


HUMAN IN SPACE

eTwinning project

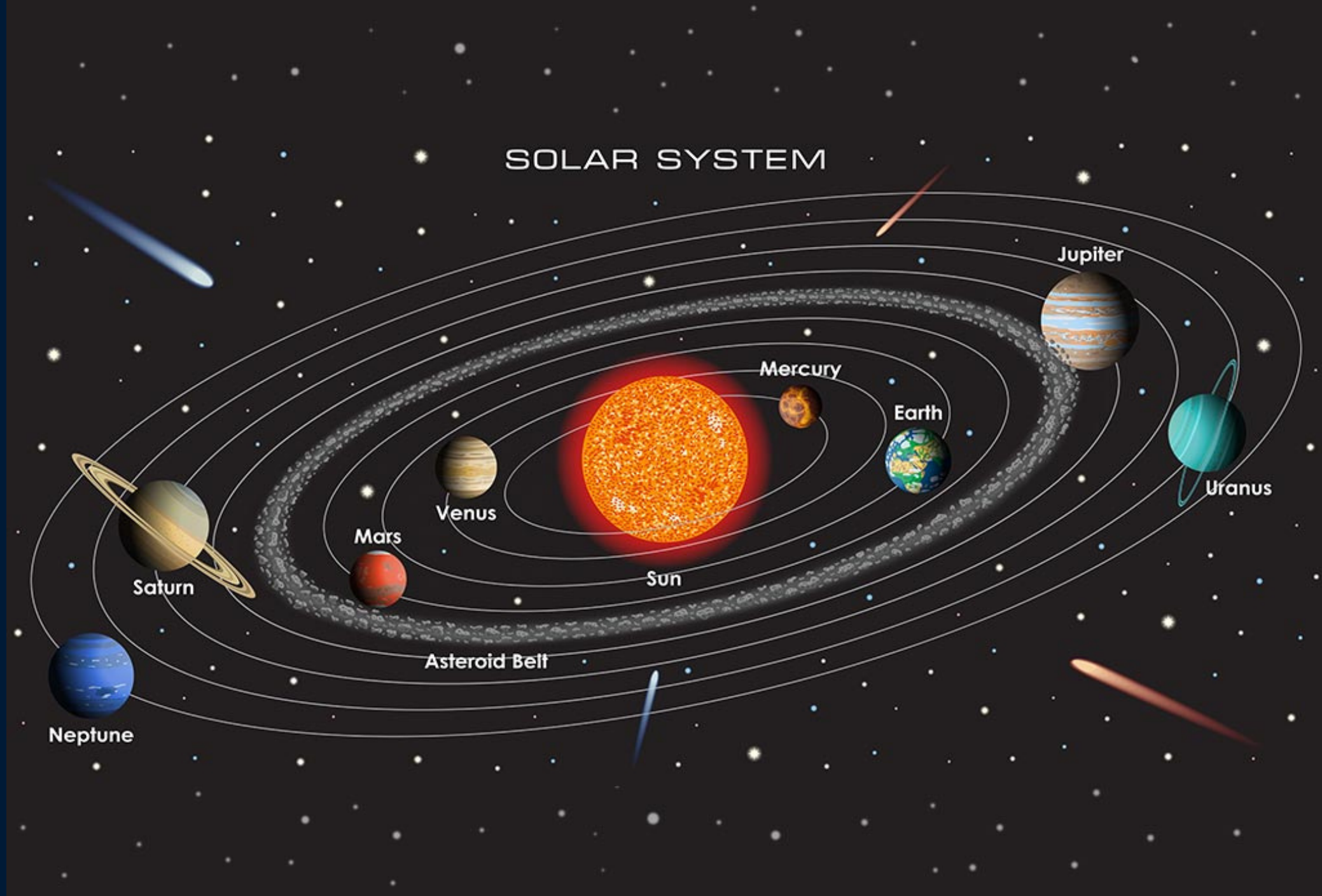
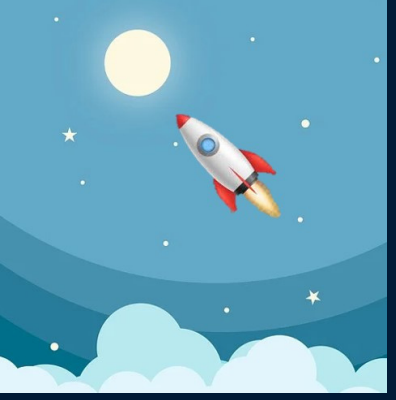


