

Solar System Scale Activities for “A Universe of Stories”

Presenters: Brooks Mitchell (STAR Net) and Claire Ratcliffe (STAR Net)

The webinar will begin at 2:00 p.m. (MT) and will be recorded.

While you're waiting:

- 1) Find the toolbar – it will either be on the bottom or top of your Zoom window
- 2) Introduce yourself in the chat box (please select “Share with All” *not* “Share with Presenter”)
- 3) Click audio “Join by Computer” – you won’t have microphone access

Tip for viewing: You can resize and move the location of the video and slide screens by clicking and dragging them

STAR Net Team Member Introduction

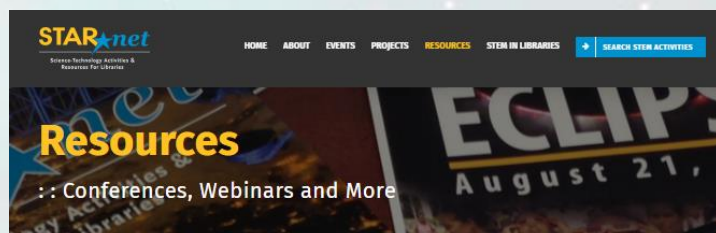
- Brooks Mitchell
- Greg Mosshammer
- Claire Ratcliffe
- Stephanie Vierow-Fields

Today's Agenda

1. **Upcoming Webinars**
2. **Hands-on Activity:** *Pocket Solar System*
3. **Hands-on Activity:** *Solar System Bead*
4. **Hands-on Activity:** *Jump to Jupiter*
5. **Hands-on Activity:** *Solar System in My Neighborhood*
6. **Q&A**

Join STAR Net!

www.starnetlibraries.org




Professional development
resources, including webinars,
newsletters, blogs, forums, videos,
and much more!

Curated Resources For Professional Development


Building the capacity of public libraries and library staff to deliver engaging, inspirational, and educational STEM programs has the potential to transform the STEM education landscape across the country. What started in libraries some years ago as independent experiments in STEM programming has become a national STEM movement.

Across the country, libraries are redefining their roles. They're becoming primary centers of informal learning, especially STEM learning. And this critical transition is being carried out by many dedicated librarians. To help them, the STAR Library Education Network (STAR_Net) is providing resources to support their efforts to develop new skills and provide quality STEM programming.


Collaboration is the key to transforming libraries into STEM learning centers




Conferences




Webinars




Newsletters




Online Forums




STAR_Net Blog




2017 Solar Eclipse



Exhibition Posters



Books, Videos & More!



Guides, Facts & Tips

Recent Blogs

- Watercraft Design
- The Dirt on Soil
- Do You Have Your Solar Eclipse Glasses? Great - Now Try Them Out!

Upcoming Events

- Discover NASA Exhibition (AZ)
May 3 - July 28
- Summer Learning - Build a Better World
May 15 - August 31
- Discover Tech Exhibition (CO)
May 31 - August 25

[View All Events](#)

A full-page background image of an astronaut in a white spacesuit standing on the lunar surface. The astronaut is facing left, with their back slightly to the camera. A large American flag is planted in the ground to the left of the astronaut. The lunar surface is covered in dust and rocks, with a series of footprints leading from the foreground towards the astronaut. The sky is a deep black.

What's Next?

Universe of Stories

Summer 2019

NASA@ My Library and *STAR Net* are partnering with the Collaborative Summer Library Program to support 16,000 libraries.

Please join us!!

STEM ACTIVITY Clearinghouse

For example:
[DIY Sun Cookies](#)

STEM Activity Clearinghouse

Search

STARnet Science-Technology Activities & Resources For Libraries

CS Cornerstones of Science awakening curiosity, enriching lives

Collections > 2017 Total Solar Eclipse

ATTRIBUTES

2017 TOTAL SOLAR ECLIPSE

There are 7 items.

Showing 1 - 7 of 7 items

Content Area

- ☐ Earth Science (0)
- ☐ Astronomy and Space (0)
- ☐ Chemistry (0)
- ☐ Physics (0)
- ☐ Engineering (0)
- ☐ Mathematics (0)
- ☐ Technology and Computing (0)
- ☐ Health Science (0)

Age Group

- ☐ Family (0)
- ☐ Infant (0-2) (0)
- ☐ Pre-K (0)
- ☐ Early Elementary (0)
- ☐ Upper Elementary (0)
- ☐ Tweens (9-12) (0)
- ☐ Teens (0)
- ☐ Adults (0)

Time to Complete Activity

- ☐ Under 10 minutes (0)
- ☐ 10-20 minutes (0)
- ☐ 20-40 minutes (0)
- ☐ 40 minutes to 1 hour (0)
- ☐ 1-2 hours (0)
- ☐ 2-4 hours (0)
- ☐ Long Duration (days to months) (0)

How Big, How Far, How Hot, How Old?

This is an activity about scale. Participants will arrange imagery of Earth and many other space objects in order of their size from smallest to largest, their distance from Earth's surface, their temperature from coolest to hottest, and/or their age from youngest to oldest.

