

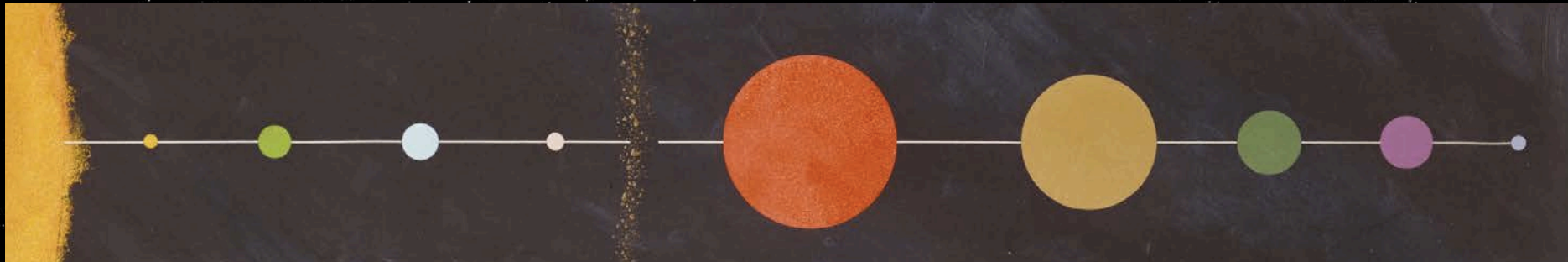
PROFESSOR SMARTT'S GUIDE TO THE UNIVERSE

Presented by
smarttscience

SOLAR SYSTEM MNEMONICS

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

- My Violent Evil Monster Just Scared Us Nuts.
- My Very Educated Mother Just Served Us Nachos.



Solar system artwork. NASA ID number AC72-1279.

Before and after Pluto was demoted to a dwarf planet:

- My Very Easy Memory Jingle Seems Useful Naming Planets.
 - My Very Easy Memory Jingle Seems Useless Now.

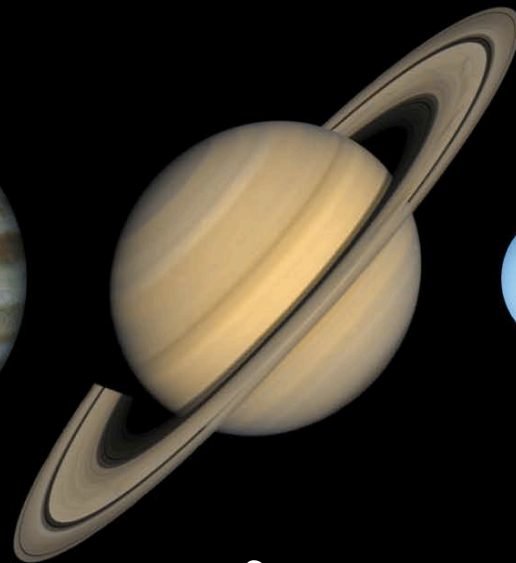
THE GAS GIANTS AND ICE GIANTS

These are huge planets composed mostly of gas with a rocky or metallic core. Due to their enormous size which gives them a very strong gravitational field, they usually have many large moons that are potential hosts for life.

Earth
(to scale)



Jupiter



Saturn



Uranus



Neptune

Jupiter is massive; twice as large as all of the other planets in the Solar System combined.



DORLING KINDERSLEY/GETTY IMAGES

JUPITER

One of Jupiter's moons, Europa, is a frozen, icy world. Scientists believe that beneath the frozen layer of Europa's surface, there is a salt-water ocean, which means it could support aquatic life.



