

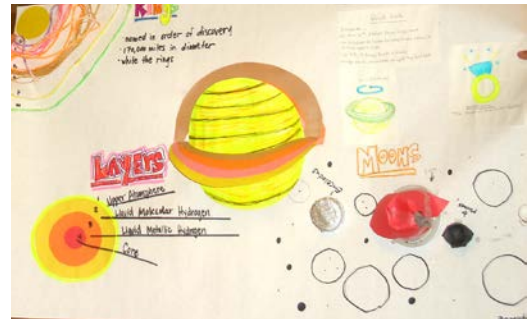
Activity 8

Celebrating Saturn and Cassini

Overview

During this activity, your youth:

- Design a culminating “celebration” display and event, based on their *Saturn Discovery Logs* full of notes and observations and on products produced from their working knowledge of Saturn and Cassini. They have sketches of spacecraft and probes, models, and test results.
- Can invite their parents or classmates in for an event to view the displays and hear them talk about their work and their discoveries.
- Will show an assessment of both their personal and knowledge growth from this unit through the way they choose to share their presentations and through the products themselves.



Time/number of sessions

One or more 40-minute sessions, plus time for a parent/school/community event

Activity Type

Art and communication

Space Needed

Room with tables and chairs to create the displays; open space for display and presentations

Activity Goals

Youth will:

- Learn how to organize their knowledge of science to create a display.
- Learn how to communicate this knowledge to others.
- Consolidate learning that has taken place during the program unit.



Where's the Science and Engineering?

- Synthesizing, communicating and presenting are essential skills in science and engineering careers and across NASA. Students, scientists, and engineers alike discuss, display, and publish their findings for peers, supporters, and their community.
- As mission results come in, Cassini-Huygens scientists discuss and share their findings, and build on each other's work as the body of knowledge grows. As the mission proceeds, some questions are answered, but often more arise.
- An important area of any NASA mission is Education and Public Outreach, which has the responsibility to translate the work of science and engineering into engaging and informative presentations for the educational system and the public.

National Science Education Standards

K-4
History and Nature of Science
 • Science as a human endeavor

5-8
History and Nature of Science
 • History of science



Equity/Leveling the Playing Field

- The role models for the “Jewel of the Solar System” activities were chosen carefully. All of them work at NASA and do science and engineering related to the Cassini–Huygens mission. Just as important, the team includes women and men, people from very different backgrounds, interests, and skills.
- Encourage students that the message they want their presentations to convey to their families or peers is that science is a way of thinking and doing things, that everyone can do science, and that science and engineering can be many things requiring many different skills and abilities.
- Have your students incorporate the questions they had or still have into their presentations to encourage family and peers to be curious. Remind them that adventure begins in the mind! To learn and discover they need to be curious and persistent.

Materials — From Your Supply Closet

Session	For Leader	For Students
1	<ul style="list-style-type: none">• Chart paper/ white board, markers	<ul style="list-style-type: none">• <i>Saturn Discovery Logs</i>• Crayons, markers, colored pencils, writing pencils• Poster boards• Products from previous activities

From a Photocopier/Printer

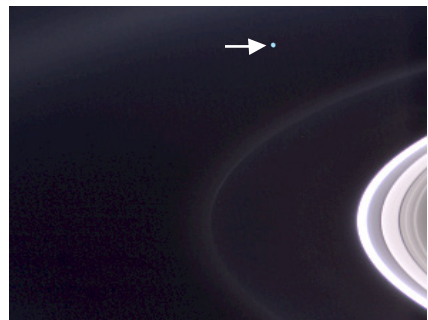
Session	For Leader	For Students
1		<ul style="list-style-type: none">• Pictures or information from this activity guide — see the <i>Cassini Extras</i> student handout — or that they can find on the Internet