THE SOLAR SYSTEM

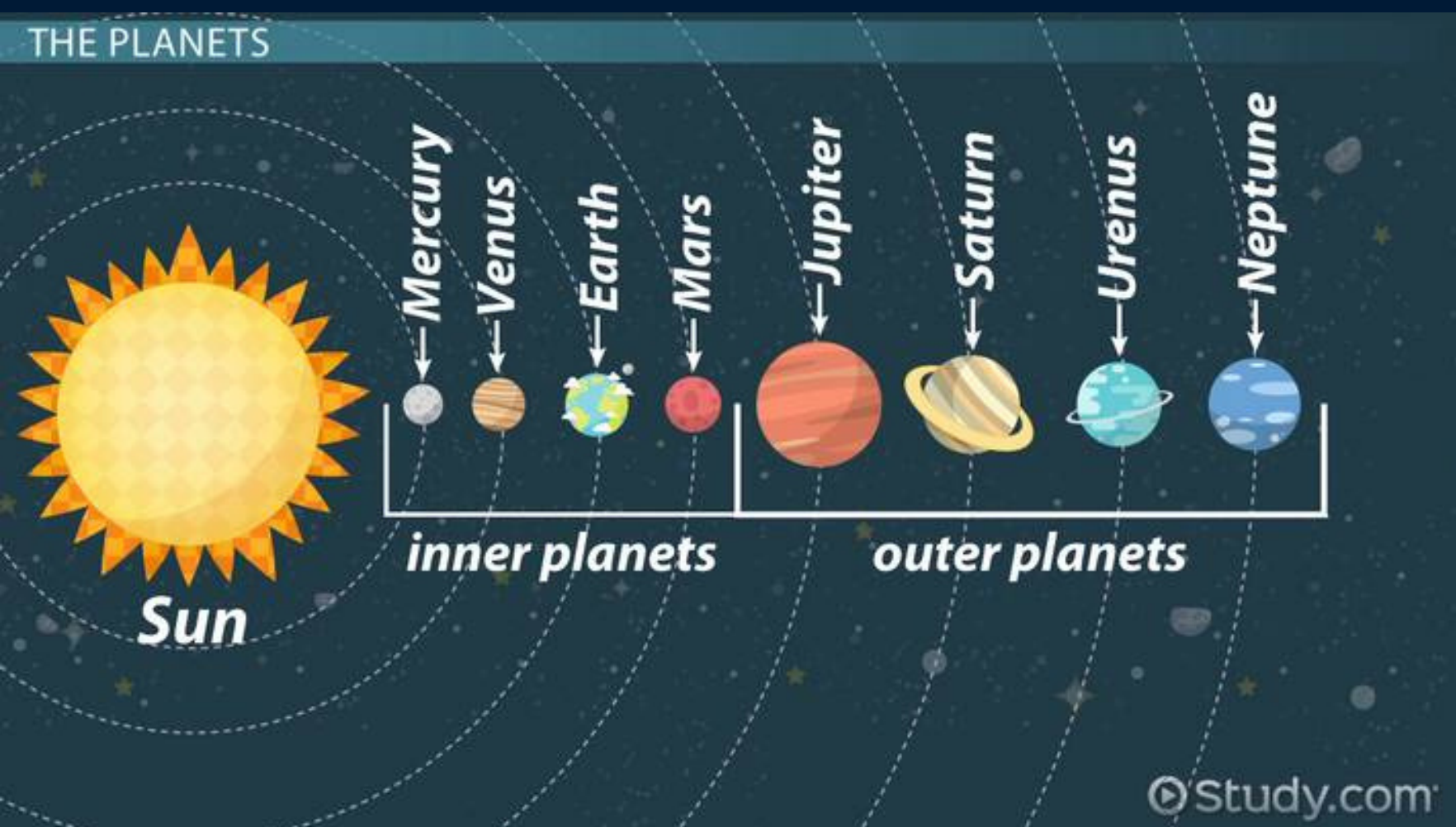
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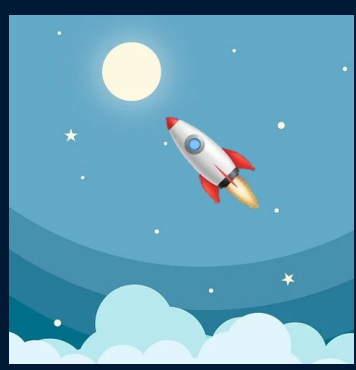


There are billions of galaxies in the Universe. Each galaxy has got billions of solar systems. Our galaxy, the Milky Way, has got up to 400 billion stars, and one of them is the Sun. It is in the centre of our Solar System and all the planets move around it. It is important for life on Earth because it gives us light and heat.



Our Solar system has got eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Scientists don't consider Pluto a planet anymore but a dwarf planet, because it is very small. So, the smallest planet in our solar system is Mercury and the biggest is Jupiter. Also, the closest planet to the Sun is Mercury.

The hottest planet of all is Venus. It has temperatures of about 460°C ! Neptune is the farthest planet from the Sun, and it is one of the coldest planets of the solar system along with Saturn and Uranus. Temperatures on Neptune can reach -220°C . It takes one second for a human to freeze on Uranus!



THE SUN



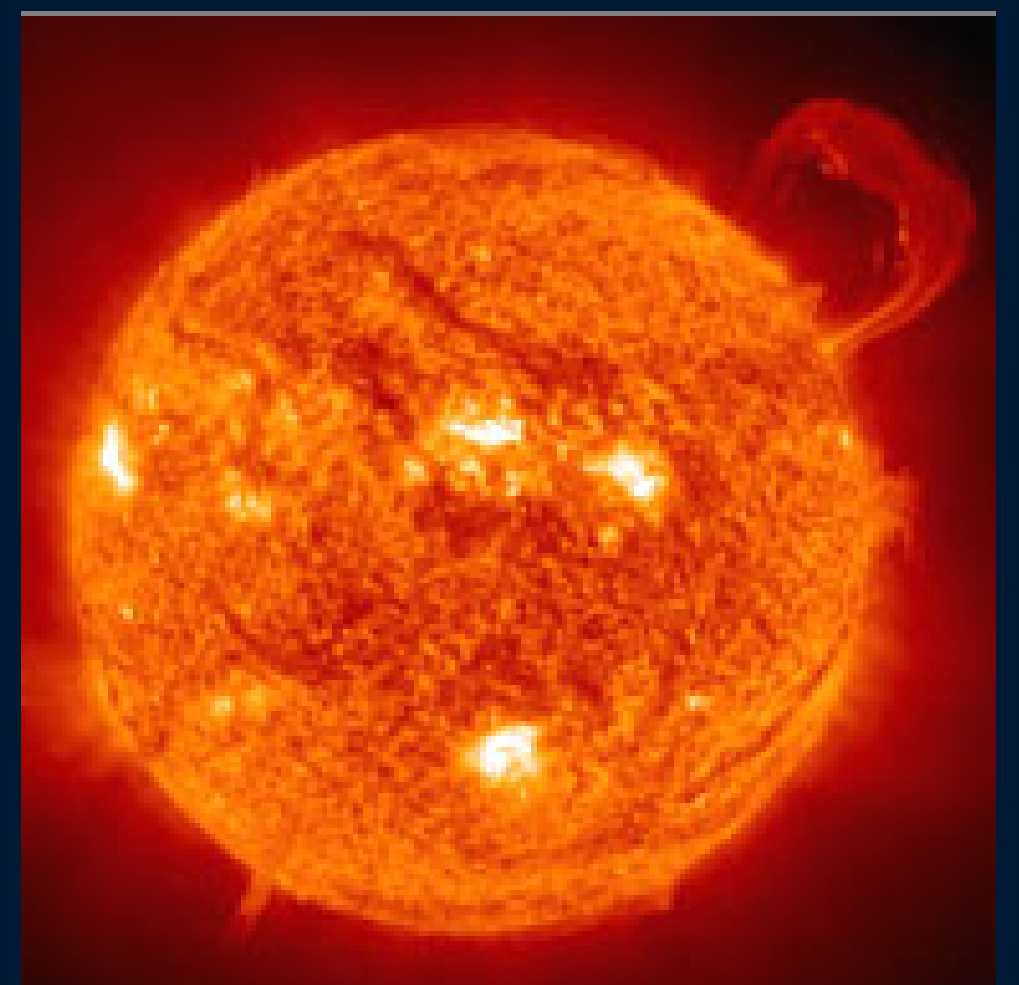
The Sun is the star at the center of the Solar System. It is a nearly perfect sphere of hot plasma, heated to incandescence by nuclear fusion reactions in its core, radiating the energy mainly as light and infrared radiation. It is by far the most important source of energy for life on Earth. Its diameter is about 1.39 million kilometres (864,000 miles), or 109 times that of Earth, and its mass is about 330,000 times that of Earth. The Sun is the brightest and closest star to the Earth, visible to the naked eye. It is 149.6 million km away from our planet. The Earth orbits the Sun.