[Open Activity](#) Report broken link

Content Area
Earth Science
Astronomy and Space

Age Group
Family
Upper Elementary
Tweens (9-12)

Time to Complete Activity
10-20 minutes

Difficulty Level (by content)
Medium

[View Details](#)

How Can the Little Moon Hide the Giant Sun?

This is an activity exploring the concept that distance affects how we perceive an object's size, specifically pertaining to the size of the Sun and the Moon as seen from Earth.

[Open Activity](#) Report broken link

Content Area
Earth Science
Astronomy and Space

Age Group
Early Elementary
Upper Elementary

Time to Complete Activity
40 minutes to 1 hour

Difficulty Level (by content)
Easy



Like an activity and think other library staff should know how great it is? Didn't like an activity or have modifications to make it better? **Make sure to leave a review!**

FREE STAR Net Resources

(take a picture of this slide!)

180+ Activities Specifically for #STEMINLIB

<http://clearinghouse.starnetlibraries.org/>

**Upcoming and Archived Professional Development
Webinars**

<https://www.starnetlibraries.org/resources/webinars/>

Monthly Newsletter

<https://www.starnetlibraries.org/resources/newsletters/>

Upcoming STEM Events

<https://www.starnetlibraries.org/upcoming-events/>

**STAR Net Blog (for library staff and written
by library staff!)**

<https://www.starnetlibraries.org/blog/>

Partnership Resources

<https://www.starnetlibraries.org/stem-in-libraries/collaboration/partnership-opportunities/>

Community Dialogue Resources

<http://www.starnetlibraries.org/resources/community-dialogues/>

Poll Question

- Who has joined STAR Net's "Summer of Space" initiative?
 - *Yes*
 - *No*
 - *What the heck is that?*

Join STAR Net's "Summer of Space"



HOME ABOUT **EVENTS** PROJECTS RESOURCES STEM IN LIBRARIES [→ SEARCH STEM ACTIVITIES](#)

STAR Net Partners with the Collaborative Summer Library Program (CSLP) for the 2019 Summer Learning Program

In the summer of 2019, 16,000 libraries across the country will celebrate space exploration in their summer reading programs. The slogan "A Universe of Stories" was chosen by library professionals to help inspire children of all ages to dream big, believe in themselves, and create their own story. [CSLP](#) and STAR Net are partnering to share [STEM resources](#) with these libraries.

This summer learning program will coincide with NASA's [60 years of achievement](#) and its celebration of the [50th anniversary of the Apollo Moon Landing](#).



[LEARN MORE ABOUT CSLP](#)



Register Your Library and Get Notified of Valuable Resources!

If you're interested in getting important resource notifications (and other news) for 2019's Summer Learning Program, register your library's participation to receive this important event newsletter.

Registration Benefits:

- A monthly newsletter curated with valuable resources and opportunities
- Automatic entry for chance to win 1 of 2 FREE [Orion StarBlast Telescopes](#) (open to U.S. public libraries only)
- Library representation on STAR Net's "Summer of Space" Map (below)

[REGISTER YOUR LIBRARY TODAY!](#)

Upcoming Webinars

(External Webinar) – Difficult Questions in the Era of ‘Alternative Facts’:
Dealing with Pseudo-science Related to Astronomy

- Andrew Fraknoi and Jeffrey Bennet
- <https://goo.gl/KcL2Kf>
- March 12 at 1:00 p.m. PT / 2:00 pm MT / 3:00 p.m. CT / 4:00 p.m. ET

(STAR Net Webinar) – Mars in May

- May 2 at 1:00 p.m. MT / 2:00 p.m. MT / 3:00 p.m. CT / 4:00 p.m. ET
- <http://www.starnetlibraries.org/event/mars-in-may/>

What is hotter:

Lava or the Sun's Surface?
A Sunspot or a Lightning Bolt?
Earth's core or Sun's core?

How Hot?

Comet's surface (171 °F; 77 °C)

Lava (1,832 °F; 1,000 °C)

Meteor (3,100 °F; 1,700 °C)

Sunspot (6,332 °F; 3,500 °C)

Sun's Surface (9,932 °F; 5,500 °C)

Earth's Core (10,832 °F; 6,000 °C)

Lightning Bolt (52,232 °F; 29,000 °C)

Sun's Corona (3.6 million °F; 2 million °C)

Sun's Core (27 million °F; 15 million °C)

Pocket Solar System

Make a scale model of our Solar System you can keep in your pocket!

Materials:

- Pencils
- Paper tape at least 2'' side



Great for families, star parties, or programs for ages 7+

Solar System Bead Activity

Construct a scale model using beads and string



Materials:

- Large craft pony beads in 11 colors
- 5 meters of string for each student
- Small piece of cardboard (10 cm x 10 cm)
- Meter sticks, rulers or measuring tape with centimeter markings
- Student worksheets