Getting Ready

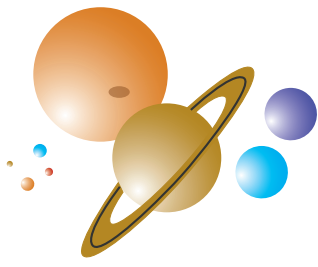
- Decide on the range of activities you can support the students to do (displays with art/written material, video, skit, etc.) and gather materials accordingly

Leader Tips

- Consider ending this program unit with a parent event. Identify a time and place for the displays when parents can be invited to see their children’s work and hear their presentations.
- To help with the families’ personal/social connection to the material, guide students to compare Saturn to what they and their families know about Earth — what is similar? What is different? Encourage them also to describe the enormity of the distance between Earth and Saturn.
- Consider a “career corner” with students describing the types of jobs it takes to run a robotic spacecraft mission — role model resources and career activities are found in the “Take It Further!” section of each activity. Students may want to select those they find most interesting as part of their display or event.
- NASA has national volunteer networks of specially-trained members in local communities, who can serve as content experts, mentors, or speakers at events. Request information on your local Solar System Ambassador at ambassadors@jpl.nasa.gov. See the “NASA Resources” section of this activity for websites of many NASA networks.
- See “Taking the Science to the Next Step” section on the “Take It Further!” page of this activity for suggestions on multimedia resources to use.



The pale blue planet Earth as seen behind Saturn's rings (upper right) by the Cassini spacecraft.



Celebrating Saturn and Cassini

Student Activity

Session 1 • Collect Information, Select Key Points, and Design Display/Event

(May extend into additional sessions)

1. Tell the students that they have completed their journey to Saturn. Tell them that, as scientists and engineers, they have the opportunity to present their findings about Saturn and the Cassini-Huygens mission through prepared displays (or video project, student panel discussion, skit, etc.). Get their ideas about who they would like to invite to their presentation: family, another class, the whole school, their teachers, etc.. Tell them they are going to collect ideas and pull together their final piece to present what they know.
2. Have students go through all the work in their individual *Saturn Discovery Logs*, and pull out the key pieces of information they would like to present. Make sure that any pieces taken from a student's *Saturn Discovery Log* bear his or her name so that they can be returned to them after the presentation or event.
3. First, work with the class to chart an outline for their presentation or event and lead them in the following questions:
 - Who will we invite to this event?
 - What do you think they will know about Saturn or the Cassini-Huygens mission?
 - What are some of the questions you had, discoveries you made, interesting facts you learned and things you would like to know for the future that you think should be part of your presentation or exhibit?
 - What should be our biggest message to share?
 - How shall we organize all your ideas to follow this message?



Activity 8

4. Form teams of students to work on particular concepts, such as the different parts of Saturn, spacecraft designs, current status of the Cassini mission, people and careers that make the mission happen, etc.
5. Previous material they created in this unit, such as the NASA-style Saturn poster and 3-d book on Saturn, can be incorporated into the display. Materials the students and you will have created in previous units include:
 - Activity 1 — Notice/Wonder charts for Saturn and Cassini-Huygens images
 - Activity 2 — *Chart of Size Models for Walk on the Wild Size*, radial scale model of the solar system
 - Activity 3 — Saturn/Cassini Match Game board and giant poster of Saturn
 - Activity 4 — Multilayer 3-d book of Saturn
 - Activity 5 — Spacecraft to Saturn models and designs
 - Activity 6 — Drawings of Titan and story, poem, or song about a spacecraft to explore it
 - Activity 7 — Parachutes, probes, and *Parachuting Probe Packets*
6. Give students as much time as they need to work on their final project.

Questions for the Youth (Informal Assessment)

- Now that you have had the chance to think and explore like scientists and engineers, what do you think you might enjoy doing further with NASA?
- What should be explored next?

Sharing the Findings (Informal Assessment)

This can be a presentation to the rest of the group, to other students in the program or for a family night. If the group does mostly art and written projects, they can be published in a book sent home to share with their families or hung as an exhibit in a hallway wall. If the teams choose to make presentations, put on a panel discussion, or perform a skit, they can be presented at a final performance on family night. Use your imagination and find a way to work this presentation into your end of the semester or end of the year festivities.