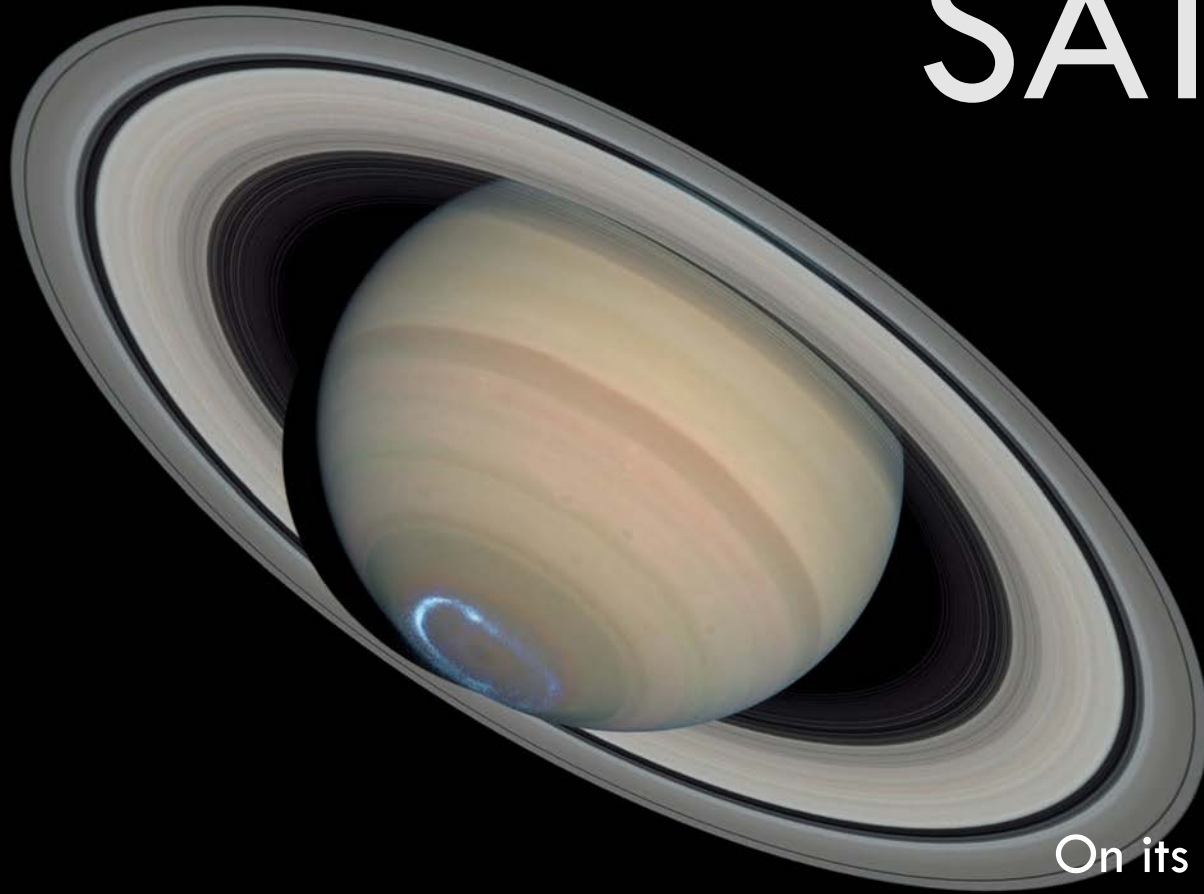
NASA/JPL-Caltech/SETI Institute

THE GREAT RED SPOT

The **Great Red Spot** is a huge storm on Jupiter, three times the size of Earth, that has been raging for over 350 years. The massive cyclone has been slowly shrinking over the past 50 years and by 2040 it may no longer be so striking.



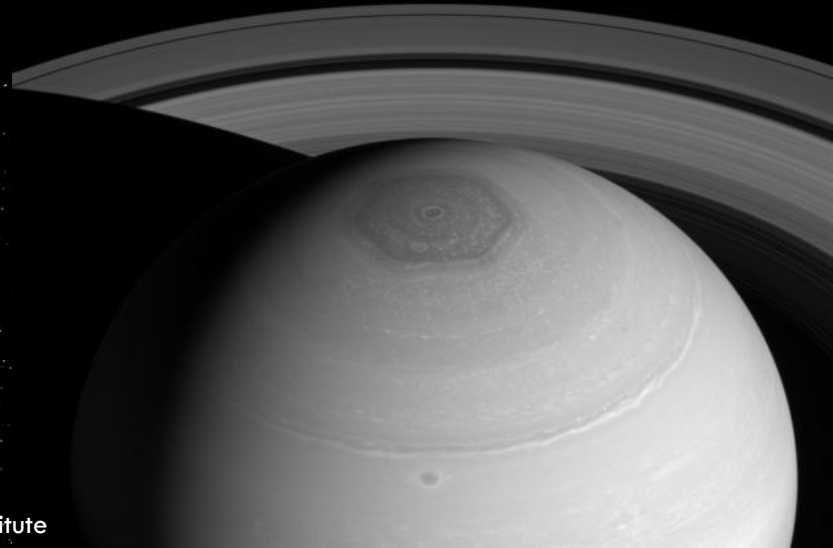
SATURN



- Best known for its distinctive rings, which are composed from particles as small as dust grains, up to chunks of rock and ice the size of mountains.
- Saturn has 150 moons and moonlets.

