

St Aiden's Homeschool



Our Solar System

Saturn

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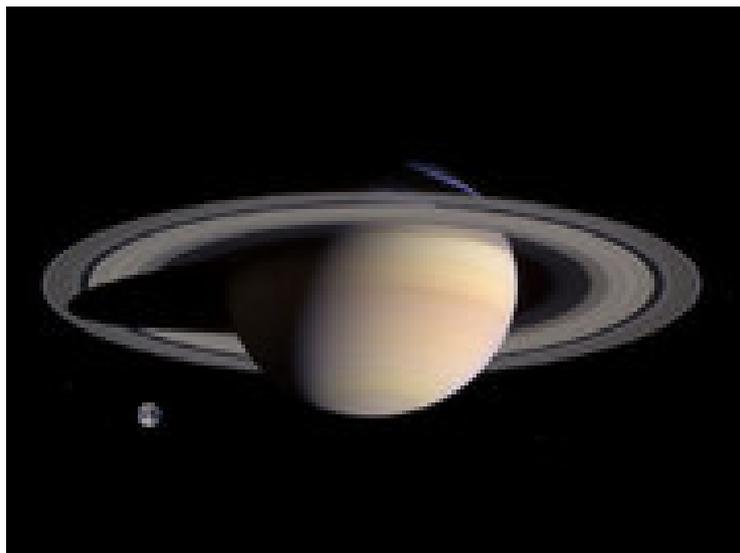
Saturn



Saturn Facts:

- *If you could find a bathtub big enough, Saturn would float in it.*
- *Some of Saturn's moons control the width of its rings. These are known as shepherd moons.*
- *Although it is made mostly of gases, scientists believe Saturn has a small rocky core.*
- **Saturn** *is the sixth planet from the sun, and is a giant gas giant.*
- *Saturn has 34 named satellites.*

How big is the planet?



Comparison of the size of Saturn and the Earth

Saturn is 120,536 km or 9.449 Earths wide at the **equator**.

Saturn : Fast Facts

When seen through a telescope, Saturn is one of the most beautiful sights in the night sky. It looks like a big ball inside of rings.

Saturn is a very large gas planet which spins very rapidly on its axis. It spins so fast that it flattens out the top and the bottom of the planet. The fast spin also causes Saturn to bulge at its equator. Saturn's atmosphere has winds which can blow at over 1800 kilometres per hour! The white spots on Saturn are believed to be powerful storms. Saturn is surrounded by over 1000 rings made of ice and dust. Some of the rings are very thin and some are very thick. The size of the particles in the rings range from pebble-size to house-size. Scientists believe that the particles came from the destruction of moons circling the planet. As comets and meteorites smashed the moons, Saturn's gravitational pull shaped the particles into rings. Saturn has at least 52 moons. Some of these moons orbit the planet within the rings, creating gaps in the rings.

True or False

The rings around Saturn contain pieces of ice which are all the size of a baseball.

False. *The rings around Saturn are made up of dust and ice. These pieces of dust and ice can be as small as pebbles or as large as a house.*

Did You Know?

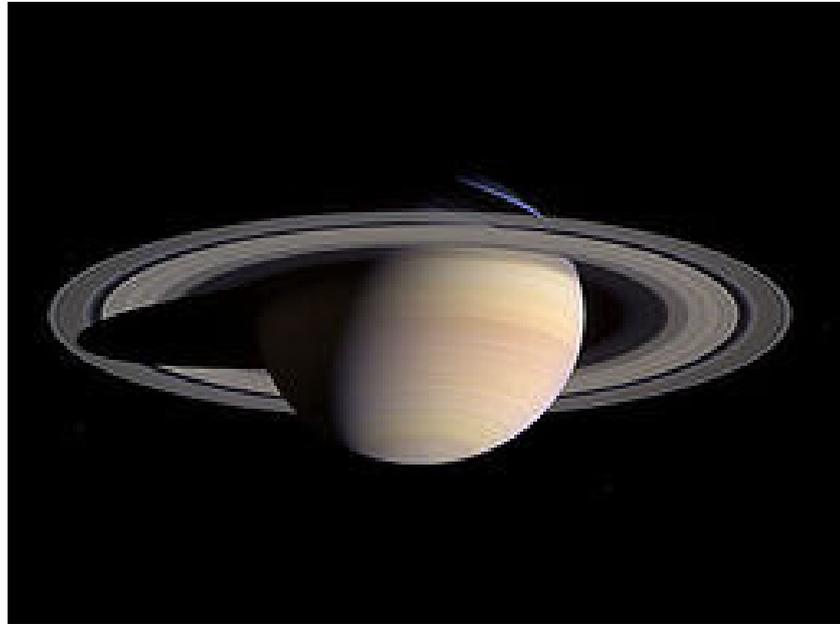
The Hubble Space Telescope photographed a storm on Saturn. This storm was as wide as the Earth.

What is its surface like?

Saturn is mostly gas and liquid. Saturn may have a small core of rock and ice. The **atmosphere** has bands, but they are not as colourful as Jupiter's.