1 Astronomical Unit (AU) = 150 million km (93 million miles)

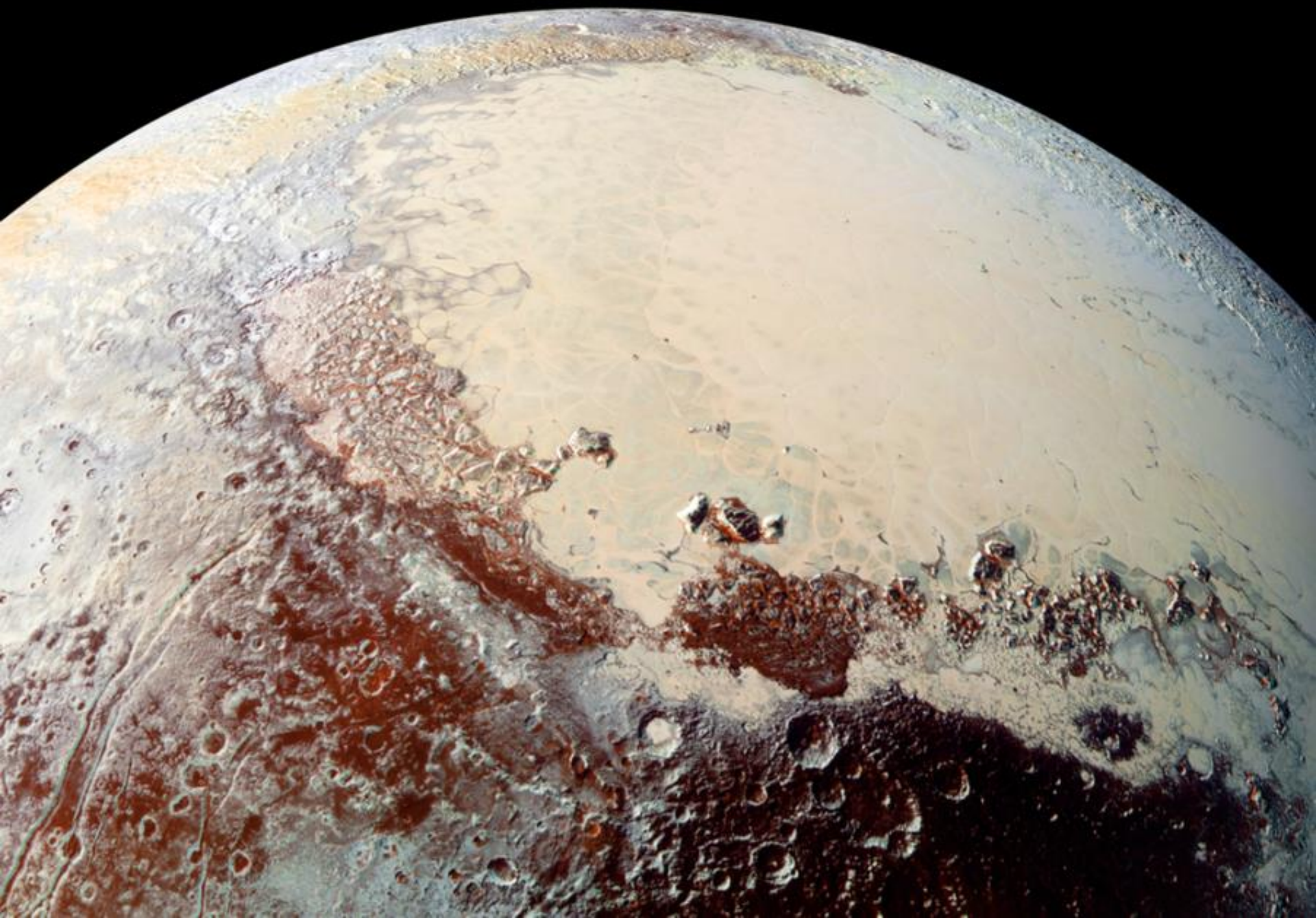
Planet Distance Chart

Calculate the scale value for each Solar System object using a scale factor of 10 centimeters per astronomical unit (AU). 1 AU is equal to about 150 million kilometers (93 million miles)!

Object	AU	Scale Value (centimeters)	Bead Color
Sun	0.0 AU	0 cm	Yellow
Mercury	0.4 AU	4 cm	Solid Red
Venus	0.7 AU	7 cm	Cream
Earth	1.0 AU	10 cm	Clear Blue
Mars	1.5 AU	15 cm	Clear Red
Asteroid Belt	2.8 AU	28 cm	Black
Jupiter	5.2 AU	52 cm	Orange
Saturn	9.6 AU	96 cm	Clear Gold
Uranus	19.2 AU	192 cm	Dark Blue
Neptune	30.0 AU	300 cm	Light Blue
Pluto (closest)	29.7 AU	297 cm	Brown
Pluto (average)	39.5 AU	395 cm	Brown
Pluto (most distant)	49.3 AU	493 cm	Brown