On its North Pole, you can see Saturn's hexagonal cloud formation, which houses a hurricane-like vortex inside, much like Jupiter's **Great Red Spot**.

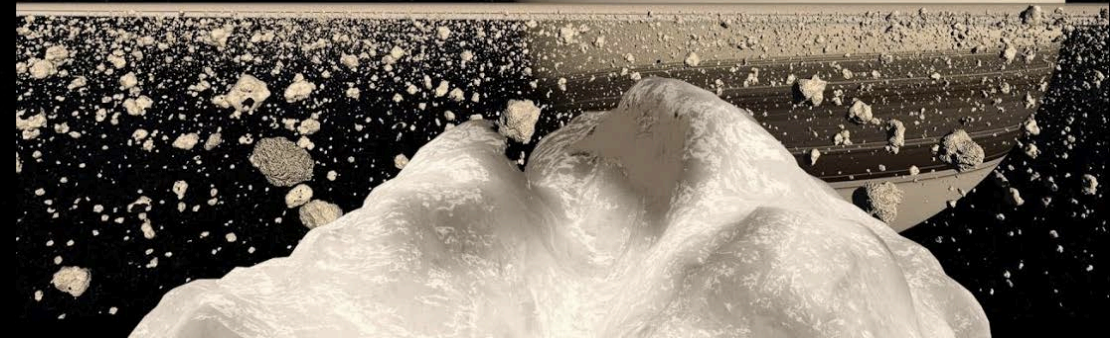
NASA, ESA, J. Clarke (Boston University), and Z. Levay (STScI)



SATURN'S RINGS

Saturn's rings are made mostly out of water ice, which is why they're so bright; they reflect the Sun's light very well. The objects that make up the rings range in size from dust particles, to chunks the size of mountains.

Ever wondered what it would be like to stand on Saturn's rings? Have a look at Ron Miller's artist's impression.



ACTIVITY

Word Search – find the 10 largest moons in the Solar System.

The Solar System

Lesson Three Worksheet 1 – find the largest moons in the solar system

C N O T I R T E N N
 W A Q Z Y F U O T A
 N M L H Y R O B I T
 U O W L O M W K T I
 Q C R P I B J G A T
 W E A E B S H T N R
 R H E A B E T I I Q
 K H Q F M O Y O A F
 B N L B T Y O P N R
 G A N Y M E D E R Q

This wordsearch contains the names of the 10 largest moons in the solar system. They are in the table below, together with their host planet and their diameter in kilometres. Find them in the wordsearch above and colour code them using a different colour to group together all the moons that belong to the same host planet.

Moon name	Host Planet	Diameter (kilometres)
Ganymede	Jupiter	5268
Titan	Saturn	5150
Callisto	Jupiter	4816
Io	Jupiter	3636
Moon	Earth	3474
Europa	Jupiter	3120
Triton	Neptune	2707
Titania	Uranus	1580
Rhea	Saturn	1528
Oberon	Uranus	1522