Leader Reflection/Assessment

As you review the students' work, ask yourself the following questions:

1. Where do I see growth in the students' understanding of Saturn and the Cassini-Huygens mission? Look at what they are producing and check for enhanced interest and understanding as the unit has progressed.
2. Are there any misunderstandings that I would like to address? If so, ask the students to critique (and in the process they will correct) each other's displays. Remind them to be courteous to each other.
3. Do I see growth in the students' curiosity and their ability to ask questions and research or experiment to find answers?

Information for Families

Send home a letter to families describing the event and inviting them to attend!

If appropriate, give families suggestions on websites to look at with their children — you can use the “Internet Resource List” at the end of this unit.

NASA Resources

Careers at NASA

NASA’s Jet Propulsion Laboratory (JPL) is home for many of this generation’s space explorers. They’re not astronauts — they don’t leave the home planet — but they are the creators and stewards of the spacecraft, rovers, telescopes, and other instruments that enable us to look into, and for, new worlds. They are the women and men who listen to signals from Mars and Saturn, who have reached beyond the limits of our solar system and beyond the limits of our imaginations. Many people contribute to the cause — the educators who teach the next generation of explorers, the folks who do the day-to-day tasks of any organization, and the folks who document and record the adventure.

Create a chart that says “Jobs at NASA” and ask students to brainstorm what some of the jobs might be. Chart their answers and post the chart in the room.

Investigate the actual job possibilities at NASA and the subjects that students should study in school:
nasajobs.nasa.gov/jobs/occupations.htm
www.nasa.gov/audience/forstudents/5-8/career

Role Model Resource



Communication is essential in space, too! Belinda Arroyo is NASA’s “air traffic controller,” negotiating tracking communication time with the dozens of robotic space missions sprinkled around the solar system. She manages the Deep Space Network

Planning and Scheduling organization, making sure the needs of the robotic spacecraft beyond Earth are



met. Spacecraft commands are sent from Earth, and the spacecraft returns data to Earth on its health and the data it has collected. NASA’s Deep Space Network has three sites located in key areas around the world — Spain, Australia, and California. Each site has a 70-meter (230-foot) diameter antenna and a variety of smaller ones. “It’s very exciting to be part of a flight project,” says Belinda. “I really like learning about each mission, interfacing with the different people in the missions, and working with my team.”

Read more about Belinda at:
stardust.jpl.nasa.gov/news/news92.html

Read other inspirational stories of women at NASA at: women.nasa.gov

Resources

NASA has several national networks of volunteers who are specially trained for working with the public and in educational settings. Instructions for requesting a local volunteer are on their websites.

- The Solar System Ambassadors are motivated volunteers across the nation, who communicate the excitement of JPL’s space exploration missions and information about recent discoveries to people in their local communities. Learn more at: www2.jpl.nasa.gov/ambassador
- The Night Sky Network is a nationwide coalition of amateur astronomy clubs bringing the science, technology, and inspiration of NASA’s missions to the general public. They share their time and telescopes to provide unique astronomy

experiences at science museums, observatories, classrooms, and under the real night sky — nightsky.jpl.nasa.gov/

- NASA Student Ambassadors are high-performing interns and fellows, who volunteer their time to advance the NASA mission, by focusing on STEM research, education, and outreach. They are looking for opportunities to serve, learn, and inspire. The ambassadors serve as speakers and exhibit supporters. Learn more at: intern.nasa.gov/intern/
- The NASA Speakers Bureau is composed of engineers, scientists, and other professionals who represent the agency as speakers at civic, professional, educational and other public venues. Each year, NASA speakers provide hundreds of presentations to thousands of people — www.nasa.gov/about/speakers/

Sign up to get the latest education information from NASA: www.nasa.gov/audience/foreducators/Express_Landing.html

Taking Science to the Next Step

Create a multimedia presentation — Have the students adapt their final writing projects with computer-based multimedia authoring tools for kids, and present the projects to each other or invited guests.