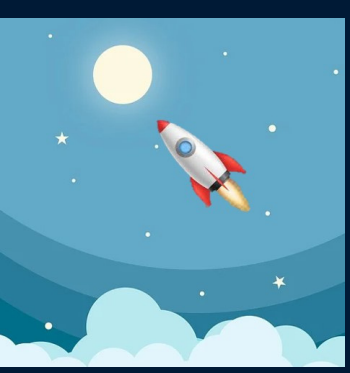


The Sun is mostly made of hydrogen (73%) and helium (25%) with much smaller quantities of heavier elements, including oxygen, carbon, neon, and iron. The temperature at its surface is about 5 500 degrees Celsius – more than 20 times hotter than an oven on maximum. In the centre, the temperature soars to about 15 million degrees Celsius and the gas is squeezed to about 10 times the density of lead.

At such high temperatures and pressures, the Sun becomes a nuclear reactor, where hydrogen is converted to helium. At the same time, huge amounts of radiation are produced. This finds its way to the surface as visible, infrared and ultraviolet light, and X-rays.

Every hour, the Sun ejects a billion tons of gas into space at a speed of up to 2 million km per hour. Even so, the Sun is so massive that it can continue burning for billions of years.





MERCURY



Distance from the Sun: 57,000,000km

Surface area: 74 800 000 km²

Radius: 2,439km

Size: 4900km

Satellites: 0

Mercury is the smallest and the closest planet to the Sun in the Solar System. Its orbit around the Sun takes 87.97 Earth days, the shortest of all the planets in the Solar System.

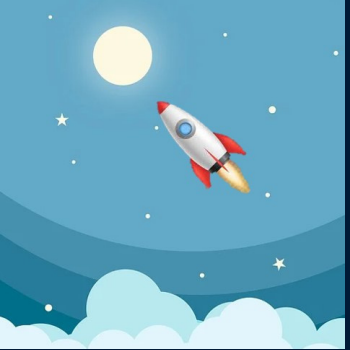
Mercury has a rocky body like the Earth. This is the second densest planet, after Earth. It has a large metallic core with a radius of about 2,074 km, about 85 percent of the planet's radius. There is evidence that it is partly molten, or liquid. Mercury's outer shell, comparable to Earth's outer shell (called the mantle and crust), is only about 400 kilometers thick.



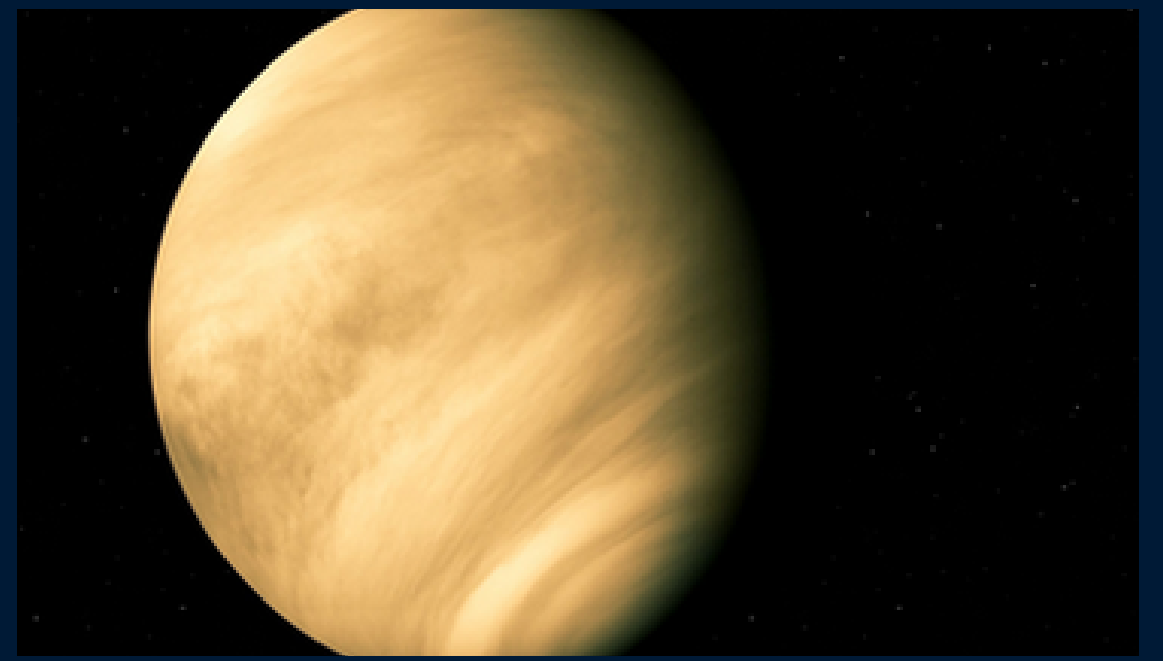
Mercury's surface resembles that of Earth's moon, scarred by many impact craters resulting from collisions with meteoroids and comets. Craters and features on Mercury are named after famous deceased artists, musicians or authors, including children's author Dr. Seuss and dance pioneer Alvin Ailey.