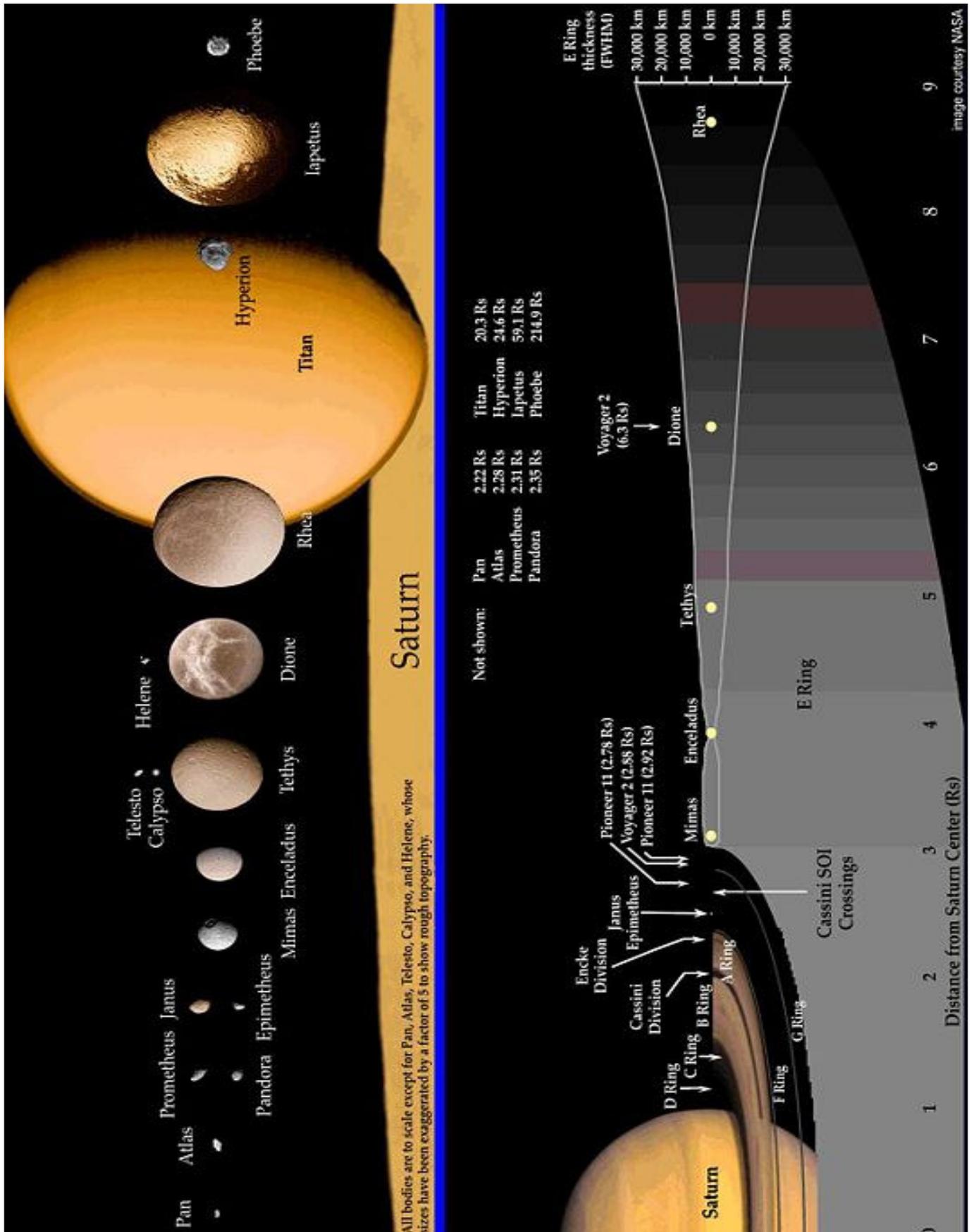
What are its rings like?

Saturn casts a shadow on its rings



Saturn's rings are composed of rock and ice particles ranging in size from specks of dust to the size of a house. Some particles might even be a few kilometres wide! The particles in the rings are actually spaced far apart. It would be easy to pass through the rings.

Map of the Saturn System (NASA)



What are its moons like?

Saturn has 56 moons, and many of them have names. The size of Saturn's moons and the size of the chunks of ice in its rings are similar, which means that we can never know the exact number of moons. New moons are still being discovered. Saturn's biggest moon is named Titan, and is large enough to be a planet in its own right!

Shepherd moons

There are small potato-shaped moons in or near Saturn's rings. They control the ring particles with their gravity. That is why they are called shepherd moons. Six of them are known, and there may be more.

Mimas

Mimas is mostly made of water ice with a small amount of rock. It has a large **crater** for its size called *Herschel*. It is 130 km across, making it about a third as big as Titan. The crater makes Mimas look like the Death Star from the *Star Wars* movies.