URANUS

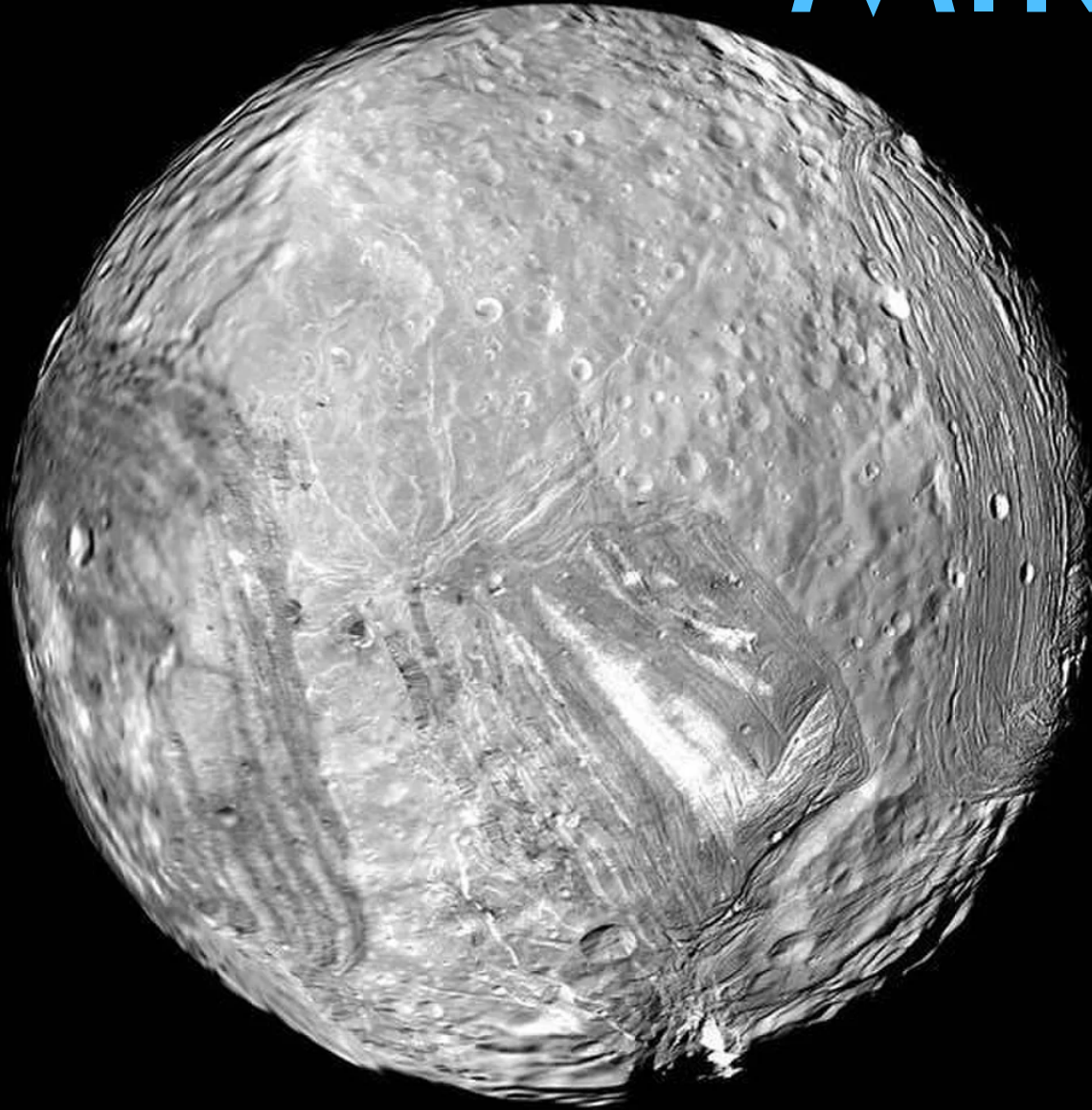
Uranus is tilted on its side. Its unusual axis why Uranus' faint rings orbit the planet vertically. This extreme tilt could be due to a collision with another planet-sized body early in its formation.

This planet is called an **Ice Giant**. It is mostly hydrogen and helium, but has more water, methane, and ammonia than Jupiter or Saturn. It is so cold (-200°C) that the atmosphere is likely to be a soup of dense gas and ice crystals.

Methane gives it its distinctive blue colour.