Despite its proximity to the Sun, Mercury is not the hottest planet in our solar system – that title belongs to nearby Venus, thanks to its dense atmosphere. Mercury's average surface temperature is 332°C

Mercury is appropriately named for the swiftest of the ancient Roman gods - Hermes (Mercury) was a god of commerce, messenger of the gods.



VENUS



Distance from the Sun: 108 200 000 km

Surface area: 4.6023×10^8 km²

Radius: 6 052 km

Surface: 8.87 m/s²

Mass: 4.8675×10^{24} kg

Satellites: 0

Venus is the second planet of the Solar System in terms of distance from the Sun. This is the third brightest celestial body visible in the sky, after the Sun and the Moon. Venus has a thick, toxic atmosphere filled with carbon dioxide and it's perpetually shrouded in thick, yellowish clouds of mostly sulfuric acid that trap heat, causing a runaway greenhouse effect. Venus has crushing air pressure at its surface – more than 90 times that of Earth – similar to the pressure you'd encounter a mile below the ocean on Earth.

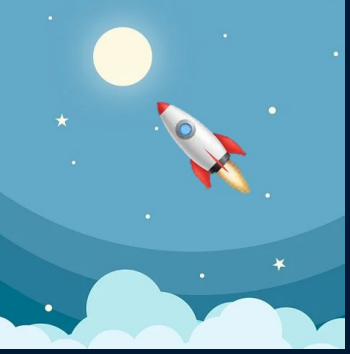


Venus has mountains, valleys, and tens of thousands of volcanoes. The highest mountain on Venus, Maxwell Montes, is 20,000 feet high (8.8 kilometers), similar to the highest mountain on Earth, Mount Everest. The landscape is dusty, and surface temperatures reach a scalding 880 degrees Fahrenheit (471 degrees Celsius). It's the hottest planet in our solar system, even though Mercury is closer to the Sun.

Venus can cast shadow and can be, on rare occasion, visible to the naked eye in broad daylight.

No human has visited Venus, but the spacecraft that have been sent to the surface of Venus do not last very long there. Venus' high surface temperatures over heat electronics in spacecraft in a short time.

It is named after the Roman goddess of love and beauty.



EARTH



Distance from the Sun: 150000000 km

Surface area: 510072000 km²

Mean radius: 6371.0 km

Mass: 5.97237×10^{24} kg

Satellites:

- 1 natural satellite: the Moon
- 5 quasi-satellites
- >1 800 operational artificial satellites billion years ago.
- >16 000 space debris

Our home planet is the third planet from the Sun, and the only place we know of so far that's inhabited by living things. Earth was formed some 4.54 billion years ago.

Earth is a rocky, terrestrial planet. It has a solid and active surface with mountains, valleys, canyons, plains and so much more. Earth is special because it is an ocean planet. Water covers 70% of Earth's surface. About 29% of Earth's surface is land consisting of continents and islands. The remaining 71% is covered with water, mostly by oceans but also by lakes, rivers, and other fresh water. Earth is also known as the "Blue Planet" because of its bluish appearance from the outer space.

Earth's atmosphere is made mostly of nitrogen and has plenty of oxygen for us to breathe. The atmosphere also protects us from incoming meteoroids, most of which break up before they can hit the surface. Earth has an Ozone layer which protects it from Sun's powerful and harmful UV rays.



As Earth orbits the Sun, it completes one rotation every 23.9 hours. It takes 365.25 days to complete one trip around the Sun. That extra quarter of a day presents a challenge to our calendar system, which counts one year as 365 days.

Earth is the only planet not named after a god.



MARS



Distance from the Sun: 227 900 000 km

Surface area: 144 800 000 km²

Radius: 3 390 km

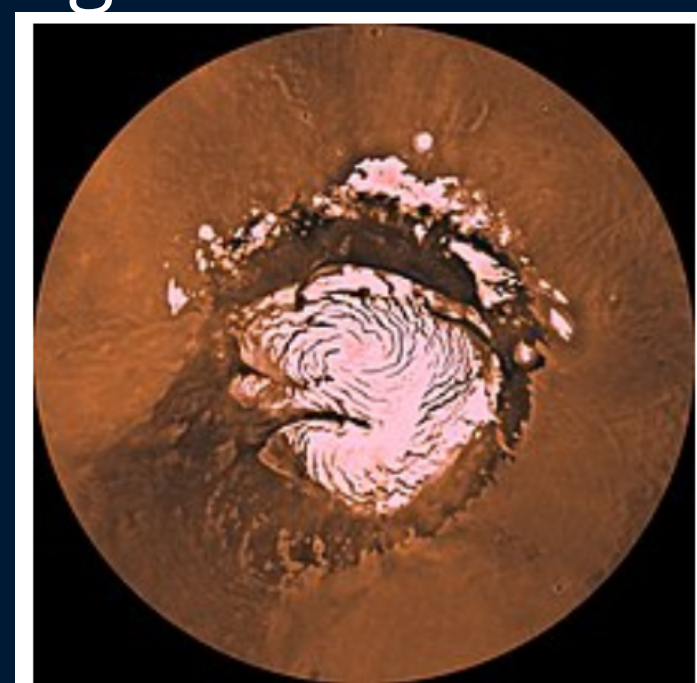
Surface gravity: 3,711 m/s²

Mass: 6.4171×10^{23} kg

Satellites: 2 - Phobos, Deimos

Mars is the fourth planet from the Sun in the Solar System. Named after the Roman god of war - Mars, it owes its color to a color that, when viewed from Earth, was associated by the ancient Romans with the conflagration of war. It is called „the Red Planet“.

Mars is a dusty, cold, desert world with a very thin atmosphere. This planet has seasons, polar ice caps, canyons, extinct volcanoes, and evidence that it was even more active in the past.



