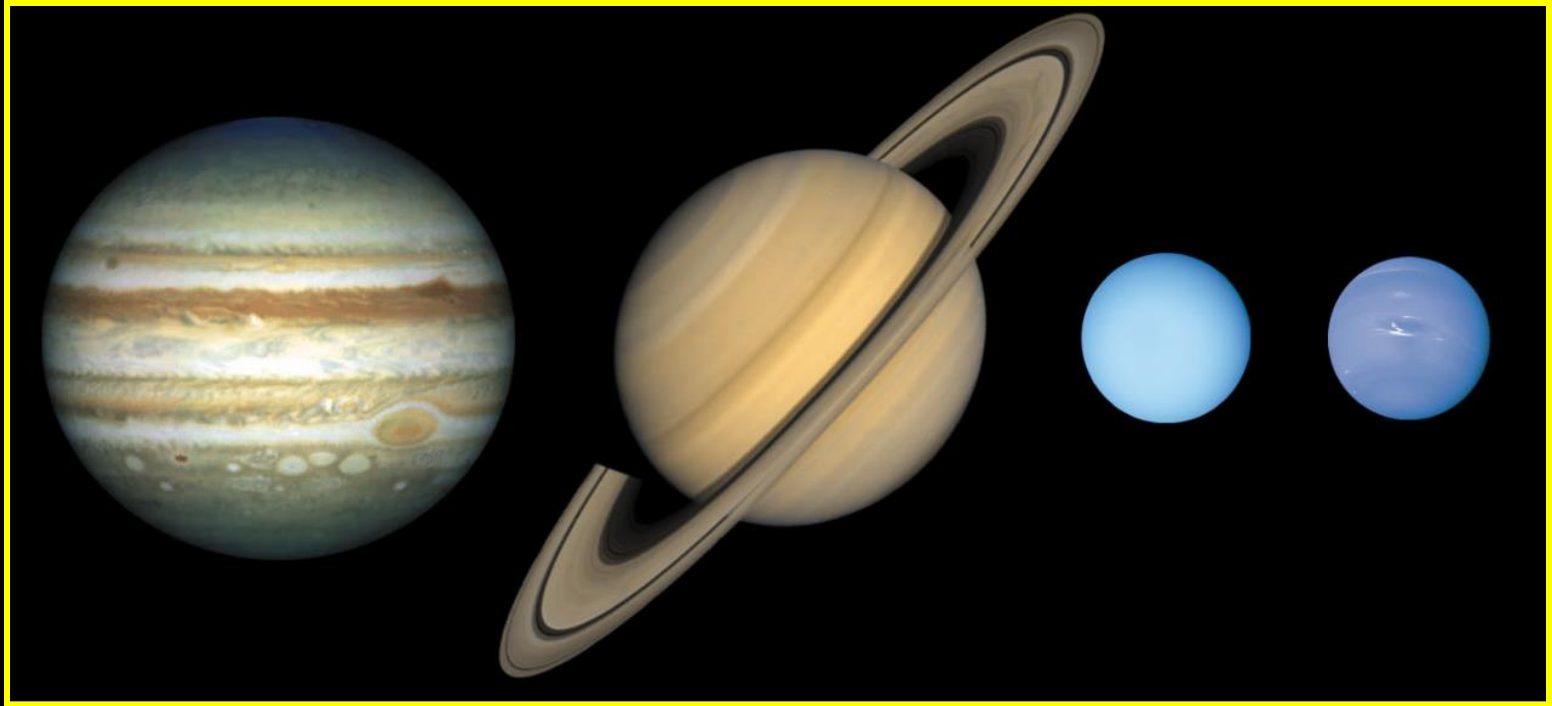


The Outer Planets and Beyond



Essential Standard 1.1: Explain Earth's role as a body in space.

Objective 1.1.1 Explain Earth's motion through space, including precession, nutation, the barycenter, and its path about the galaxy.

I Can Statements

At the end of this lesson, you should be able to say, with confidence:

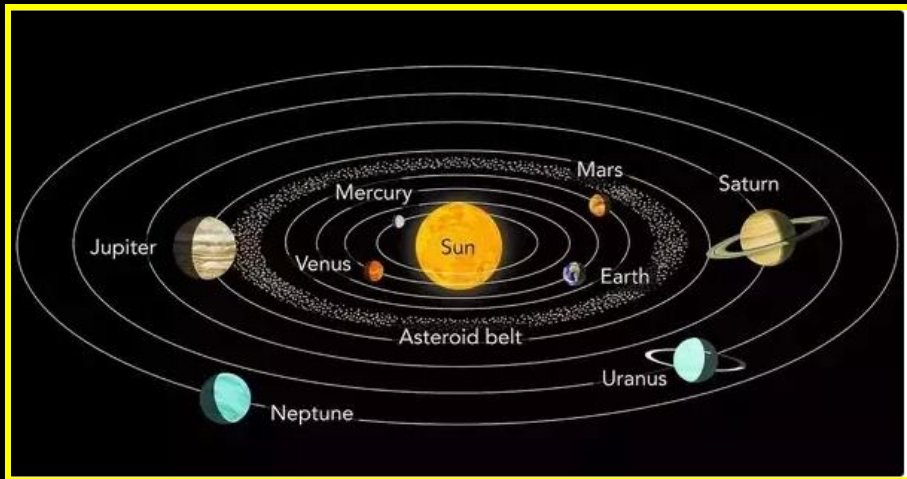
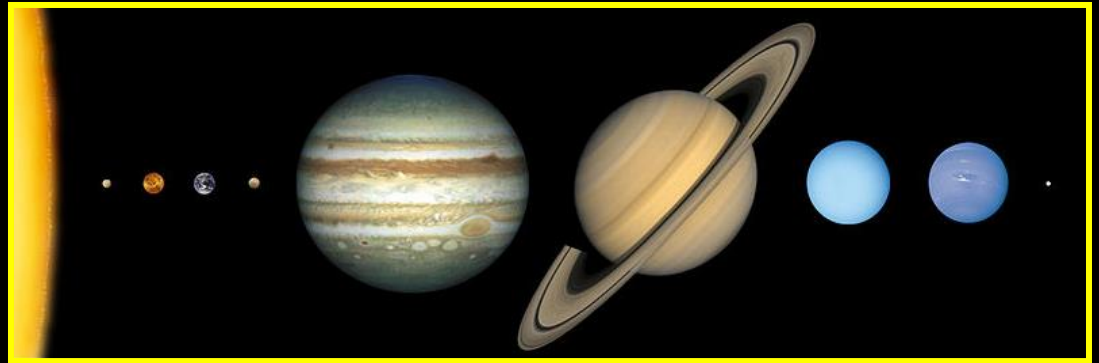
- I can describe basic characteristics of the four gas giant planets.
- I can compare the time it takes for each of the four gas giant planets to orbit the Sun.
- I can describe where Pluto is found in the Solar System and why it is considered to be a dwarf planet.



Jupiter

Jupiter is the fifth planet from the Sun and the closest gas giant to Earth. It is also the largest planet.

All of the planets and Pluto, in correct size scale.



It takes Jupiter 10 hours to rotate about its axis and 11.8 Earth years to complete one orbit of the Sun.



Jupiter's Atmosphere

Jupiter is covered in swirling cloud stripes, called bands.



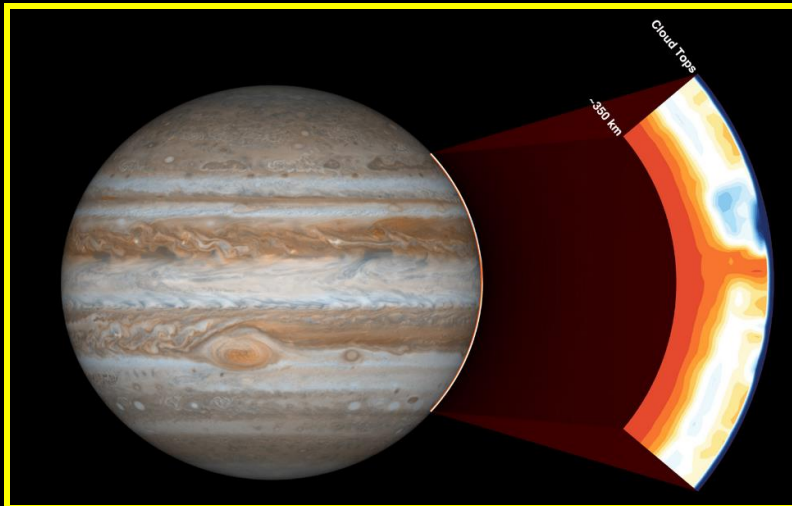
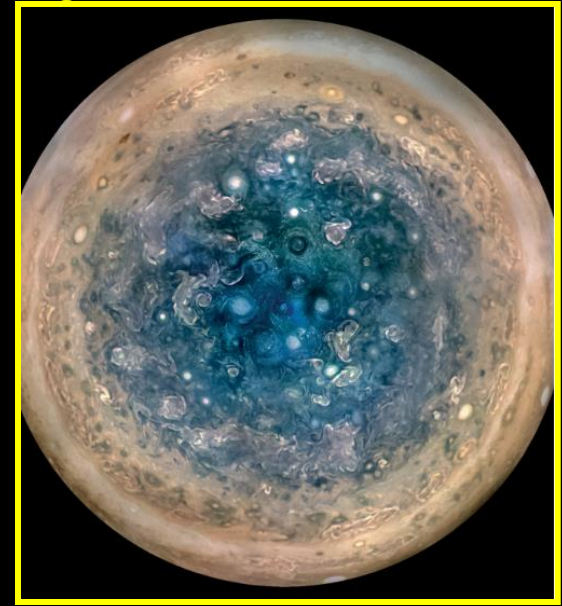
Jupiter also has massive storms, like the Giant Red Spot, that has been going on for hundreds of years.



Jupiter's Atmosphere

The south pole of Jupiter is blue and with many Earth sized storms.

