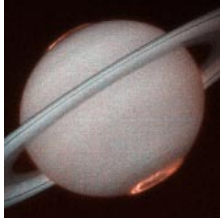


Wondering About Saturn: A Short History

Saturn's polar auroras glow in this ultraviolet view.



LESSON TIME

1 hour

MATERIALS CHECKLIST

For the teacher:

- Copy of reading passage, including marked sample: "Wondering About Saturn: A Short History"

For the students:

- Reading passage: "Wondering About Saturn: A Short History" (one copy for each student)
- Pencils
- Saturn Discovery Log

LESSON NO. 3

- *Language Arts Focus*
—Nonfiction Writing Practice: Summary
—Nonfiction Comprehension Skills: Visualizing and Wondering
- *Science Focus* — Reading to Support Inquiry-Based Thinking

OVERVIEW

Humans have been wondering about Saturn for centuries upon centuries. In this lesson, students hear a read-aloud of the history of discoveries that have been made about Saturn. Next, they learn two reading comprehension strategies (visualizing and wondering) to become more powerful readers of nonfiction text. Finally, students share their work with partners and the class.

Saturn, the sixth planet from the Sun, is the farthest planet that is visible without a telescope, and so it has a long history of discoveries associated with it. The National Science Education Standards state that students should understand that science is an ongoing, changing enterprise. It is exciting for students to learn that scientists such as Galileo Galilei were willing to take risks and be mistaken in their quest to make sense of what they observed. The National Science Education Standards state that children should understand the relationship of science and technology. The reading passage in this lesson describes the discoveries that unfold as telescopes become larger and more powerful.

WHY THIS WORKS

Studies have shown that there is a decline in progress in reading in fourth grade (Chall, 1983; Chall, Jacobs, & Baldwin, 1990). This has sometimes been called the "fourth-grade slump." This decline has been attributed to the fact that fourth-grade students are required to process more nonfiction than in previous years, and have been inadequately prepared to do so. This lesson gives children two concrete strategies (visualization and wondering) described in "Mosaic of Thought" (Zimmerman and Keene, 1997) to help them comprehend nonfiction text more effectively.

Objectives

- Teachers will:
 - Gain insight into how students think as they read.
- Students will:
 1. Learn and practice reading comprehension strategies (visualizing and wondering) to help them make sense of nonfiction text.
 2. Learn about the history of discoveries about Saturn.



Teacher Preparation

- For each student plus one copy for yourself to read aloud, print out student handout 1, “*Wondering About Saturn: A Short History*” (4 pages).
- Print a copy of teacher reference 1, “*Wondering About Saturn: A Short History*” with the introductory note from the author (to read aloud) and the sample marked page (for modeling).

What to Do

Model Comprehension Strategies — Suggested time 10 minutes

1. Tell the class that you are going to read a summary of the history of discoveries about Saturn. Read aloud to the class “*Wondering About Saturn: A Short History*,” starting with the introductory paragraph.
2. After you read it aloud once, give each student a copy of the reading passage. Ask the students to write the words “I picture” in the upper left-hand corner of the page. Ask them to write “I wonder” in the upper right-hand corner of the page. Explain that, next to each section, the students will draw what they picture on the left-hand side and write what they wonder on the right-hand side.
3. Model the first section for the class. (Skip the introductory note from the author.) Read the paragraph out loud, and then draw on the board what you picture and write what you wonder. Hold up (or show a transparency of) the sample marked reading passage “*Wondering About Saturn: A Short History*” as an example of what it will look like on the page.
4. Explain that the students may picture and wonder something different than what you pictured and wondered so they should mark the first section as well (have them skip the note from the author).
5. Explain to the students that they will be sharing what they picture and wonder with a partner at the end of class.

Read to Learn — Suggested time 20 minutes

Give the class time to complete all the sections. Be available if students need help with the passage.

Share with a Partner — Suggested time 10 minutes

Have the students share what they drew and wrote with a partner.

Share with the Class — Suggested time 10 minutes

1. Ask if any students would like to share what they wondered or pictured with the whole class.
2. Ask students to put their name and date on their work, and put it inside their Saturn Discovery Log.



Extensions

- What Our Class Pictured and Wondered

Put the reading passage on a chart. Have students cut out their pictures and what they wondered and paste them next to the reading passage. Look at the pictures and notes from the whole class. Ask children to write what they notice, and why they think it is like that.

- Independent Internet Research Project

1. Have students research how Saturn, Titan, Pioneer, and Voyager got their names, and share this research with the class.
2. Have students research how telescopes are built and how they work, and share this research with class.