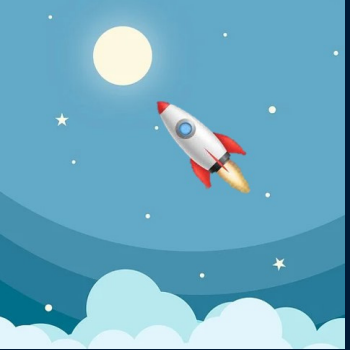
It's made of iron, nickel and sulfur. Surrounding the core is a rocky mantle between 770 and 1,170 miles (1,240 to 1,880 kilometers) thick, and above that, a crust made of iron, magnesium, aluminum, calcium and potassium. This crust is between 6 and 30 miles (10 to 50 kilometers) deep.

The Red Planet is actually many colors. At the surface we see colors such as brown, gold and tan. The reason Mars looks reddish is due to oxidization—or rusting—of iron in the rocks, regolith (Martian “soil”), and dust of Mars. This dust gets kicked up into the atmosphere and from a distance makes the planet appear mostly red.



Mars has a thin atmosphere made up mostly of carbon dioxide, nitrogen and argon gases. The temperature on Mars can be as high as 20 degrees Celsius or as low as about -153 degrees Celsius. And because the atmosphere is so thin, heat from the Sun easily escapes this planet.

Occasionally, winds on Mars are strong enough to create dust storms that cover much of the planet. After such storms, it can be months before all of the dust settles.



JUPITER



Distance from the Sun: 467 606 930 km

Surface area: 61,418,738,571 km²

Mean Radius: 69,911 km

Surface gravity: 24.79m/s²

Mass: 1.8982×10^{27} kg

Satellites: 80

Jupiter is the largest planet in the solar system.

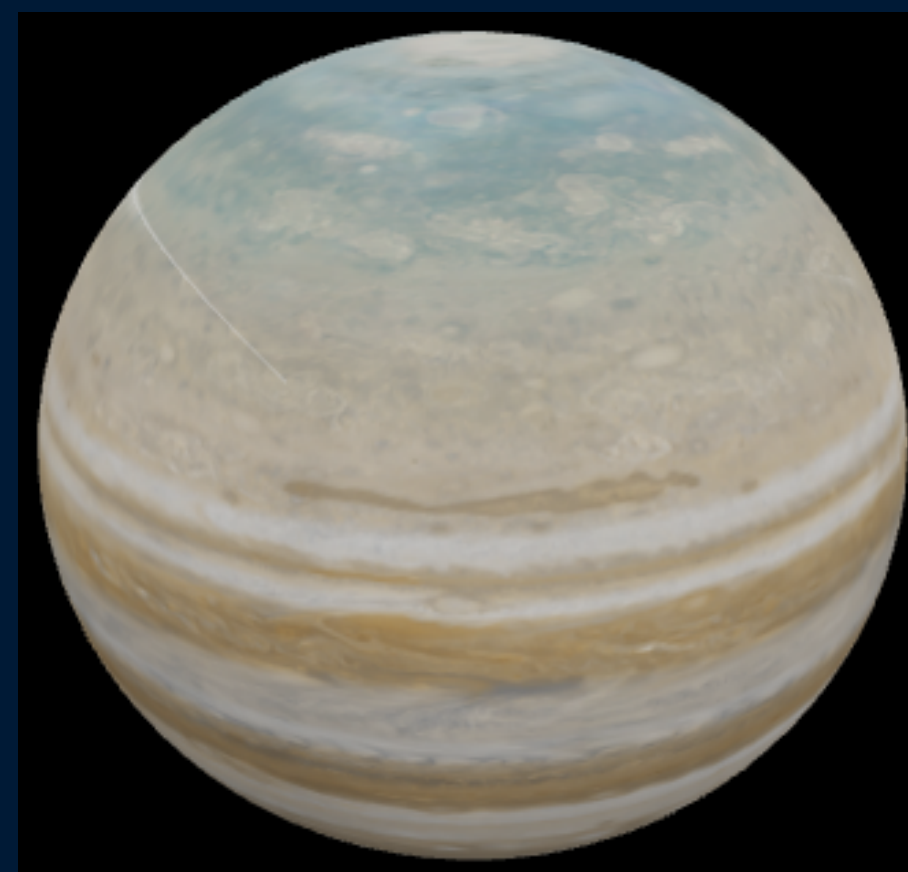
It is a gas giant with a mass more than two and a half times that of all the other planets in the Solar System combined, but slightly less than one-thousandth the mass of the Sun. Jupiter is the third-brightest natural object in the Earth's night sky after the Moon and Venus

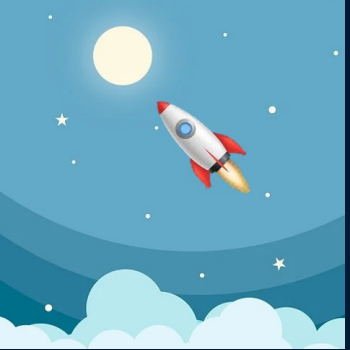


Jupiter's familiar stripes and swirls are actually cold, windy clouds of ammonia and water, floating in an atmosphere of hydrogen and helium. Jupiter's iconic Great Red Spot is a giant storm bigger than Earth that has raged for hundreds of years.