Photo taken by the Juno spacecraft that is currently orbiting Jupiter



Orange color - high levels of ammonia
Blue color - low levels of ammonia

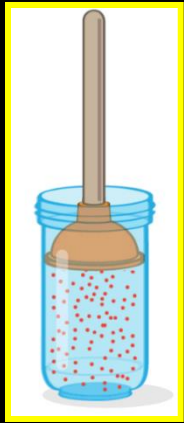
Jupiter has a very thick atmosphere, made of mostly hydrogen and helium, full of varying levels of ammonia.



Jupiter's Core

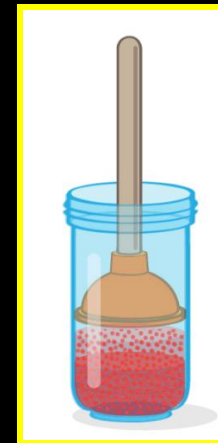
On the surface of Earth, hydrogen exists as a gas. However on Jupiter, it may exist as a liquid, or even as a solid metal, due to the pressure on Jupiter.

Gas

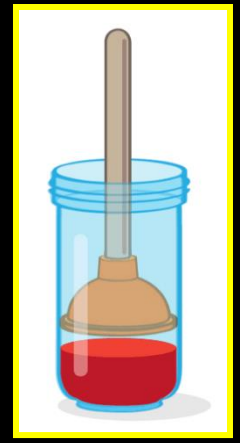


Under low pressure, hydrogen atoms have lots of room and can exist as a gas.

As pressure increases, there is less room and the atoms crowd together to form a liquid and, with even more pressure, a solid.



Liquid

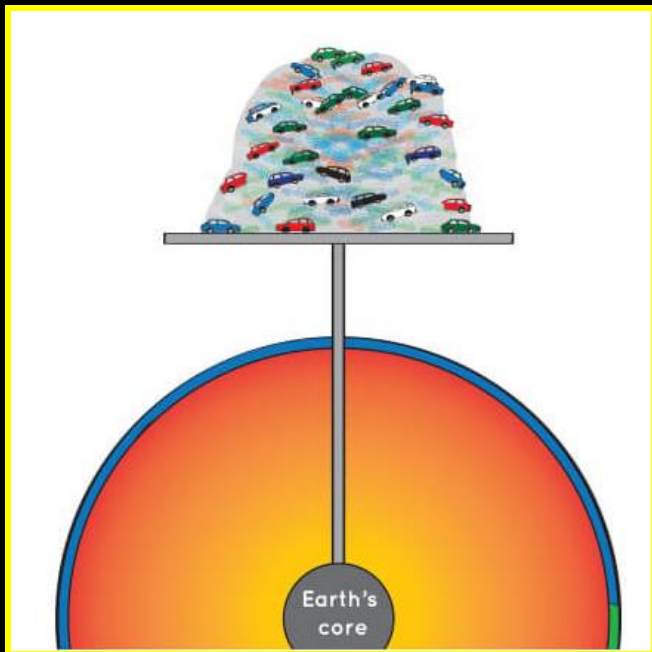
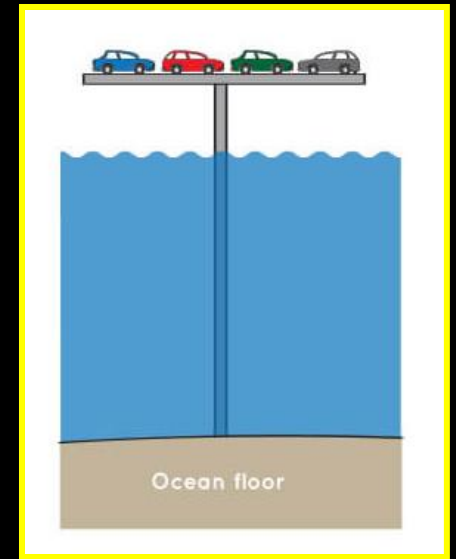


Solid



Jupiter's Core

If you were to swim to the bottom of the Pacific Ocean, all the weight of the water would create a pressure equal to the weight of 4 cars.