MIRANDA

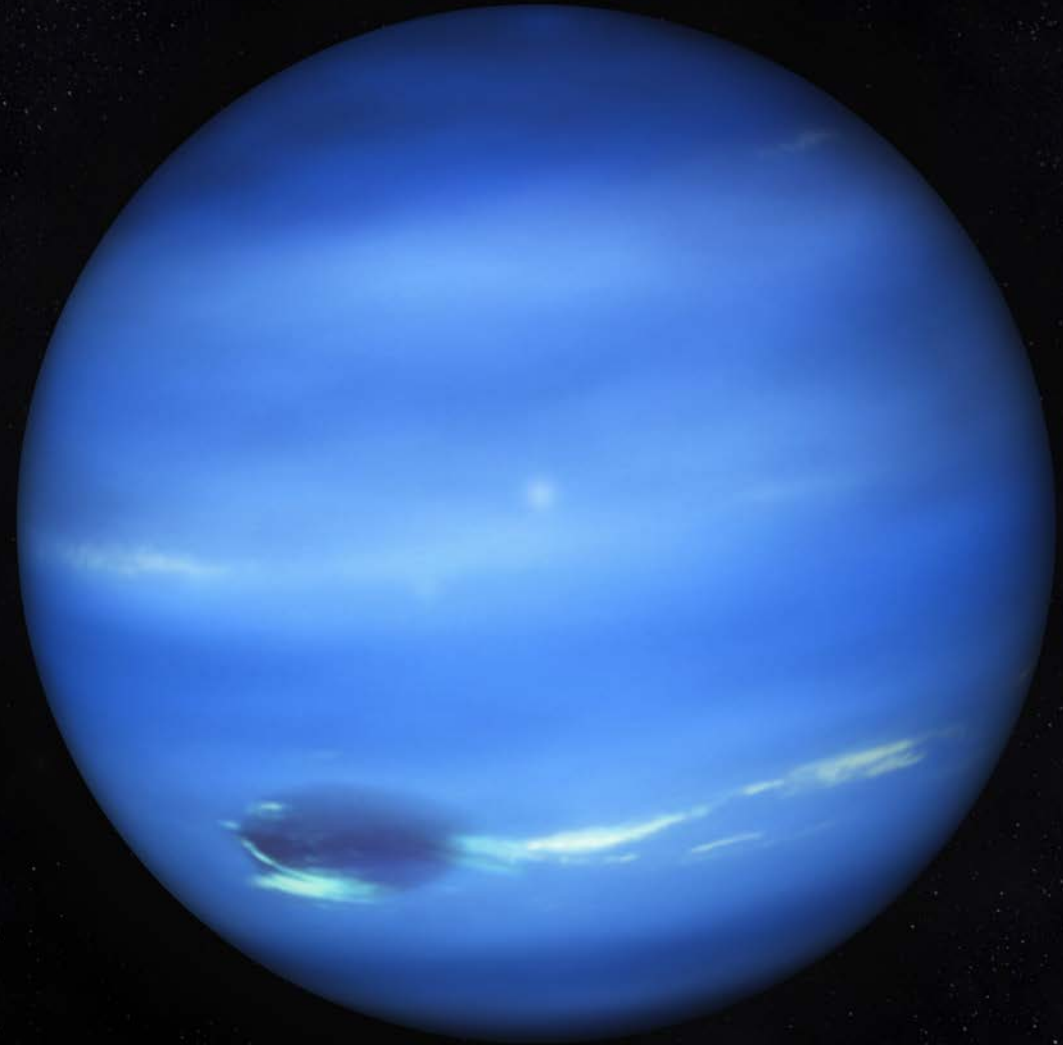


Uranus has one of the most bizarre looking moons in the Solar System.

- Miranda has the largest known cliff in the Solar System, Verona Rupes, which 20 kilometres high.
- It resembles Frankenstein's monster - a bizarre jumble of parts that didn't quite merge properly, with giant canyons up to 12 times deeper than the Grand Canyon.

NEPTUNE

- The existence of Neptune was predicted by two mathematicians before it was physically observed.
- In 1846, mathematicians in Cambridge and Paris both calculated the planet's existence due to its gravitational effect on the orbit of its neighbour Uranus.
- Since the French Professor had an astronomer friend with a telescope who could confirm the planet's existence, he got all the credit. This led to disputes between the two countries over who had discovered it!



ACTIVITY

Fill in the question sheet.

The Gas Giants & Ice Giants

1. What is the largest planet in our Solar System?
 - a. Mars
 - b. Jupiter
 - c. Saturn
2. Which planet is tilted almost 90° on its axis?
 - a. Neptune
 - b. Saturn
 - c. Uranus
3. Circle the two planets that are visible to the naked eye and have been known since ancient times.

Jupiter	Neptune
Uranus	Saturn
4. Circle the planets that have rings.

Earth	Saturn
Uranus	Venus
5. What is the name of Uranus' strange, carved up, Frankenstein's monster-like moon?
 - a. Callisto
 - b. Phobos
 - c. Miranda
6. Which chemical gives Uranus and Neptune their blue colour?
 - a. Hydrogen
 - b. Ammonia
 - c. Methane
7. What are Saturn's rings mainly composed of?
 - a. Water Ice
 - b. Metal
 - c. Rock
8. What is the name of the huge storm that has been raging on Jupiter for the past 350 years?
 - a. The Big Old Dot
 - b. The Great Red Spot
 - c. An Incredibly Large Blot

Score: / 8

BONUS ACTIVITY

As a class, come up with some questions about the Solar System and tweet them to Professor Smartt.

@smarttscience



The Gas Giants & Ice Giants

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