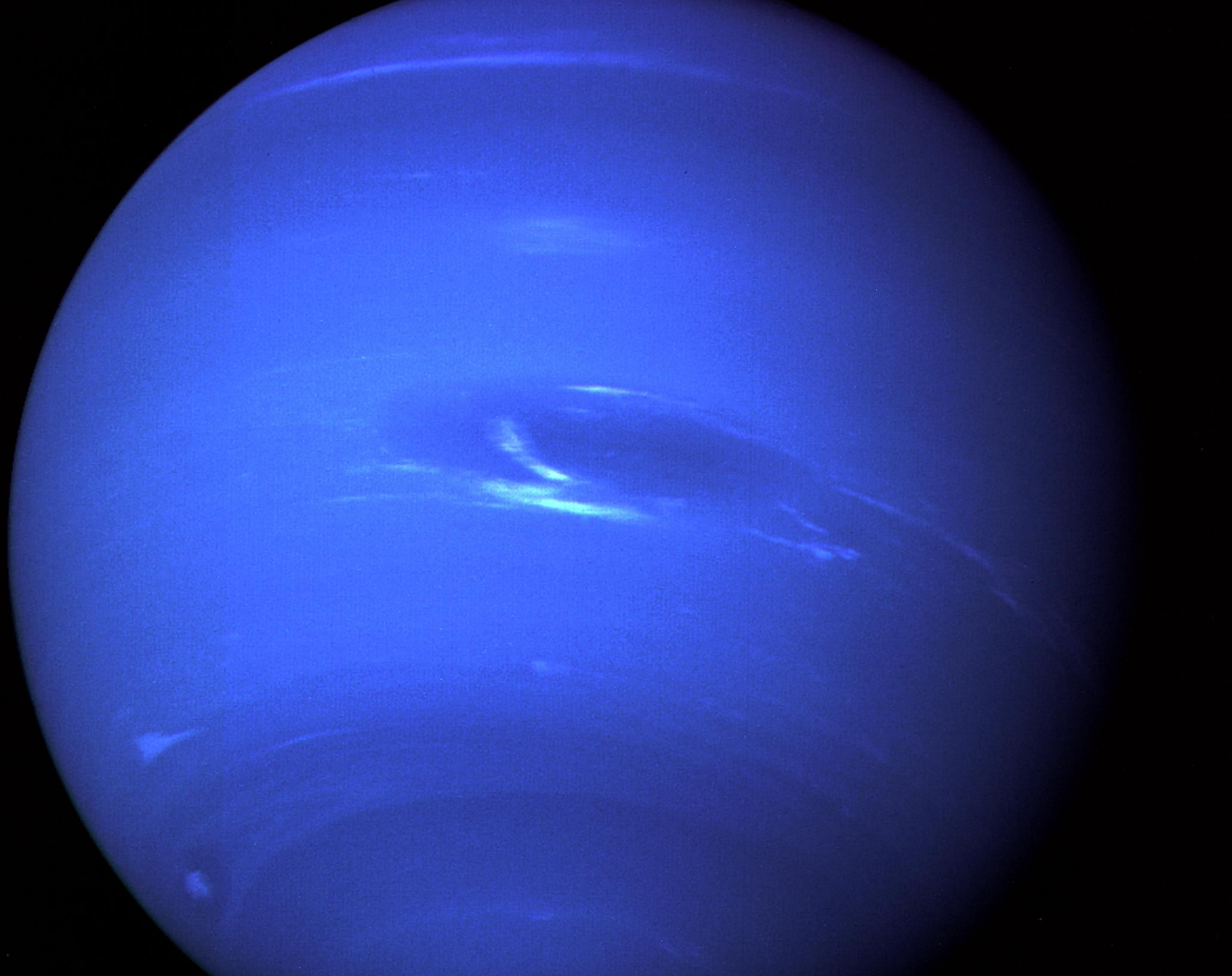


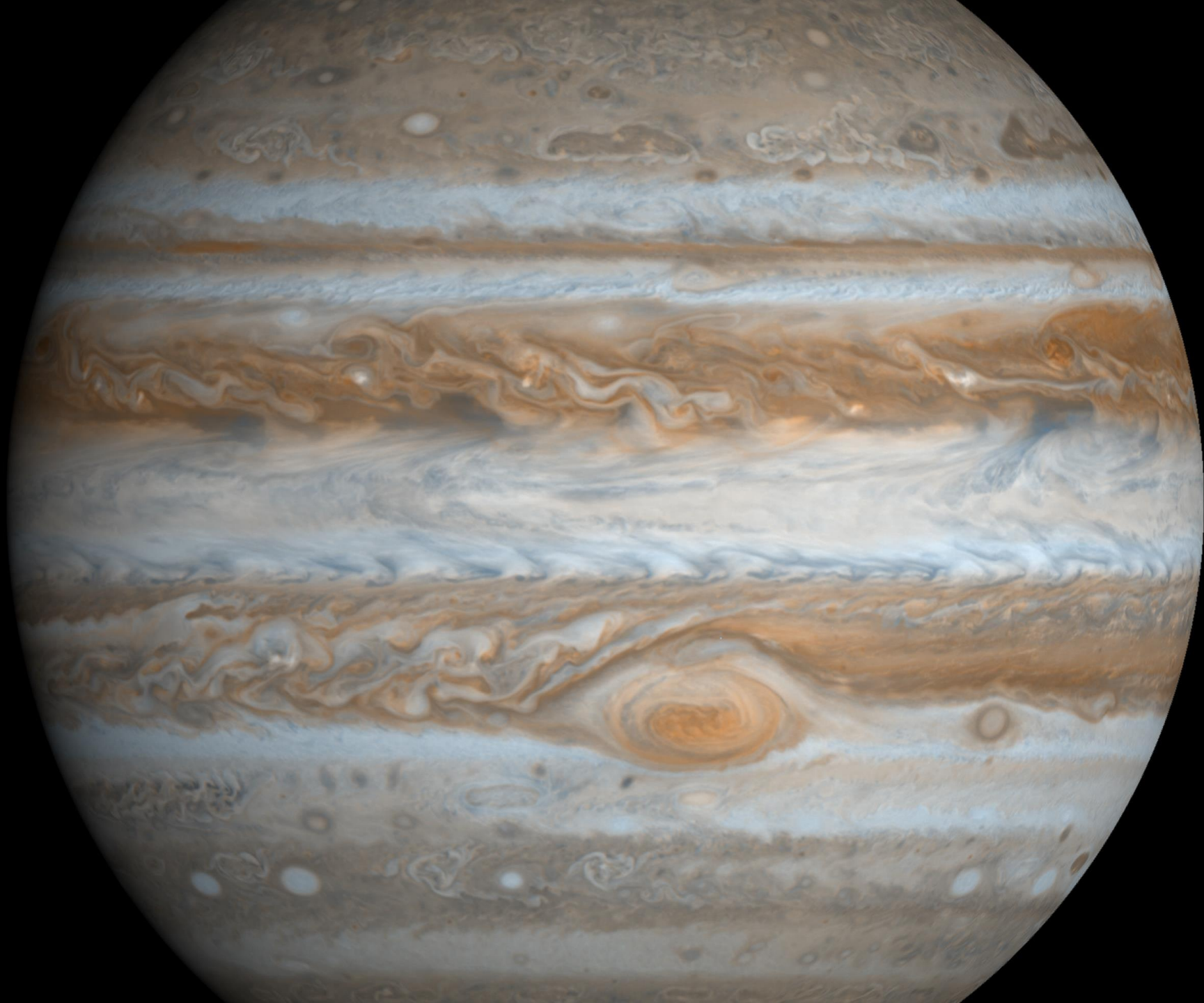
Jump to Jupiter

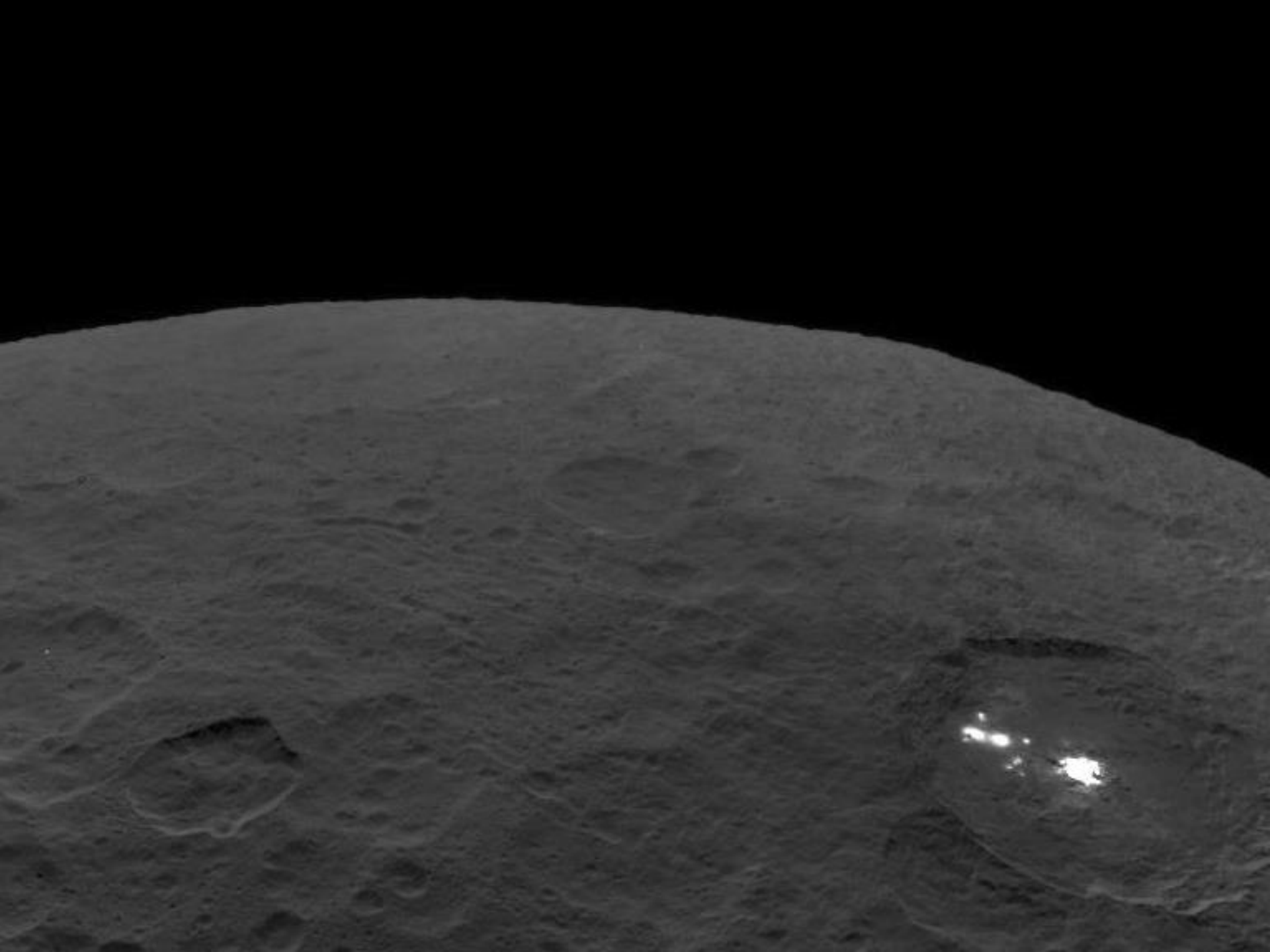


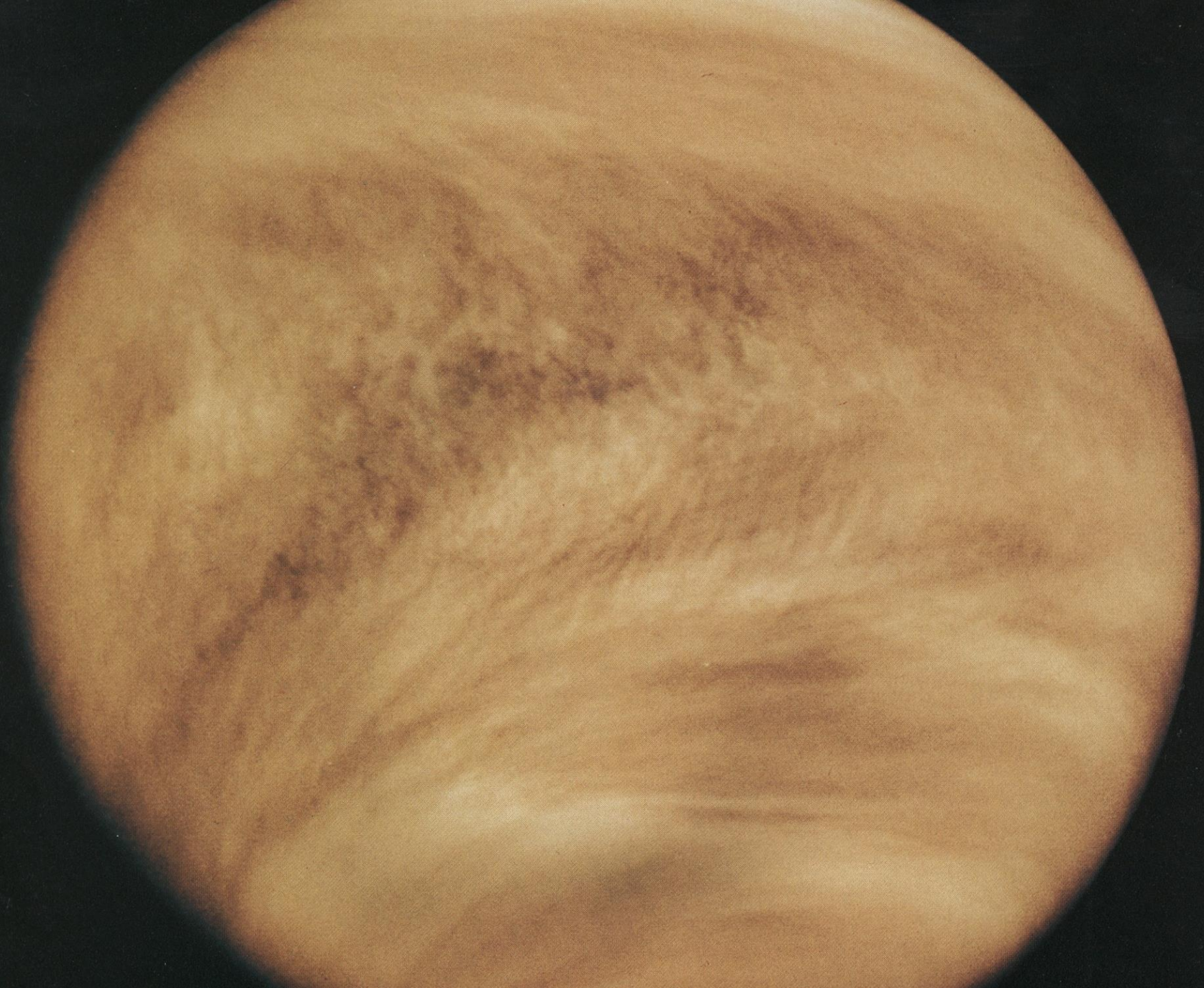


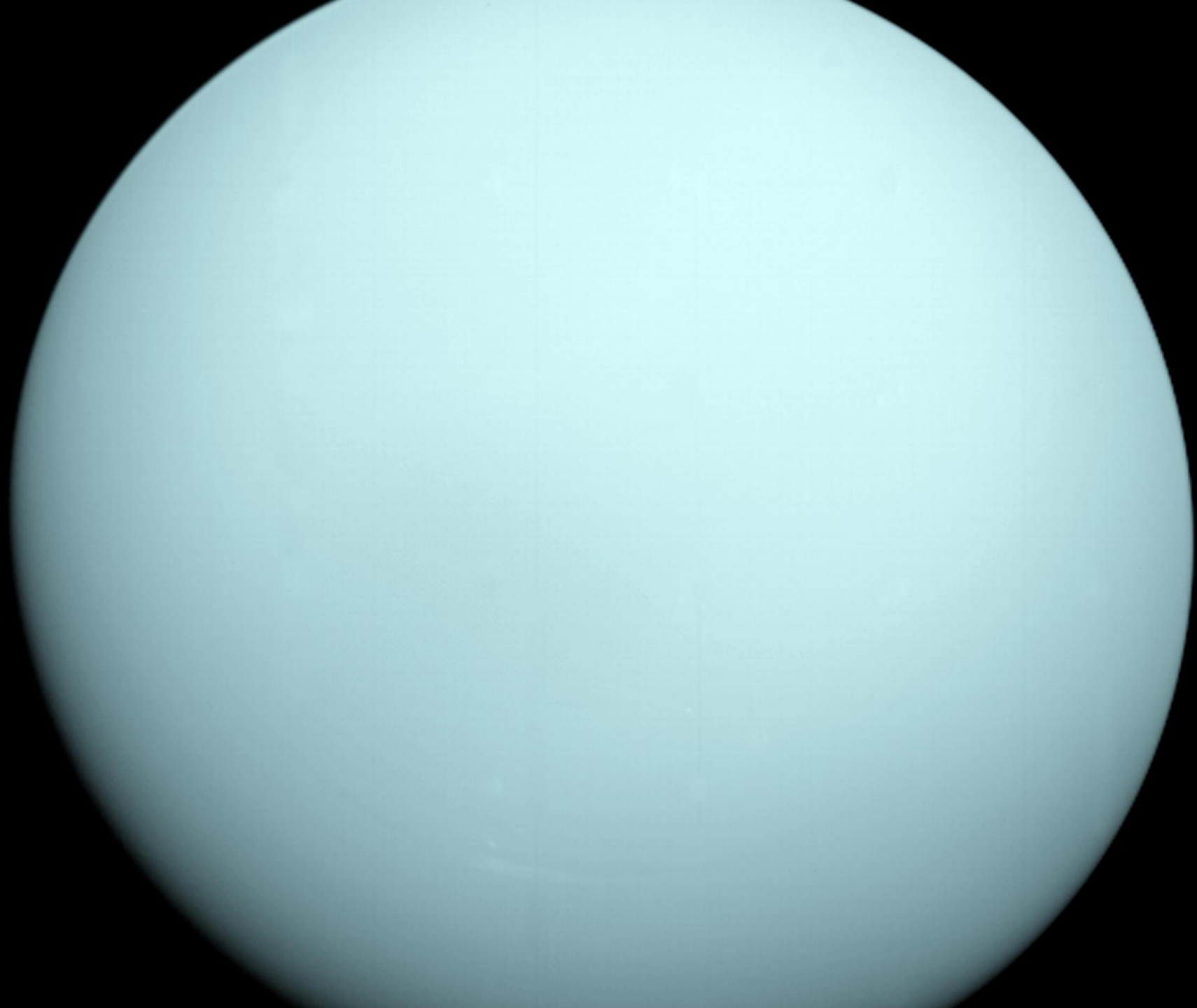


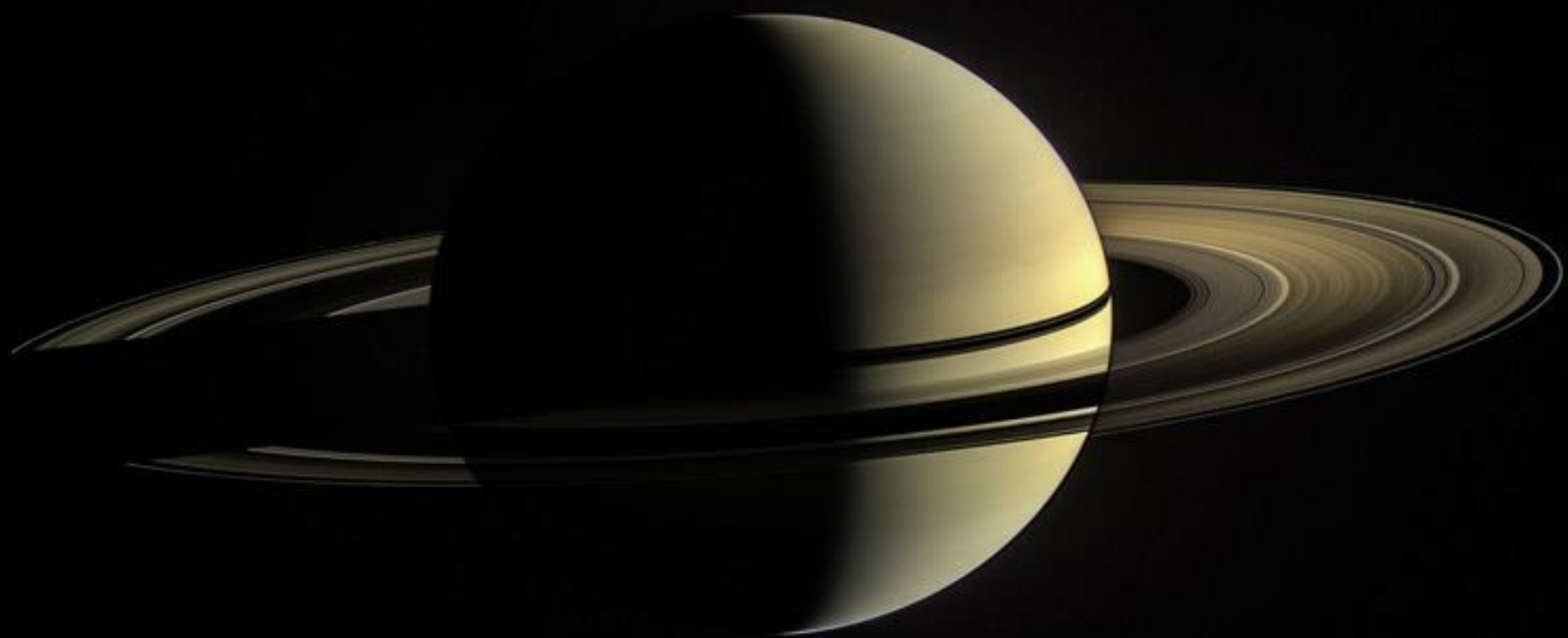
















Jump to Jupiter

	Memorable Representative	Scaled Diameter	Scaled Average Distance from Sun	Number of Jumps Between Objects
Sun	Grapefruit or pomegranate	4" (10 cm)	-	-
Mercury	Table salt or sugar crystal	1/100" (0.3 mm)	20' (6 meters)	6