- Galileo's Telescope

You may want to have this link to an illustration of one of Galileo's telescopes bookmarked on the computer for the children to explore —

<http://faculty.rmw.edu/tmichalik/Galileotelescope.htm>

Assessment

As you read over the children's work, ask yourself the following questions:

1. How would I rate this student's comprehension based on the pictures and questions that I see?

Often reading comprehension is assessed by multiple-choice or short-answer questions. Some students have excellent comprehension skills, but struggle with multiple-choice and short-answer formats. This exercise provides another method to gain a sense of how well your students are making sense of what they read.

2. What vocabulary was confusing to the children?

Note vocabulary that you would like to address in future lessons. Jot these ideas down next to the lesson in the unit in which they would be most appropriately integrated.

3. What misunderstandings might the students have?

Note ideas that they have about science content that you would like to address in future lessons. Jot these ideas down next to the lesson in the unit in which they would be most appropriately integrated.



Standards

National Council of Teachers of English and International Reading Association Standards for the English Language Arts

All students must have opportunities to:

- Read a wide range of print and nonprint texts.
- Apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts.
- Participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.
- Use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

National Science Education Standards

As a result of their activities in grades K–4, all students should develop understanding:

- About scientific inquiry (Science as Inquiry).
- Of position and motion of objects (Physical Science).
- Of objects in the sky (Earth and Space Science).
- About science and technology (Science and Technology).
- Of science as a human endeavor (History and Nature of Science).



Wondering about Saturn: A Short History

(A Note from the Author — Behind the Scenes of Writing a Summary: Later in the unit, you will be writing summaries. A summary piece of writing includes only important pieces of information. This summary is a history of discoveries about Saturn. Summaries can be difficult to write! When I was researching to write this summary, I found a lot of information about Saturn discoveries. But I only wanted to write a couple of pages about the topic, so that I didn't overwhelm you with information. It was hard to decide what information to include! I decided to put in the information that I thought was the most interesting, and to make sure to show what happened when people invented more and more powerful telescopes. I hope you enjoy hearing and reading this summary!)

Sample

I Picture



A long, long time ago, before the 1600s, when your great, great, great, great, great, great, great, great grandparents looked up into the sky, the farthest planet they could see was Saturn — the sixth planet from the Sun! But they didn't have telescopes yet, so they couldn't see Saturn very well. It looked like a speck.

In 1610, Galileo Galilei spotted Saturn with a telescope that he built. Galileo's telescope was four feet long.

I Wonder

I wonder how well regular people back then knew the difference between planets and stars



Wondering about Saturn: A Short History

A long, long time ago, before the 1600s, when your great, great, great, great, great, great, great, great grandparents looked up into the sky, the farthest planet they could see was Saturn — the sixth planet from the Sun! But they didn't have telescopes yet, so they couldn't see Saturn very well. It looked like a speck.

In 1610, Galileo Galilei spotted Saturn with a telescope that he built. Galileo's telescope was four feet long. The telescope could only magnify distant objects by 20 to 30 times, so Galileo still couldn't see Saturn very clearly. In one of his notebooks, Galileo wrote that he was confused because Saturn almost looked like three planets instead of one. It was a puzzle to him — why would Saturn look like three planets?



In 1655, Christiaan Huygens used a more powerful telescope that he had built, and said, "Saturn isn't three planets. It just has rings!" Huygens also discovered Titan, Saturn's largest moon.

In 1675, Jean-Dominique Cassini studied Saturn using a telescope that was 136 feet long! His telescope was 132 feet longer than Galileo's. He noticed that there was more than one ring around Saturn, and he discovered four more moons.



Hundreds of years passed, and the more astronomers learned about Saturn, the more curious they became about the planet. How did Saturn and its rings form? What were its rings really made of? NASA decided to send a spacecraft to Saturn.

Once NASA decided to send a spacecraft to Saturn, engineers discussed how to build it so that it would be safe on its long journey. (NASA engineers are the people who build spacecraft.)

NASA scientists discussed what the spacecraft would study. (NASA scientists conduct experiments and analyze data.) "Let's land a probe on this moon," one scientist would say. "No, let's land a probe on another moon," another scientist would say.



In 1997, after eight years of discussions, coming to agreements, planning, and building, NASA engineers and scientists launched the Cassini spacecraft into space. The engineers and scientists who worked so hard on the spacecraft hoped that Cassini would stay safe during its trip of 800 million miles.

Cassini arrives at Saturn in July 2004, after seven years of flying. Everyone at NASA is excited to see what the spacecraft will learn!