- Try these multimedia resources:
 - Actual sounds recorded by the Cassini-Huygens spacecraft — saturn.jpl.nasa.gov/news/cassinifeatures/feature20060424
- 30-minute video podcasts of Ring World 2, the story of the Cassini-Huygens mission, in both English and Spanish — saturn.jpl.nasa.gov/video/videodetails/?videoID=114

- Monthly 3-minute video podcast of what to see in the night sky and how it connects to NASA's exploration of the solar system — solarsystem.nasa.gov/news/whatsup-archive.cfm

Students can visit the following website to track Cassini's progress and discoveries, and give summary updates to the group — saturn.jpl.nasa.gov/

Consider implementing in your afterschool or summer school the other program guides in the "From Out-of-School to Outer Space" series. More information is available at: www.jpl.nasa.gov/education/os2os

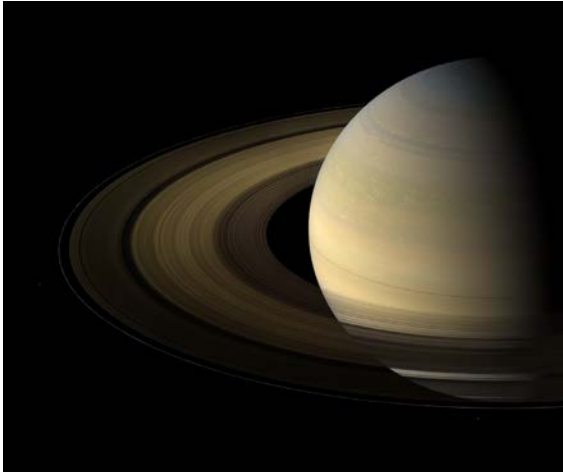


Literacy

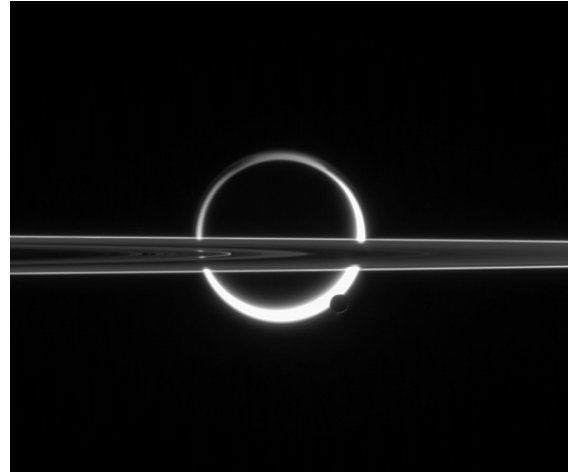
Compile the final writing projects into a whole-group book, and have students read from it to other rooms, to a community organization, or invite the parents in for a reading.

Publish! You may want to encourage students to share their final projects with a local newspaper or science museum.