Venus	Sea salt crystal	3/100" (1 mm)	35' (11 meters)	5
Earth	Sea salt crystal	4/100" (1 mm)	50' (15 meters)	4
Mars	Table salt or sugar crystal	2/100" (0.4 mm)	75' (23 meters)	8
Asteroids (e.g. Ceres)	Pollen, milled flour or corn, or gelatin	3/1000" (70 micrometers)	(41 meters)	18
Jupiter	Wooden bead	1/3" (1 cm)	255' (78 meters)	37
Saturn	Pony bead	1/3" (8 mm) (marble)	470' (143 meters)	65
Uranus	Peppercorn	1/10" (3 mm) (peppercorn)	945' (288 meters)	145
Neptune	Peppercorn	1/10" (3 mm) (peppercorn)	1,480' (452 meters)	164
Pluto	Fine sand	7/1000" (170 micrometers)	1,950' (593 meters)	141
Alpha Centauri star system	Grapefruit	-	1,800 miles (3,000 kilometers)	Roughly the distance between Washington, D.C. and Mexico City


Solar System In My Neighborhood

Big Take-Away: Shrinking the scale of the solar system to the size of your neighborhood!

- Great addition to “Jump to Jupiter”
- Uses objects to model the size of planets
- Uses a neighborhood map to model the distance of planets to the sun

Earth

Scaled distance from Sun:
150 m (491 ft.)



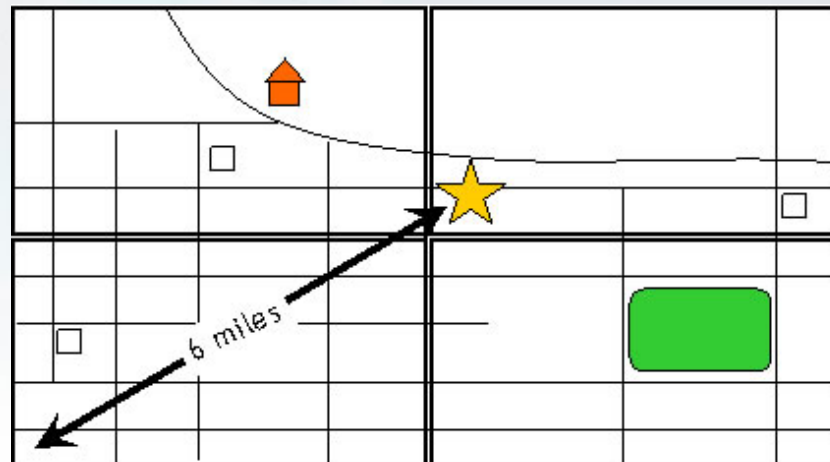
is a _____
(food or other object)

at _____
(landmark)

Solar System In My Neighborhood

Set-up and Materials:

- 22" x 32" Neighborhood map, extending to 6 miles in all directions from your geographic location
- One food item per planet
- Measuring tape
- Coloring supplies
- String
- Planet labels
- Coffee stirrers



Sun = giant beach ball

What planet is a...

- Blueberry
- Lime
- Potato

Planet Sizes and Distances

Planet	Food Representative	Distance from the Sun (miles)*
Sun	Giant pumpkin	
Mercury	Uncooked orzo pasta	4/100
Venus	Large blueberry	7/100
Earth	Small grape	9/100
Mars	Pea	1/10
Jupiter	Large mango or potato	$\frac{1}{2}$
Saturn	Large orange	$\frac{3}{4}$
Uranus	Plum	$1\frac{3}{4}$
Neptune	Lime	$2\frac{3}{4}$
Pluto	Grain of uncooked rice	$3\frac{3}{4}$
Eris	Grain of uncooked rice	6

*Distances have been reduced by a factor of 1 billion