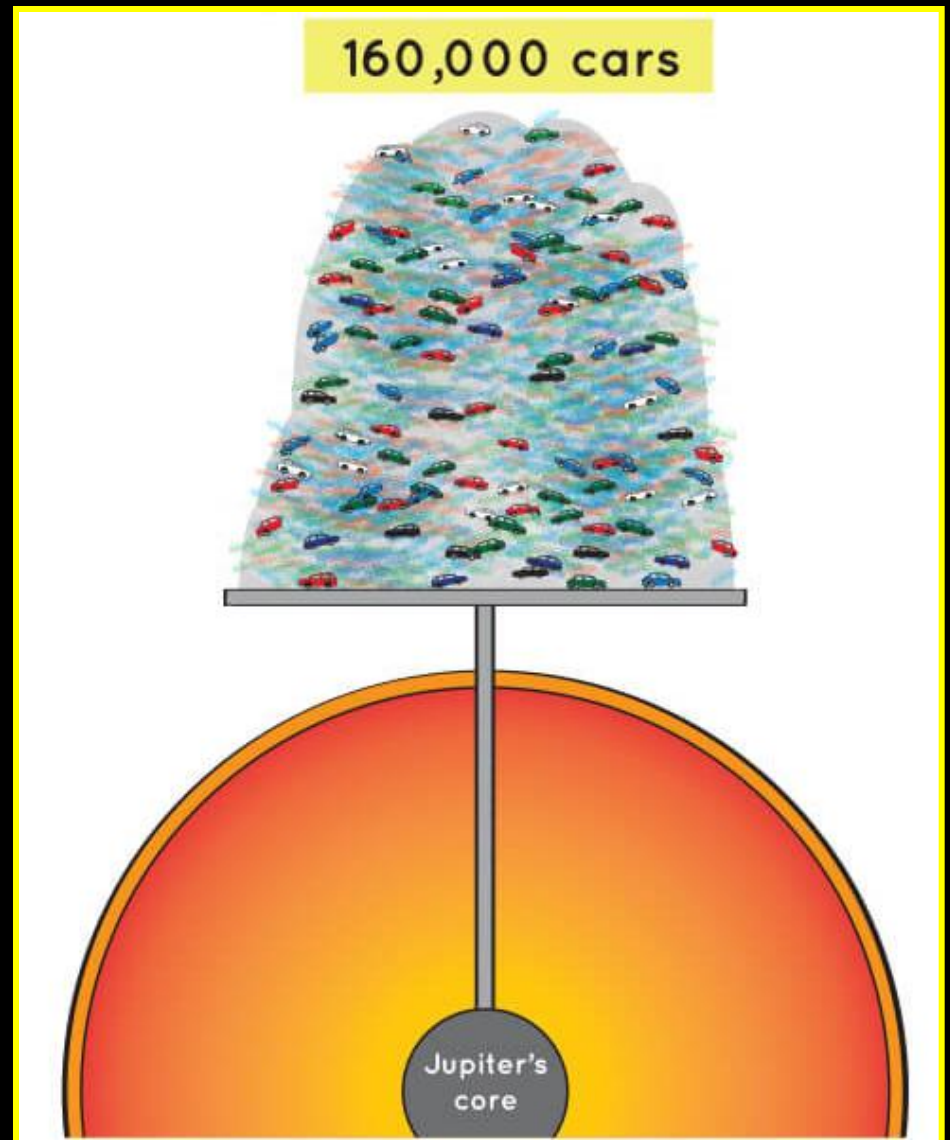
At the center of the Earth, the pressure is equal to the weight of 11,000 cars.



Jupiter's Core

At the core of Jupiter, the pressure is as great as the weight of 160,000 cars.

Scientists think that amount of pressure may create a core like a hot, boiling soup or possible even as a solid metal.





Jupiter's Moons

Jupiter has 70 moons, the largest four being Ganymede, Callisto, Io, and Europa. Ganymede is the largest.



Ganymede



Callisto



Io

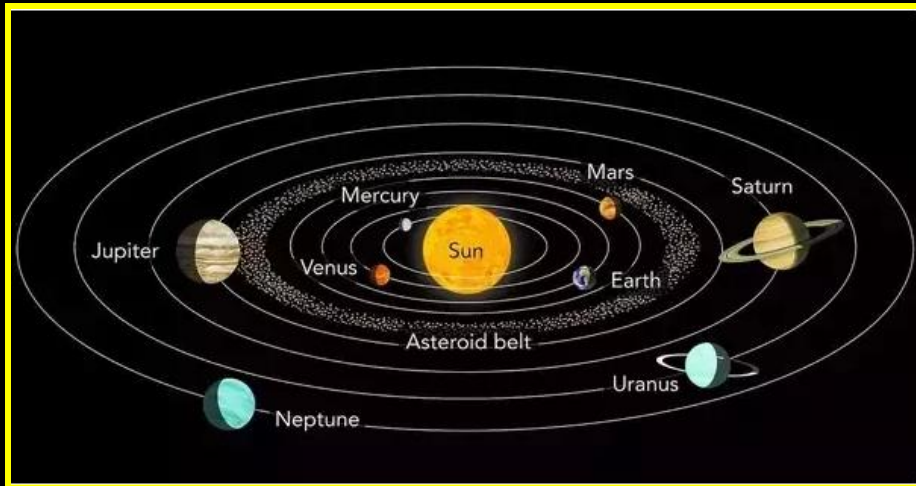
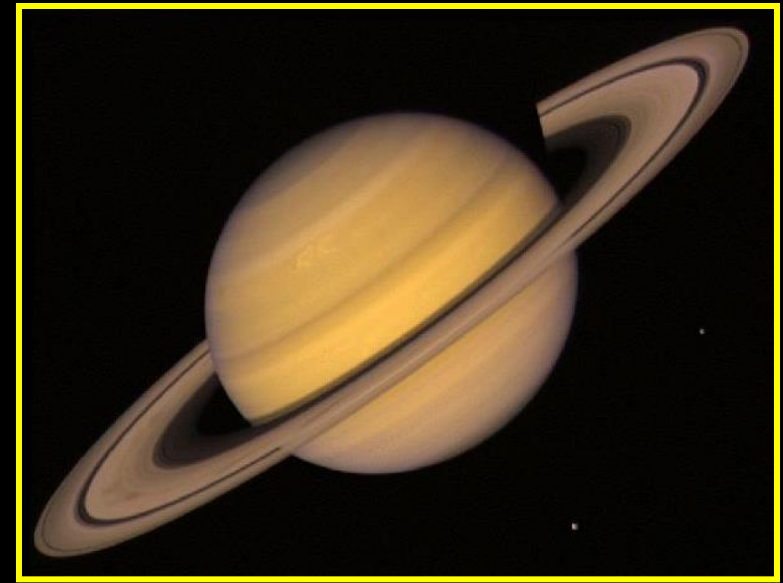


