

Wow, Saturn Is Much Bigger than Earth!

A giant storm can be seen near Saturn's equator.



LESSON TIME

May be carried out over two days. Total time: 1 hour, 20 minutes.

PREPARATION TIME

20 minutes

MATERIALS CHECKLIST

- White drawing paper
- Black construction paper (9 x 12 inches)
- Glue, scissors, watercolors, paint brushes, pencils or markers
- Half-inch round blue adhesive labels
- Copies of "Watercolor Saturn" and "Saturn Labels" worksheets
- Silver glitter glue (optional)
- Science Notebooks

STUDENT PREREQUISITES

Students should have some basic knowledge of Earth and Saturn and be able to write independently or with some teacher support.

LESSON NO. 3

Language Arts Focus — Scientific Captions and Labels

Science Focus — Creating an Earth–Saturn Model

OVERVIEW

This lesson explores the comparative sizes of Saturn and Earth. Students learn about their relative sizes first-hand as they make to-scale illustrations. Students also label and caption their illustrations using scientific language.

BACKGROUND

Sizes of objects in the solar system can be far greater than those we encounter here on Earth. Young students — and adults for that matter — often cannot easily grasp the enormity of these objects. This activity is meant to begin students' exploration of size using a model and introduces the basic concept that Saturn is much larger than Earth.

COMPARING EARTH AND SATURN

Here are a few measurements to help you understand the comparative sizes of Earth and Saturn. Earth is the fifth largest planet in our solar system. Saturn is the second-largest planet — only giant Jupiter is larger. The diameter of Earth is about 13,000 kilometers (8,000 miles). Our planet's diameter is rather small when compared to Saturn's diameter of about 121,000 kilometers (75,000 miles). The ratio of Earth's diameter to Saturn's diameter is about 1 to 9. For young students, who are just beginning to develop a sense of numbers, it is enough to know that when using Earth's diameter as a measure, it will take about nine Earths to span Saturn's diameter. For more information on Earth and Saturn, visit:

<http://www.solarsystem.nasa.gov/>

Objectives

Students will:

1. Draw and paint an accurate illustration of Saturn.
2. Learn that planets vary in size.
3. Learn that Saturn is much larger than Earth.
4. Learn that the diameter of Saturn is about 9 times the diameter of Earth.
5. Practice vocabulary words related to Saturn.
6. Write scientific labels and captions.



Teacher Preparation

For each student, make one copy of the “Watercolor Saturn” worksheet and “Saturn Labels” worksheet. (If possible, use white drawing paper to make copies of the “Watercolor Saturn” worksheet; regular paper can be used for the “Saturn Labels” worksheet.) Make a teacher’s copy of the worksheets for modeling. Provide one piece of black construction paper, 9 x 12 inches, for each student and 9 half-inch round blue labels per student.

Procedure

You may wish to take two or more days for this activity.

Day One

Starting the Illustration — 20 minutes

1. To give your students a good idea of what Saturn looks like, visit: <http://saturn.jpl.nasa.gov/multimedia/images/saturn/index.cfm>
2. Distribute the “Watercolor Saturn” worksheets, paints, and brushes.
3. Model this activity for your students with your own worksheet.
4. Begin painting with diluted light yellow paint and cover the entire planet. Model brush strokes going one way across the circle outlining the planet.
5. Place a few streaks of diluted brown paint across the middle of the planet and a few thin streaks at the top and bottom. The brown streaks will bleed into the yellow to resemble the dense cloud cover of Saturn.
6. Using the brown paint, show students how to paint the rings of Saturn. Explain to students that the rings are not solid, but rather chunks of water ice — some big, some small — that are orbiting the planet.
7. Ask your students to use a series of small dots (pointillism) to indicate that the rings are actually made up of many, many chunks of ice.
8. If you are using optional silver glitter glue to simulate ice in the rings, put a drop on each child’s rings and let them use their index finger to spread it.
9. Let dry.

Day Two

Completing the Illustration — 30 minutes

1. Return the “Saturn Watercolor” worksheets to the students.
2. Ask students to cut out the painted Saturn and glue it to a piece of black construction paper. Model the cutting and gluing for your students.
3. Discuss the enormous size of Saturn in contrast to Earth.
4. Hold up a round blue label and ask students to predict which planet the round blue label is. If needed, explain that it is Earth.
5. Ask students to predict how many labels, or “Earths,” are needed to go across the diameter of Saturn.
6. Write their predictions on the board.



7. Place your Saturn illustration on the board. Ask two or three students to come up and place the round labels across the diameter of Saturn. Remind them to be careful to place labels edge to edge. Count up the blue circles!
8. Note how many different predictions there were and compare your students' findings to their predictions.
9. Distribute 9 round blue labels to students so that they can place them on their own illustrations.