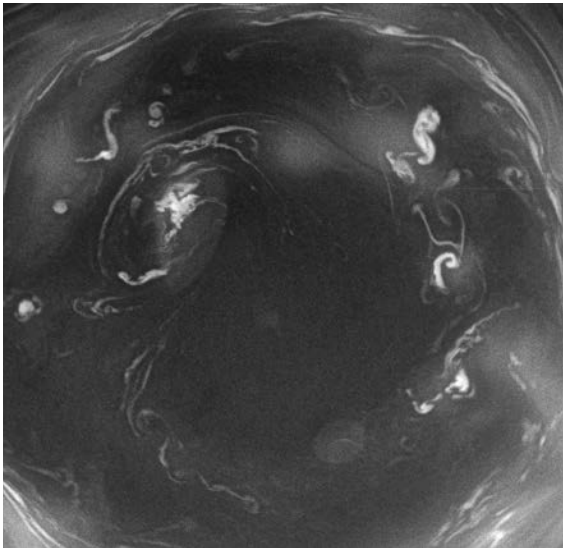
Cassini Extras



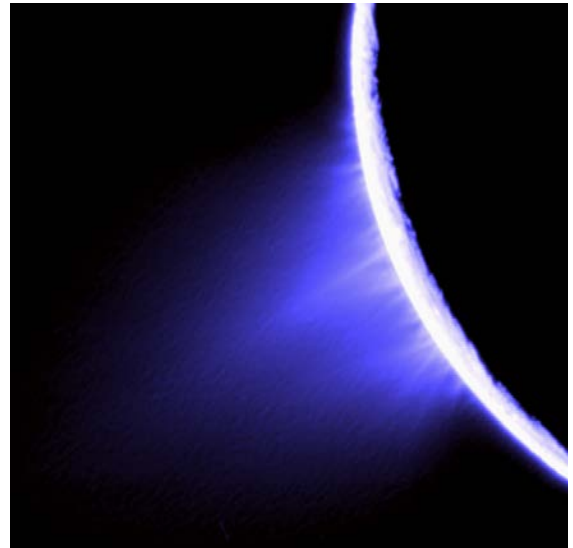
Mosaic of Saturn on the Second Day of Spring



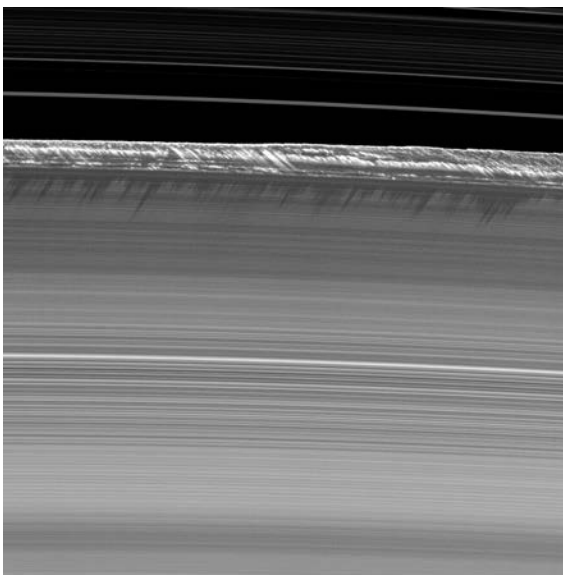
Saturn's Rings, Titan's Glowing Atmosphere, and Enceladus



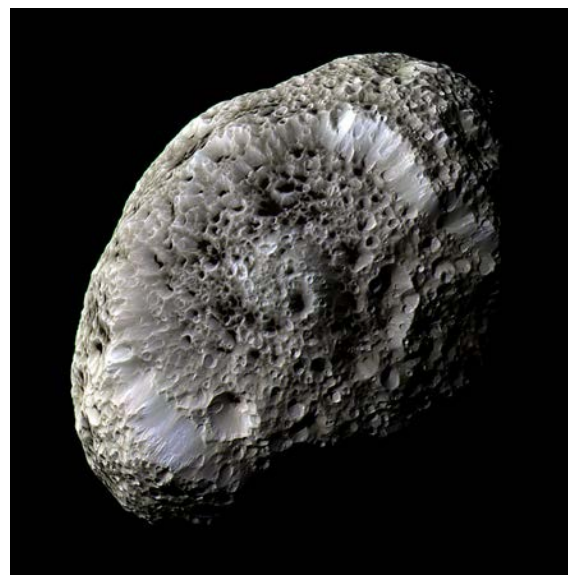
Clouds Near Saturn's South Pole



Jets on Saturn's Moon Enceladus (colored blue for dramatic effect)



Tall Peaks Edge Saturn's B Ring



The Odd World - Saturn's Moon Hyperion

