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Summary Article: **Saturn**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Sixth planet from the Sun, and the second-largest in the Solar System, encircled by bright and easily visible equatorial rings. Viewed through a telescope it is ochre. Its polar diameter is 12,000 km/7,450 mi smaller than its equatorial diameter, a result of its fast rotation and low density, the lowest of any planet. Its mass is 95 times that of the Earth and its magnetic field 1,000

times stronger.

Mean distance from the Sun 1.427 billion km/0.886 billion mi

Equatorial diameter 120,000 km/75,000 mi

Rotational period 10 hours 14 minutes at equator, 10 hours 40 minutes at higher latitudes

Year 29.46 Earth years

Atmosphere visible surface consists of swirling clouds, probably made of frozen ammonia at a temperature of $-170^{\circ}\text{C}/-274^{\circ}\text{F}$, although the markings in the clouds are not as prominent as Jupiter's. The Voyager probes, visiting in 1980 and 1981, found winds reaching 1,800 kph/1,100 mph

Surface Saturn is believed to have a small core of rock and iron, encased in ice and topped by a deep layer of liquid hydrogen

Satellites as of 2013, 62 moons were known, more than for any other planet. The largest moon, Titan, has a dense atmosphere

Rings the rings visible from Earth begin about 14,000 km/9,000 mi from the planet's cloud tops and extend out to about 76,000 km/47,000 mi. Made of small chunks of ice and rock (averaging 1 m/3.3 ft across), they are 275,000 km/170,000 mi rim to rim, but only 100 m/300 ft thick. The Voyager probes showed that the rings actually consist of thousands of closely spaced ringlets, looking like the grooves in a gramophone record. In 2004 a new ring around Saturn was reported by astronomers. They detected a 300-km/186-mi-wide dust ring located 1,200 km/746 mi beyond the main ring system of Saturn, between the A and the F rings.

From Earth, Saturn's rings appear to be divided into three main sections. Ring A, the outermost, is separated from ring B, the brightest, by the Cassini division, named after its discoverer the Italian astronomer Giovanni Cassini, which is 3,000 km/2,000 mi wide; the inner, transparent ring C is also called the Crepe ring. Each ringlet of the rings is made of a swarm of icy particles like snowballs, a few centimetres to a few metres in diameter. Outside the A ring is the narrow and faint F ring, which the Voyagers showed to be twisted or braided. The rings of Saturn could be the remains of a shattered moon, or they may always have existed in their present form.

The Cassini-Huygens space probe, developed jointly by NASA and the European Space Agency, was launched in October 1997 and went into orbit around Saturn in 2004. In December of that year the lander Huygens separated from Cassini, and in January 2005 it descended to the surface of Titan. The

Cassini mission was extended in 2008 and again in 2010, and may continue to explore the Saturnian system until 2017.

A flood of discoveries of Saturnian satellites was made in the 21st century. During 2005 astronomers using the Subaru telescope on Mauna Kea, Hawaii, announced the discovery of 12 satellites. In 2006 nine more were discovered with the same instrument. In the following year, three more satellites were discovered, and in later years, still more. Many of the smaller moons orbit Saturn in the opposite direction to the planet's larger moons, indicating that they have probably been captured by Saturn's gravitational pull.

In 2005 scientists announced the discovery of an atmosphere surrounding Enceladus, one of Saturn's moons. Measurements from the Cassini space probe showed that a thin water vapour atmosphere surrounds the moon. The atmosphere is too thin to be visible and was detected by scientists using the probe's magnetometer to measure variations in Saturn's magnetic field caused by interactions with the moon's atmosphere.

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