Europa



Saturn

Saturn is the sixth planet from the Sun and the second gas giant.



Saturn rotates about its axis every 10.7 hours and takes 29 Earth years to orbit the Sun.



Saturn's Atmosphere

Saturn has a very thick atmosphere containing hydrogen and helium, and, like Jupiter, has bands of clouds.



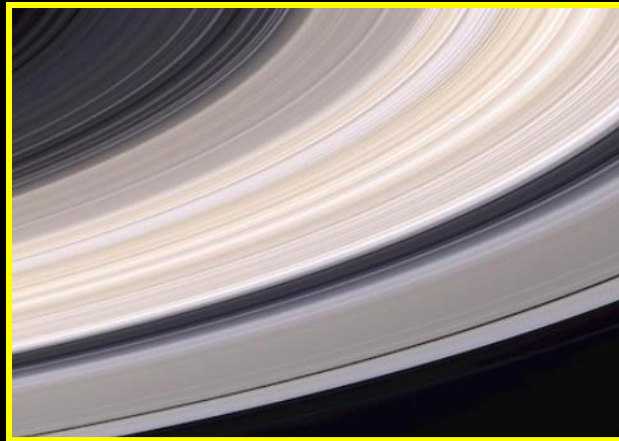
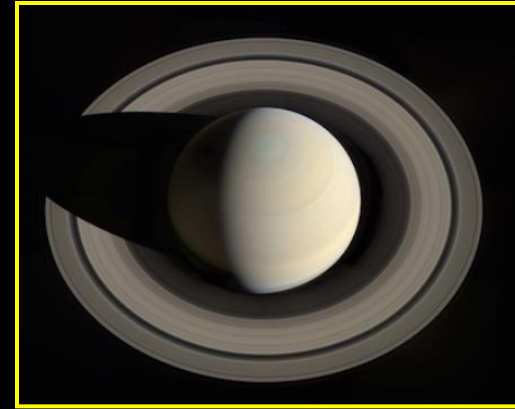
There is even a giant storm on Saturn, just like on Jupiter.





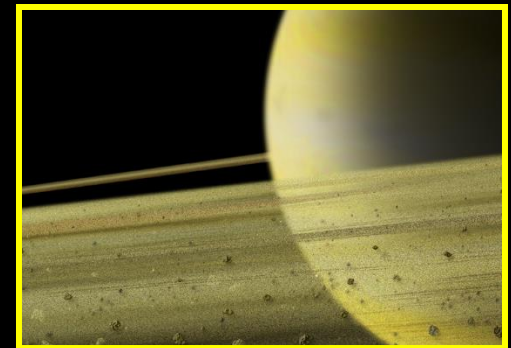
Saturn's Rings

Saturn has seven rings with spaces between them.



Saturn isn't the only planet with rings, they are just larger and more vivid.

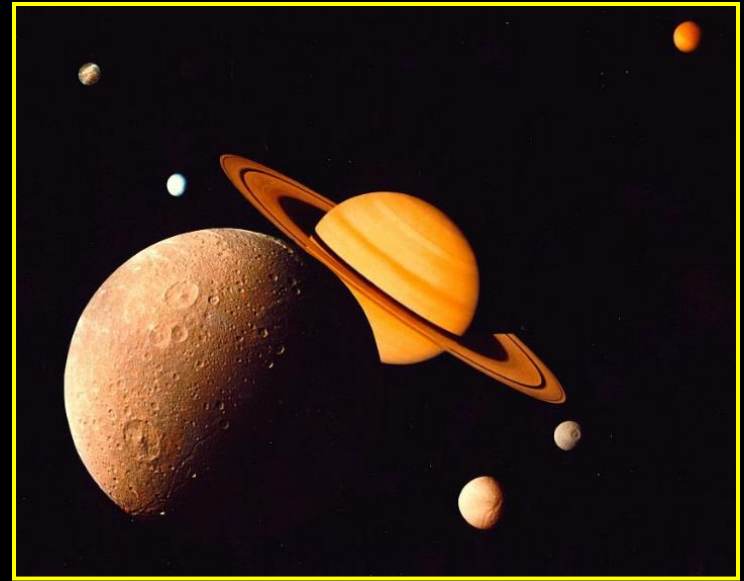
Saturn's rings are made up ice and ice covered rocks.





Saturn's Moons

Saturn has 53 moons that have been named and 9 moons awaiting confirmation.

