

**Andrew Gendron**

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**Mr. Ling**

**HOTU (green)**

# **SATURN**



In our solar system we have many different planets. Among all these planets, one of them is the planet Saturn. Saturn is probably the most beautiful planet in our solar system. Saturn's rings are the key things that make the planet Saturn so extraordinary. Without these rings Saturn would not be as glorious as it is today. Scientists got a lot of information on the planet Saturn during the Cassini mission in 1998-2004. Scientists are continually finding out more about Saturn, its rings and its moons and hope to know everything they can about Saturn in the near future.

The rings of Saturn are one of the most mysterious and majestic things in our entire solar system. Saturn's rings are made up of 93 percent ice particles, 7 percent of amorphous carbon and smaller amounts of rock debris and dust. The materials making up Saturn's rings range in size from specks of dust to the size of a small automobile. These same rings are twenty meters in thickness and they extend from 6,630 km to 120,700 km above Saturn's equator (Saturn, Wikipedia, 08).

Saturn is one of the four gas giants, the 2<sup>nd</sup> largest planet in the solar system and is the 6<sup>th</sup> planet from the sun. Saturn is very large with an equatorial

diameter of 119,300 kilometers. Saturn's day is 10 hours 39 minutes long, and it takes 29.5 Earth years for Saturn to revolve around the sun once.

Saturn's atmosphere is composed of hydrogen, helium and methane. Saturn is the only planet lighter than water. So if there were ever a body of water big enough for Saturn to fit in it, Saturn would float. Saturn's winds are incredible; at high speeds they reach 500 meters a second (Robert Goddard, 08). Saturn has a planetary magnetic field weaker than the one around Earth and also weaker than the more powerful magnetic field around Jupiter.

Saturn is named after the Roman god Saturnus, which is why the symbol for Saturn represents Saturnus' sickle (Robert Goddard, 08). There are sixty known moons that orbit Saturn. Titan is Saturn's largest moon and the only moon in the solar system that has a significant atmosphere.

Saturn is about 95 times the size of earth and its internal temperature is about 11,700 degrees Celsius. Saturn also has a core that is 9-22 times the size of earth's core and Saturn radiates 2.5 times more energy into space than it receives from the sun. This is made possible because most of the extra energy is generated by the [Kelvin-Helmholtz mechanism](#) (slow gravitational compression) (Robert Goddard, 08).

Saturn is 887,000,000 miles from the sun. Therefore, Saturn is extremely cold. Saturn has an average temperature of -300 degrees F. Saturn also has upper clouds made of ammonia ice crystals and lower clouds made of ammonium hydrosulfide or water which can reach the temperature of -300 degrees F (NOAA's 08).

Saturn has a banded pattern similar to Jupiter's but Saturn's bands are much fainter.

“Saturn's usually bland atmosphere occasionally exhibits long-lived ovals and other features common on Jupiter. In 1990, the [Hubble Space Telescope](#) observed an enormous white cloud near Saturn's equator which was not present during the Voyager encounters, and, in 1994, another smaller storm was observed. The 1990 storm was an example of a [Great White Spot](#), a unique but short-lived phenomenon which occurs once every Saturnian year, or roughly every 30 Earth years, around the time of the northern hemisphere's [summer solstice](#).<sup>[21]</sup> Previous Great White Spots were observed in 1876, 1903, 1933, and 1960, with the 1933 storm being the most famous. If the periodicity is maintained, another storm will occur in about 2020 (Saturn, Wikipedia, 08).

In recent images from the [Cassini spacecraft](#), Saturn's northern hemisphere appears a bright blue, similar to Uranus. This blue color cannot currently be observed from Earth, because Saturn's rings are currently blocking its northern hemisphere ( Saturn, Wikipedia, 08).”

In 1998 the European Space Agency, the Italian Space Agency and NASA started the Cassini Orbiters mission. The scientists sent the Cassini probe to Saturn to study the planet itself and its moons. They also wanted to study the dynamical behavior of Saturn's atmosphere at cloud level, study Titan's clouds, hazes and its surface, and study Saturn's rings and the history of Saturn's moons. This mission took a good seven years (1998-2004), and scientists learned much about Saturn and its moons from this important space expedition.

The Cassini probe was equipped for almost anything. The probe had a radar mapper, a CCD imaging system, a visible/infrared mapping spectrometer and much more to help make its mission successful (NASA, Cassini. National Space Science Data Center, 08).

Saturn's rings were first observed by Galileo Galilei in 1610 with his telescope. In 1612 the rings of Saturn were oriented directly at earth and the rings appeared to vanish. This astounded Galileo and he wondered "Has Saturn swallowed his children?". Then in the year 1613, the rings reappeared again, further confusing Galileo. In 1655, [Christiaan Huygens](#) became the first person to suggest that Saturn was surrounded by a ring. Using a telescope that was far superior to those available to Galileo and found out more about Saturn's rings ( Saturn, Wikipedia, 08).

"There are two main theories regarding the origin of Saturn's rings. One theory, originally discovered by [Édouard Roche](#) in the 19th century, is that the rings were once a moon of Saturn whose orbit decayed until it came close enough to be ripped apart by [tidal forces](#). A variation of this theory is that the moon disintegrated after being struck by a large [comet](#) or [asteroid](#). The second theory is that the rings were never part of a moon, but are instead left over from the original [nebular](#) material from which Saturn formed ( Saturn, Wikipedia, 08).

Saturn's rings are one of the most interesting and most mysterious things in our solar system. Some things about Saturn and its rings still remain a mystery to our many scientists. The Cassini mission was a complete success by giving the scientists so much valuable information. But the mission did not answer all of

their questions that they wanted to know. Our scientists are still looking for answers and even life. If we ever did find life on Saturn would we worry about it? Or would our scientists be thrilled with their discovery and study it further? For example, scientists could send a probe or ship up there to retrieve some data/proof. If scientists did find life would they tell the public, or would they be worried about our reaction and keep it a secret? So many questions that we do not know, but still we wonder about them and how they could change the way we think about our universe.



“This [image of Saturn](#) was taken by NASA's Cassini spacecraft when it was behind Saturn. In other words, [the Sun](#) is completely obscured by Saturn, and illuminating it from behind. The tiny speck in the upper, left-hand side of [Saturn's rings](#) is our own home planet [Earth](#).”

# Works Cited

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