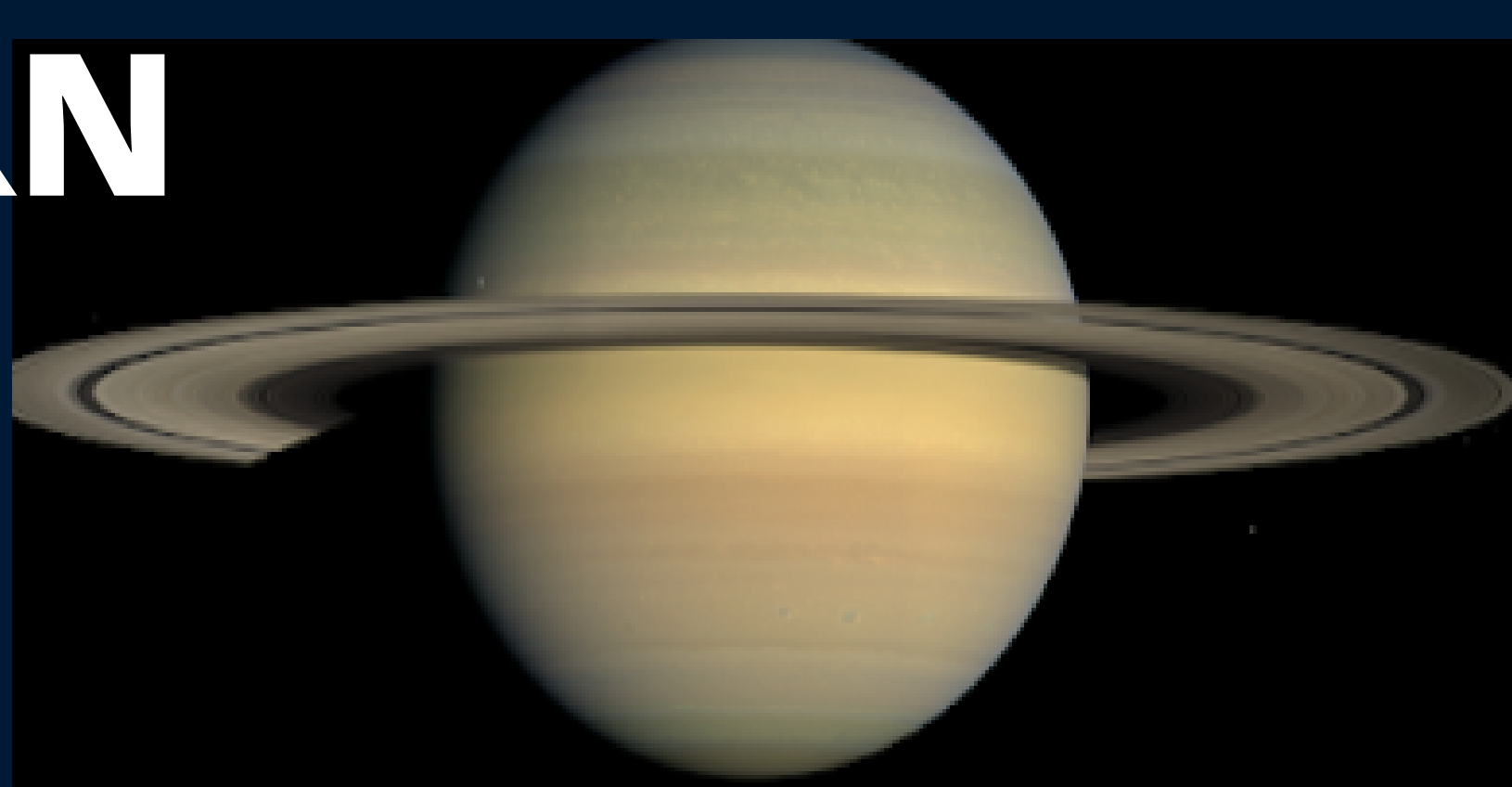
The composition of Jupiter is similar to that of the Sun—mostly hydrogen and helium. Deep in the atmosphere, pressure and temperature increase, compressing the hydrogen gas into a liquid. This gives Jupiter the largest ocean in the solar system—an ocean made of hydrogen instead of water. As a gas giant, Jupiter doesn't have a true surface. The planet is mostly swirling gases and liquids. While a spacecraft would have nowhere to land on Jupiter, it wouldn't be able to fly through unscathed either. The extreme pressures and temperatures deep inside the planet crush, melt and vaporize spacecraft trying to fly into the planet.

Jupiter has the shortest day in the solar system. One day on Jupiter takes only about 10 hours (the time it takes for Jupiter to rotate or spin around once), and Jupiter makes a complete orbit around the Sun (a year in Jovian time) in about 12 Earth years (4,333 Earth days).





SATURN



Distance from the Sun: $1,434 \times 9$ km
Surface area: 4.27×10^{10} km²
Radius: 58,232 km
Mass: 5.6834×10^{26} kg
Satelites: 82

Saturn is a gas giant, the sixth planet in the solar system by distance from the Sun, second only to Jupiter by mass and size. This planet is a massive ball made mostly of hydrogen and helium.



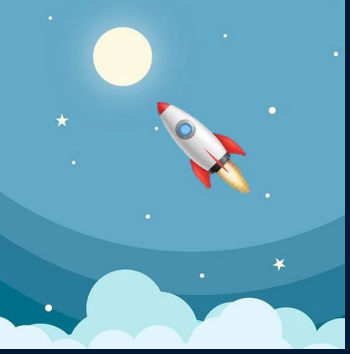
Saturn has the most spectacular ring system, with seven rings and several spaces and divisions between them. These rings are made of chunks of ice and rock.

Saturn is blanketed with clouds that appear as faint stripes, jet streams and storms. The planet is many different shades of yellow, brown and grey. More than any other planet in our solar system, Saturn's weather is determined by conditions deep inside the planet than by the sun. This is partly because Saturn is so far from the Sun and generates heat internally. Cloud-top temperature is equal about -139 °C.