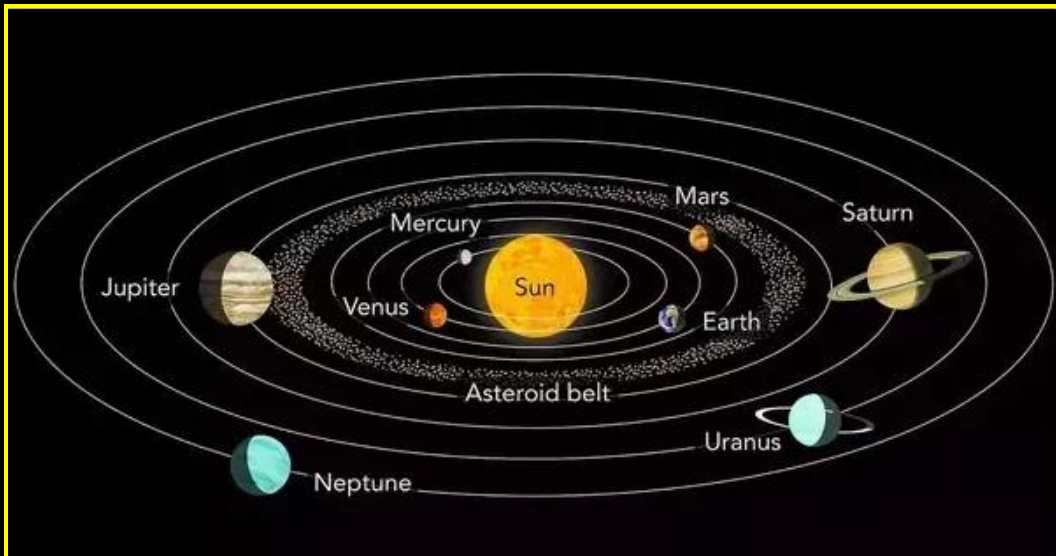


Saturn's largest moon, Titan, has an atmosphere and seas of liquid methane.



Uranus

Uranus, pronounced, Your-in-Us, is the seventh planet from the Sun. Uranus has rings, but they are very hard to see because they are composed of rocks and not ice.

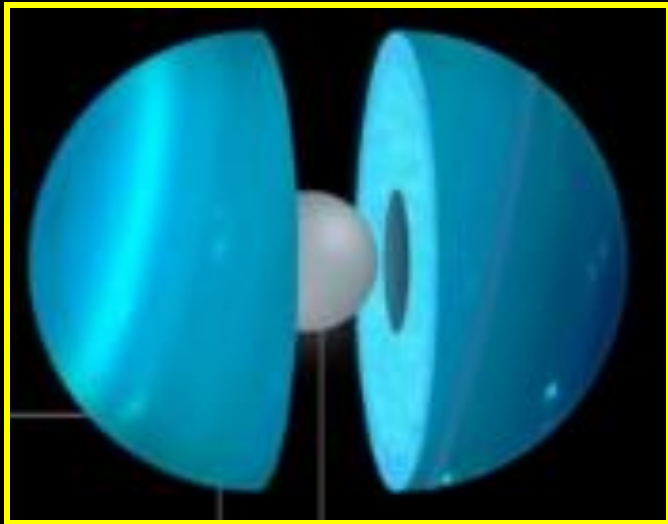
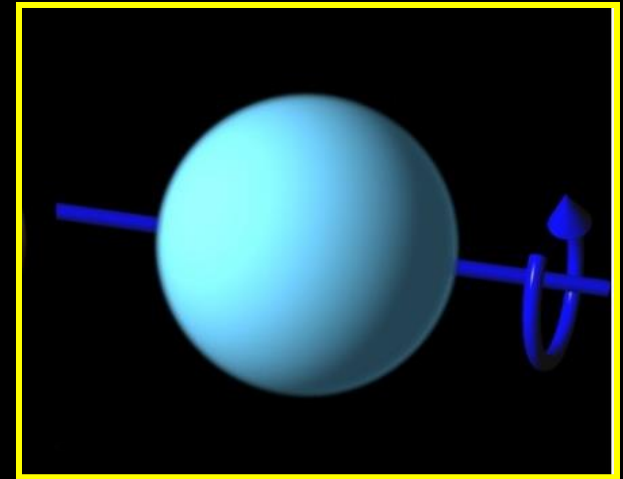


Uranus takes 84 years to complete one orbit around the Sun.



Uranus

Like Venus, Uranus rotates clockwise, or in retrograde, around its axis. However, Uranus rotates on its side.



Uranus is an ice giant, with a solid core covered with flowing icy materials.

Methane in its atmosphere makes it appear blue.



Moons of Uranus

Uranus has 27 known moons. All of the moons are named after Shakespeare characters.