Writing Scientific Labels and Captions — 30 minutes

1. In pairs, ask students to brainstorm which features they would like to include on their illustrations. Allow some time for discussions and then ask students to name the features. Write the features on the board. Your words might include: rings, ice, Saturn, Cassini Division, Cassini spacecraft, and moons.
2. If you are keeping a Saturn Word Wall in your classroom, add this vocabulary to it.
3. Distribute a “**Saturn Labels**” **worksheet** to each student. Ask students to write their vocabulary words on the label section of their worksheets.
4. Explain that many books contain labeled illustrations and that they also have captions that explain the illustration or picture. Explain that a caption is usually one or two sentences that give the reader more detail about the picture or illustration.
5. Show some examples from classroom books.
6. Ask students to write a caption for their Saturn illustration in the caption section of the worksheet.
7. Help students edit their captions if needed.
8. Have students cut out the labels and glue them to the appropriate locations on the illustration. Also cut out caption and glue it below the Saturn illustration.

Using Science Notebooks

Writing prompts for this lesson:

1. Focus questions: Where is Saturn in the solar system? Where are you in the solar system?
2. Process questions: How do you know where Saturn is? How did you find your place in the solar system?

Why This Works

After students have created their own to-scale illustrations of Earth and Saturn, they have first-hand experience of their different sizes. This lesson provides students an opportunity to learn through illustration, and then reinforces their learning as they label their work and write captions about it.



Assessment

Student writing in Science Notebooks and examples of student labeling and captioning show what they have learned during this lesson.

Standards

NCTE Standards for the English Language Arts

- Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), and genre to create, critique, and discuss print and nonprint texts.
- Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.
- Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning for enjoyment, persuasion, and the exchange of information).
- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

National Science Education Standards

Physical Science

- Position and motion of objects

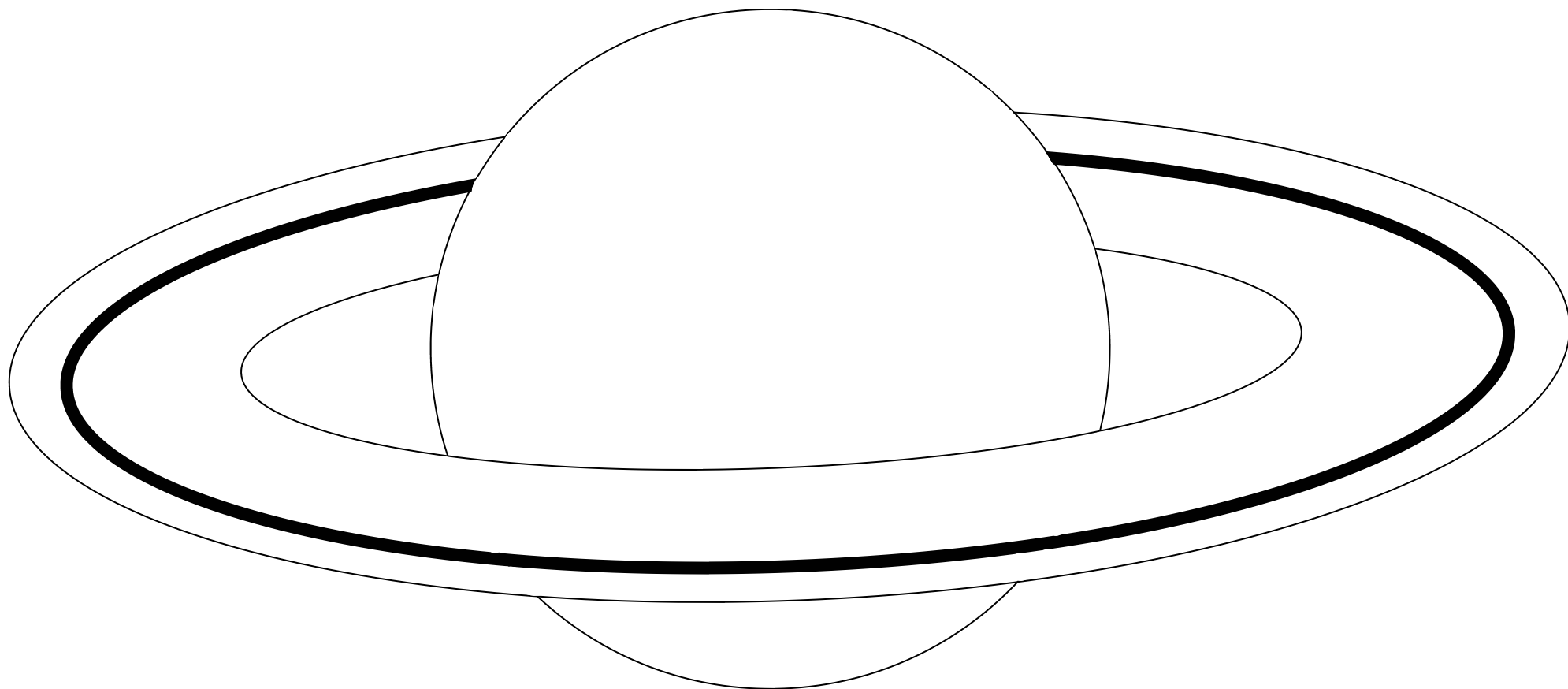
Earth and Space Sciences

- Objects in the sky



Watercolor Saturn

by _____



Saturn Labels

Saturn Caption Writing Paper

This image shows a full page of handwriting practice paper. It features four identical sets of horizontal guidelines arranged vertically. Each set includes three lines: a solid top line, a dashed midline, and a solid bottom line, providing a structured space for practicing letter formation and alignment. The paper is otherwise blank, with no text or other markings.