

A Nautilus Traveler's Advisory to Saturn

Intrepid explorers who long to walk along the face of Saturn and stare up at the rings encircling the planet will be disappointed. The planet is a gas giant and has no solid surface. Swirling clouds of hydrogen, helium, ammonia, and methane race across the planet propelled by jet streams, high pressure systems, and high winds that whip the gasses around the core at speeds as high as 1,500 kilometers per second along the equator.

Winds are not the only form of turbulent weather to be seen at Saturn. The planet also emits electrical bursts every ten hours and ten minutes. The bursts indicate that an enormous electrical storm rages in Saturn's atmosphere about four degrees north of the equator. This storm covers 35,000 miles and its ferocity never diminishes. If you visit Saturn, don't bother getting a weather forecast. The weather never changes. Each storm stays at its own latitude and wind velocities never change. In addition, the storms always move in a straight line.

The interior hidden beneath the riotous winds and lightening bolts consists of an enormous ball of hydrogen and helium where temperatures hover at a frosty 140 degrees Kelvin (133 degrees below zero Fahrenheit or 92 degrees below zero Celsius). Saturn's rocky iron core is twice the diameter of Earth's and so compressed that it may contain 20 times the mass of Earth. Despite this, Saturn is the lightest planet in the Solar System.

All planets seem to float in the sky, but Saturn is the only one that can float in water. Because its average density is only seven tenths of a gram per cubic centimeter, if you placed the planet in the middle of a large ocean, it would float on the water.

Of course the primary tourist attraction on Saturn are the rings. Seven rings composed of thousands of ringlets encircle Saturn giving it a distinctive look. These are rings made up of innumerable small icy particles, each in its own orbit. Particles of ice and frosted rock range from football sized rocks to motes of dust in a belt tens of meters to tens of kilometers thick and range in thickness from 30 to 25,000 kilometers wide.

Scientists believe the rings may have resulted when a moon or a passing body ventured too close to Saturn and was torn apart by great tidal forces or when large orbiting objects collided with the planet. Unable either to form into a moon or to drift away from each other, individual ring particles are now held in place by the gravitational pulls of Saturn and its moons.

A trip to Saturn would not be complete without a side trip to a few of its 18 moons. These moons, located in and near the rings, are intriguing destinations in their own right. Here is a glimpse of a few of them.

If you have only a limited amount of time to visit the moons, don't miss Titan. It is the only Saturnian moon with an atmosphere. This nitrogen-based atmosphere, similar in density and composition to the atmosphere on Earth four billion years ago, may hold answers to questions about the development of life on our planet. Some scientists theorize that photochemistry may be converting Titan's methane to ethane, acetylene, ethylene, and, in combination with nitrogen, hydrogen cyanide. The latter is a building block to amino acids.

However, the similarity to conditions on Earth ends there. The temperature on Titan is much colder (290 degrees below zero Fahrenheit or 179 degrees below zero

Celsius) and the gravity is only one fifth that of Earth. The moon is awash in a polluted ocean of hydrocarbons and dotted with islands of ice made of water. Scientists believe that a frigid rain from methane clouds pounds the planet, covering the islands with powdery debris and the ocean bottom with a gooey sludge. Rivers of methane cut through methane glaciers, playing the same role on Titan that water plays on Earth.

The traveler looking for the unusual should visit some of the other Saturnian moons as well. Enceladus, is coated with unusually pure water ice. Because of this, it is the Solar System's most reflective body. Scientists theorize that geysers on the moon erupt and the water falls back to the surface uncontaminated by dust or rocks to form a frozen mirror-like surface.

Mimas has a giant impact crater that covers more than a third of its diameter. Because of this, the moon has been nicknamed The Death Star after the evil Empire's starship in Star Wars.

Phoebe, the outermost moon, travels in the opposite direction of the other satellites and is reddish in color. One theory suggests that Phoebe is an asteroid caught by Saturn's gravitational pull.

Wherever you visit, you are sure to find the unusual and mysterious circling Saturn.