MAJOR MOONS OF URANUS



TITANIA



OBERON



UMBRIEL



ARIEL

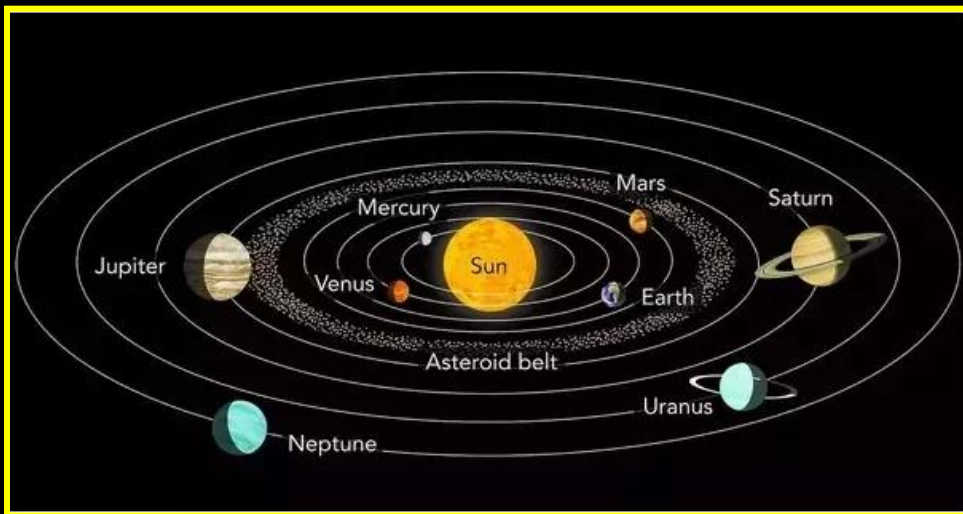
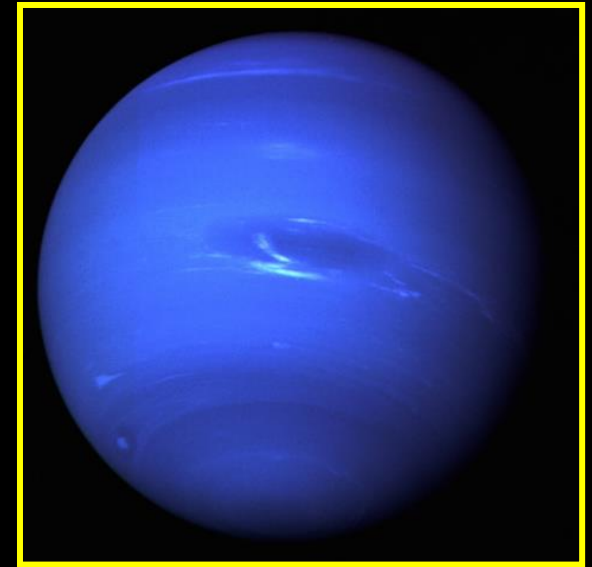


MIRANDA



Neptune

Neptune, the eighth planet, is the farthest planet from the Sun. Neptune also has rings that are very hard to see.

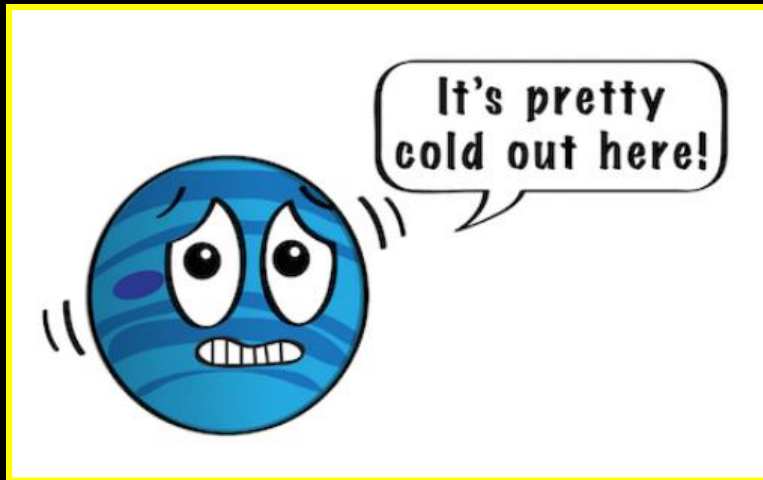
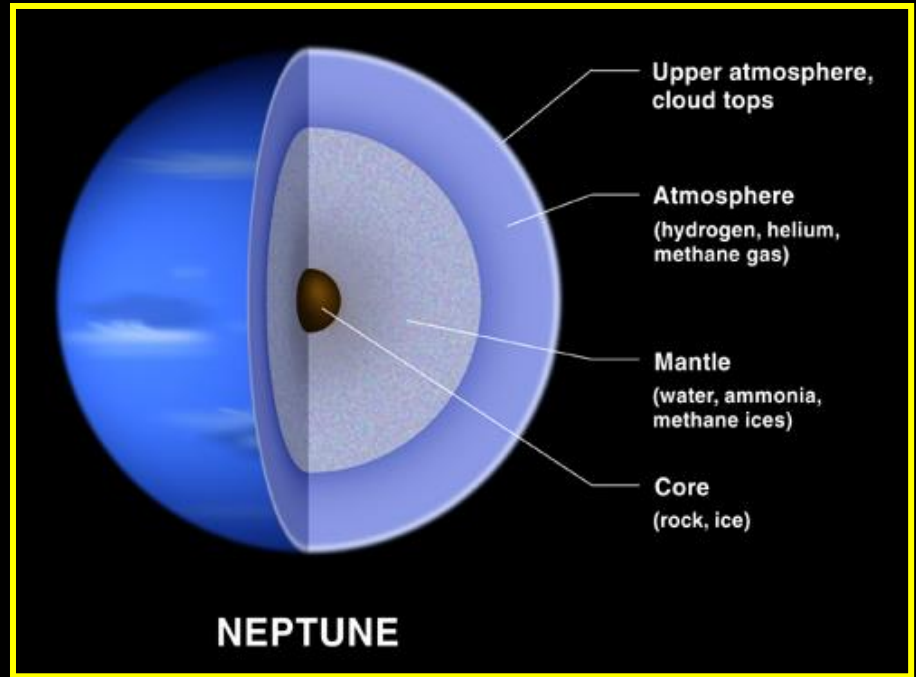


