE	SKETCH
COMPOSITION	**CLIMATE**	**NUMBER OF MOONS**

Additional Fun Facts

- _____
  _____
- _____
  _____
- _____
  _____

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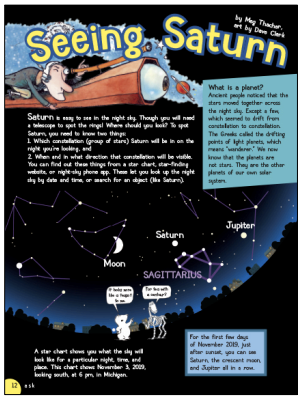
Seeing Saturn

pp. 12–15, Expository Nonfiction

Keep an eye to the sky and learn how scientists identify Saturn in the night sky. Students will learn how more knowledge and advanced equipment paint a more accurate picture of this beautiful planet.

Lexile Score: ~850L



RESOURCES

- Sequencing Saturn

OBJECTIVES

- Students will learn how our knowledge about Saturn has increased over time.
- Students will sequence and examine information.
- Students will create "Planetary Poetry."

KEY VOCABULARY

- ***atmosphere* (p. 15)** the gases surrounding a planet
- ***constellation* (p. 12)** a group of stars
- ***wavelengths* (p. 15)** the distance between successive waves of points in sound or light

ENGAGE

Conversation Question: What has scientific observation taught us about Saturn?

Show students a video clip or provide them with books that depict how ancient civilizations explained the celestial sky. Explore myths and why they were created. How does a previously accepted scientific truth become a myth?

INTRODUCE VOCABULARY

Post and discuss the vocabulary words and definitions. Guide students to notice that all of the key terms have ten or more letters. Have the students choose one of the words and create new words using some of the letters. (Three-letter words = 1 point, four-letter words = 2 points, five-letter words = 3 points, etc.) Who can get the highest score?

READ & DISCUSS

Read aloud the following questions prior to reading the text. Advise the students to note where in the article these answers are found. Have them meet in small groups to discuss responses to the questions as a post-reading activity.

- What two things do you need to know in order to spot Saturn in the night sky?
- What information does the star chart provide?
- Why do Saturn's rings seem to shrink every 30 years?
- How has technology improved our view of Saturn and helped us to gather new information?

CONCEPT/SKILL FOCUS: Sequencing Information

INSTRUCT: Review the article. Elicit from students that the passage of time brings new technology that helps us learn more about any given topic. Distribute the *Sequencing Saturn* graphic organizer and instruct students to refer back to the text and to explain how advancements in science have contributed to a more accurate understanding of this ringed planet.

ASSESS: Circulate as students are working on the chart and discuss the information in the article. Direct students having difficulty explaining the sequencing to reread the text with a partner.

EXTEND

Language Arts Have students use information from the articles in this issue to create informational poems about Saturn. The poetry can be humorous or serious but must include at least three facts that they learned about Saturn. Challenge students to conduct research about other planets to create additional planet-related poems.

Explanation of Sequence

Sequencing Saturn

Use information from the article, "Seeing Saturn," to explain how time and technology changed our perception of Saturn. How did these scientists and these inventions help us to truly "see" Saturn? Include dates to show the timeframe of their contributions.

Galileo

Huygens, Cassini

Herschel

Hubble Telescope

Cassini Spacecraft

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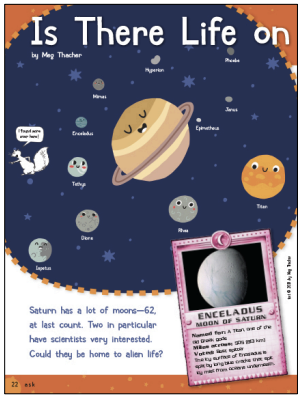
Is There Life on These Moons?

pp. 22–25, Expository Nonfiction

Students will learn that Saturn is a planet with many moons. Young readers will enjoy the in-depth look at the possibility of life on two of the moons, Enceladus and Titan.

Lexile Score: ~950L



RESOURCES

- Marvelous Moons

OBJECTIVES

- Students will learn about the possibility of life on two of Saturn's moons.
- Students will compare and contrast the characteristics of two different moons.
- Students will research one of the moons that orbit a specific planet.

KEY VOCABULARY

- ***geysers* (p. 23)** springs that throw forth streams of heated water and steam
- ***octocopter* (p. 25)** a drone with eight rotors
- ***plumes* (p. 23)** elongated and mobile columns of smoke, gas, or small matter
- ***seismometer* (p. 25)** a device that measures and records vibration within the Earth and ground

ENGAGE

Conversation Question: What has scientific observation taught us about Saturn?

Arrange a casual debate between students who believe that life exists beyond the planet Earth and those that do not. Encourage respectful discussion and have students support their theories. As a follow-up to the debate, allow students to survey other classes in the school to see if there are more believers or nonbelievers.

INTRODUCE VOCABULARY

Post and review the vocabulary. Guides students to notice that all of the key terms are nouns. Have students demonstrate meaning of the words by using the term in a sentence. Instruct them to use an appropriate adjective to describe the noun and a verb to depict its action.

READ & DISCUSS

Pose the following questions to the students to facilitate meaningful discussion following the reading of the article.

- Why is Enceladus a smooth moon with few craters?
- Why is there a possibility of life on Enceladus and Titan?
- What information did Huygens relay about Titan?
- Explain NASA's new mission utilizing the Dragonfly probe.

CONCEPT/SKILL FOCUS: Compare and Contrast

INSTRUCT: Students will compare and contrast the characteristics of two of Saturn's moons and consider the possibility of life on each of them. Instruct pairs of students to reread the text and to underline information that will be helpful for this purpose. Introduce the graphic organizer, *Marvelous Moons,* and have the partners record the data on their charts. They should answer the question in the "Think Tank" independently.

ASSESS: Collect the *Marvelous Moons* worksheet and review. Be sure that the students have collected accurate and pertinent information.

EXTEND

Science Have students research other moons of Saturn or moons of another planet. Have students fold a piece of paper into thirds and create a travel brochure for the moon that they are researching. Of course there is an element of science fiction to this project, but instruct them to include actual information (climate, appearance, etc.) that advertises what a visit to their moon would entail. Have students read each other's brochures and "book a trip."

Compare/Contrast

Marvelous Moons

Use information from the article, "Is There Life on These Moons?" to compare and contrast the characteristics of these moons and to explain why life there may be possible.

Enceladus	Titan
Characteristics:	Characteristics:
Why life may be possible:	Why life may be possible:

Think Tank: Which of Saturn's moons do YOU think would most likely support life? Why?

_____

_____

_____

_____