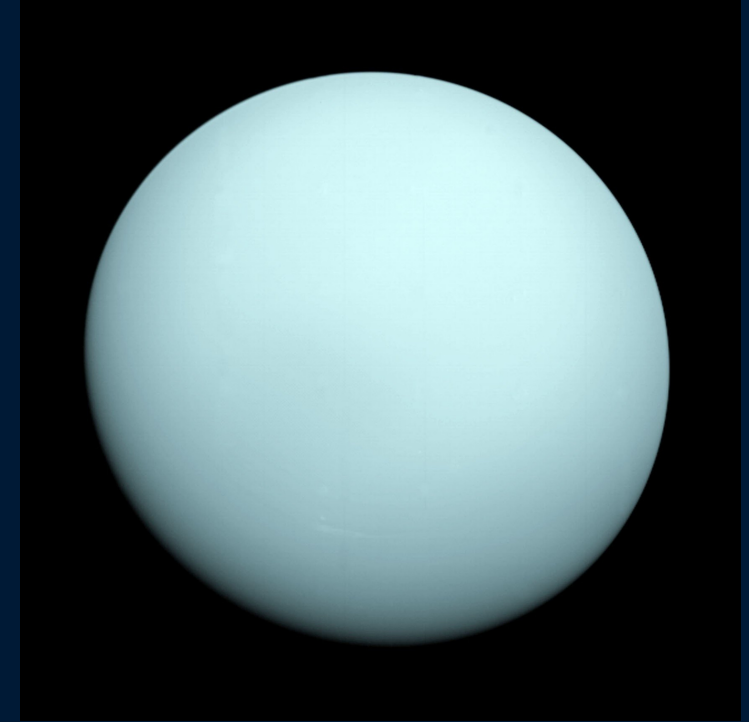
The farthest planet from Earth discovered by the unaided human eye, Saturn has been known since ancient times. The planet is named for the Roman god of agriculture and wealth, who was also the father of Jupiter. The first astronomers thought the rings were moons. When Galileo first saw Saturn in 1610, he could see its rings, but he did not know what he was looking at. He thought the rings might be two large moons stuck to either side of Saturn. It wasn't until 1655 that the Dutch astronomer Christian Huygens used a better telescope to observe Saturn.

Saturn's environment is not conducive to life as we know it. The temperatures, pressures and materials that characterize this planet are most likely too extreme and volatile for organisms to adapt to.





URANUS



Distance from the Sun: 2,800,000,000 km

Surface area: $8,084 \times 10^9 \text{ km}^2$

Size (diameter): 51,800 km

Satelites: 27

Average temperature: -214°C

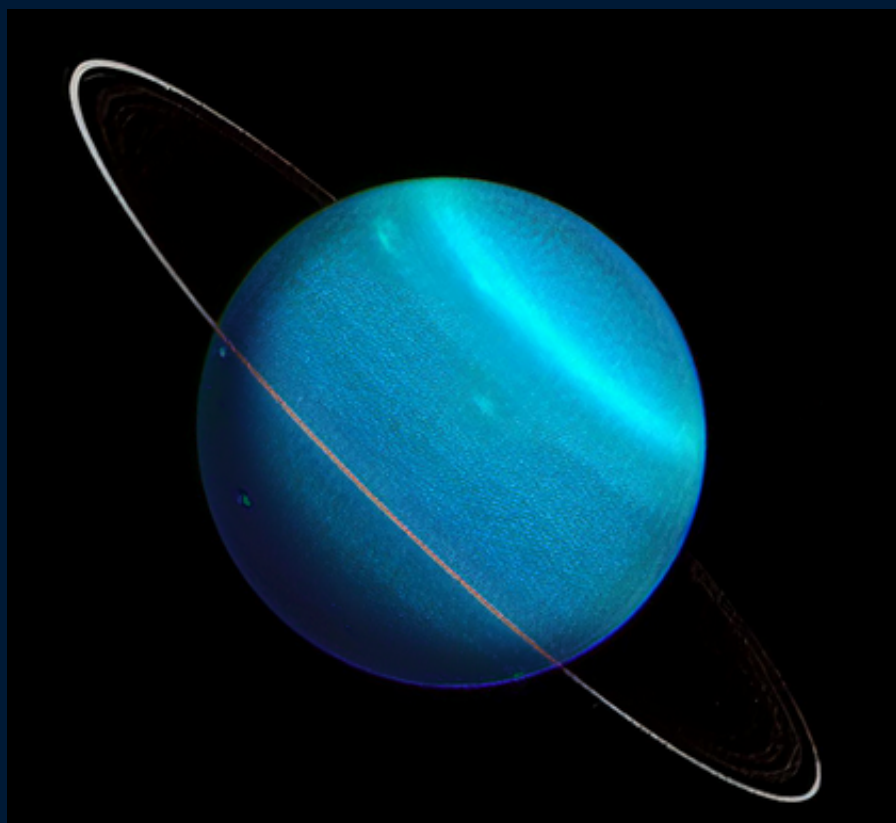
Uranus is the seventh planet from the Sun. It has the third-largest planetary radius and fourth-largest planetary mass in the Solar System.

Uranus is an ice giant. Most of its mass is a hot, dense fluid of "icy" materials – water, methane and ammonia – above a small rocky core.

Uranus has an atmosphere made mostly of molecular hydrogen and atomic helium, with a small amount of methane. The methane makes Uranus blue.

Uranus is known as the "sideways planet" because it rotates on its side.

Uranus' unique sideways rotation makes for weird seasons. The planet's north pole experiences 21 years of nighttime in winter, 21 years of daytime in summer and 42 years of day and night in the spring and fall.