Neptune rotates about its axis every 16 hours and takes 165 Earth years to orbit the Sun.



Neptune

Neptune is also an ice giant with a solid Earth sized core covered with an icy soup of water, ammonia, and methane giving it a blue color.

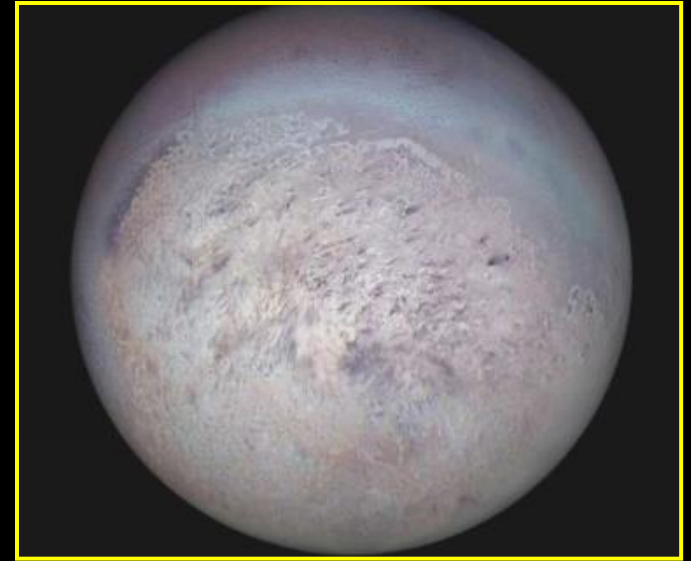


Being so far from the Sun, it is very cold, dark, and windy on Neptune.



Neptune' Moons

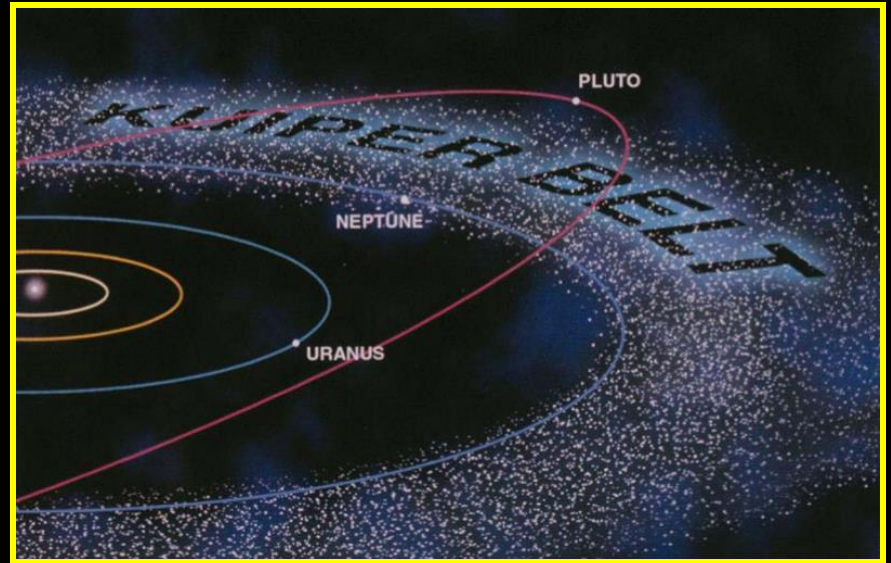
Neptune has 13 moons with Triton being the largest. Triton is unusual in that its orbit is opposite that of Neptune's rotation.



Triton is also unusual in that it is covered with frozen nitrogen and carbon monoxide.

Kuiper Belt

The Kuiper Belt, pronounced *ky-purr*, is found just outside Neptune's orbit.



The Kuiper Belt is similar to the Asteroid Belt except it contains mostly icy object, instead of rocky objects.



Comets originate the Kuiper Belt.

Kuiper Belt

The dwarf planet, Pluto, is the most well known object found in the Kuiper Belt.



Pluto was discovered before the Kuiper Belt. So, it was originally believed to just be a very odd planet. After the Kuiper Belt was discovered, along with several other objects similar in size, make-up, and behavior to Pluto, it was reclassified as a dwarf planet.

The End