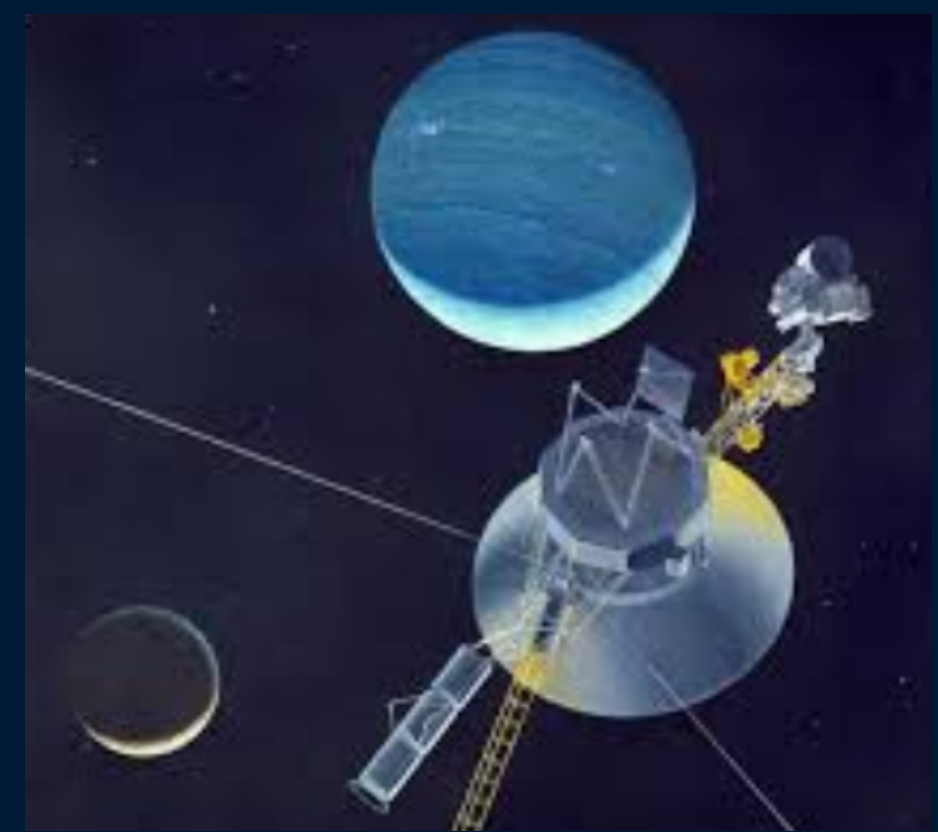


Like Saturn, Jupiter and Neptune, Uranus is a ringed planet. Uranus has 13 known rings. The inner rings are narrow and dark and the outer rings are brightly colored.

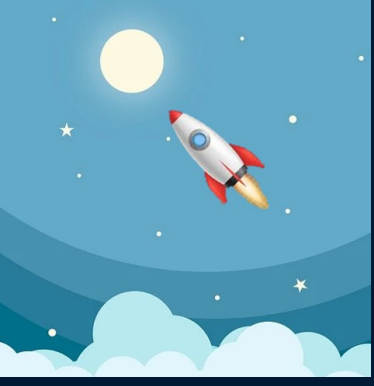
Uranus takes about 17 hours to rotate once (a Uranian day), and about 84 Earth years to complete an orbit of the Sun (a Uranian year).

Voyager 2 is the only spacecraft to fly by Uranus. No spacecraft has orbited this distant planet to study it at length and up close.

Uranus cannot support life as we know it.



Its name is a reference to the Greek god of the sky, Uranus.



NEPTUNE



Distance from the Sun: $4,495 \times 10^9$ km

Surface area: $7,6408 \times 10^9$ km²

Radius: 24 630 km

Mass: $1,0243 \times 10^{26}$ kg

Satelites: 14

Neptune is the eighth and most distant major planet orbiting our Sun—is dark, cold and whipped by supersonic winds. It was the first planet located through mathematical calculations, rather than by telescope.

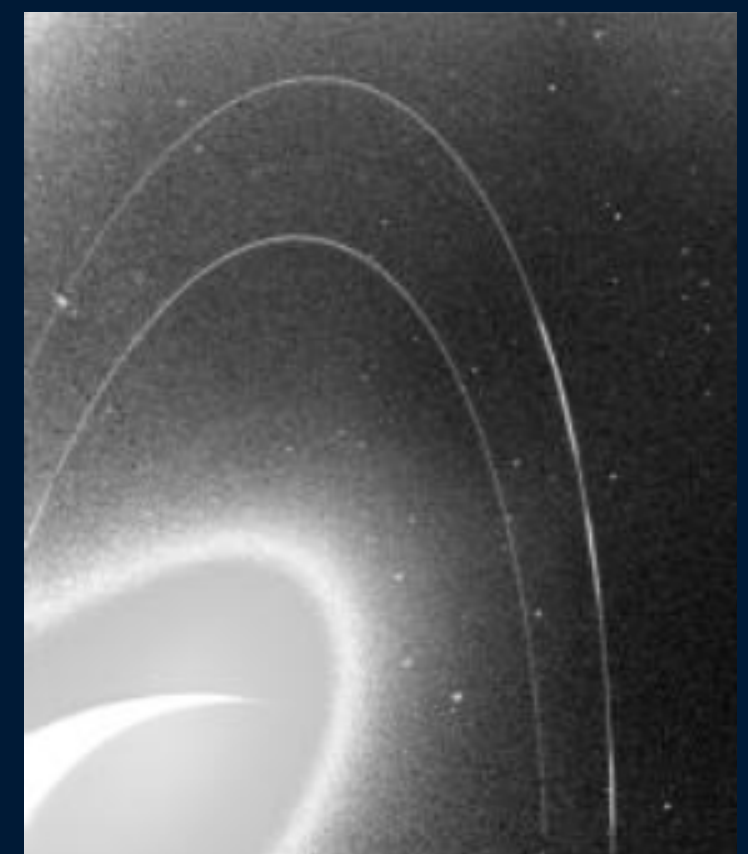
A giant planet, Neptune's atmosphere is made of hydrogen, helium, and methane. These components, specifically methane, are what give the planet its blue color. This is because methane's gaseous composition absorbs red light and reflects blue light outward. Its interior is made of ices, with a possible rocky core. Although the atmosphere is very cold (-220 degrees C), the blue planet has some very strong winds and violent storms. Voyager 2 imaged a huge spot the size of the Earth.

Neptune is one of two ice giants in the outer Solar System (the other is Uranus). 80 percent or more of the planet's mass is made up of a hot dense fluid of "icy" materials—water, methane and ammonia—above a small, rocky core. Neptune does not have a solid surface.

It is 57 times bigger than the Earth, but spins quite rapidly – one day lasts only 16 hours 7 minutes. Its average distance from the Sun is about 4,500 million km, and one year on Neptune lasts for almost 165 Earth years.

Neptune has at least five dark, narrow rings (named after Galle, Le Verrier, Adams and others who worked to discover the planet).

By far the largest is Triton, an icy world that is bigger than Pluto. Triton is very cold, so its thin atmosphere has frozen onto the surface. However, it does have many active ice volcanoes that spurt plumes of gas and dust. Triton is also unusual because it travels “the wrong way” (east to west) around Neptune.



Sources:

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