Enceladus

Enceladus is made of ice. It is **denser** than other icy moons. That suggests it also has some rock inside. It has smooth areas, cracks and some craters. The smooth areas are younger. Craters there have been erased within the past 100 million years. Water vapour was found over a smooth area around the south pole. The cracks and grooves suggest **tectonics** similar to Ganymede's. Some ridges similar to Europa's ridges were also found. Those suggest oceans like Europa's under some areas of Enceladus. **Tidal forces** from Dione could be powering some of this activity. It is because Enceladus orbits Saturn twice for every orbit by Dione. This makes Dione and Saturn tug on Enceladus. This is similar to how Europa and Ganymede's tidal forces on Io power Io's volcanoes.

Tethys is an icy moon that has many craters, including the huge *Odysseus*. It is 400 km across, 1/5th as big as Titan. The crater had become flattened because the icy material does not hold its shape as well as rock would. There is also a large valley called *Ithaca Chasma*. It is 3 to 5 km deep, 100 km wide and 2000 km long, three fourths of the way around Tethys.

Tethys



There are two moons, Telesto and Calypso, which share Tethys' orbit. Telesto is ahead of Tethys and Calypso is behind it.

Dione

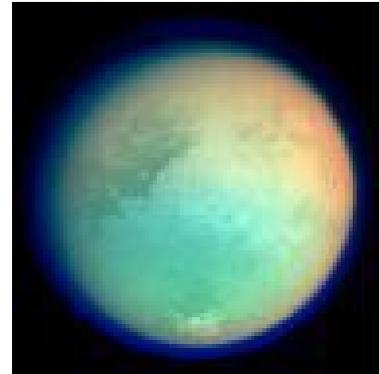
Dione is made of lots of ice and maybe some rock in the **core**. It has lots of craters. The craters are flattened because the ice does not hold their shape as well as rock. One side has bright white lines that are fractures. Two moons share Dione's orbit. Helene is ahead of Dione and Polydeuces is behind it.

Rhea

Rhea is an icy moon similar to Dione with some rock in the core. It has many craters mostly on one side, and the other side has some bright white icy areas.

Titan is the largest moon of Saturn and the second largest one in the solar system. It is the only moon in the Solar System that has a thick atmosphere. The atmosphere is made of **nitrogen, argon, methane** and various **organic compounds**. Its surface has light and dark areas and few craters. However, the Cassini probe discovered a huge crater 440 km wide.

Titan

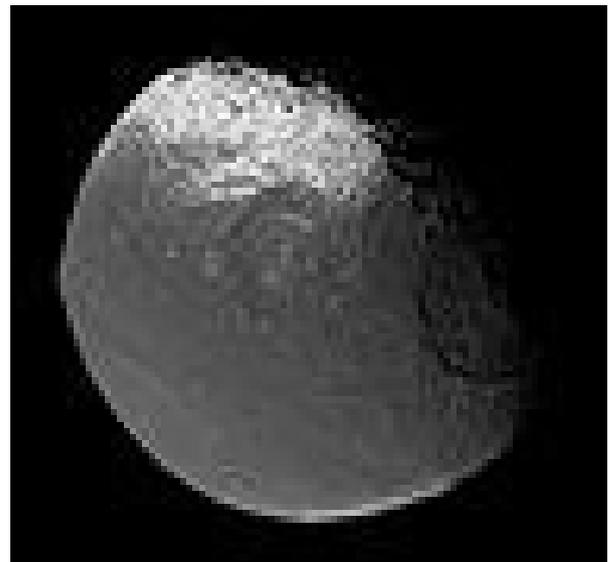


Hyperion

Hyperion is made of water ice with a little rock. It is potato shaped. It wobbles instead of rotating in the same way other moons do.

Iapetus is almost entirely ice. It has a light area called *Roncevaux Terra* that has craters. There is a big dark area called *Cassini Regio* that covers half of Iapetus. The dark material may be from Phoebe. Some of it is on the bottom of craters. Some huge craters and a ridge had been discovered in *Cassini Regio* by the Cassini probe. The ridge stretches 1300 km along the equator. It is up to 20 km high, which is over 2.26 times higher than Mount Everest. More huge craters were found in *Roncevaux Terra* when Cassini went by Iapetus again.

Iapetus



Phoebe

Phoebe is made of ice and rock. It looks dark because it has a layer of dark material on the outside. It also looks rough.

Other moons

There are two groups of small outer moons. Phoebe is part of the second outermost group.

How long is a day on this planet?

One day on Saturn is about 10 hours and 39 minutes in Earth time.

How long is a year on this planet?

One year on Saturn is about 29.46 Earth years long. That is 10,760 Earth days!

What is it made of?

Saturn has a rocky core. Around the core, there is ice. Above the ice is liquid metallic **hydrogen**. On top of that is gaseous hydrogen. There is no place where the hydrogen suddenly turns from a gas to a liquid.

The gaseous hydrogen makes up most of Saturn's atmosphere. Other gases there include **helium** and some other gases. There may be rain made of helium falling through the hydrogen. There is also ammonia on the surface.

How much would Saturn's gravity pull on me?

If you were floating close to the cloud tops of Saturn, it would pull you down with a force only a little stronger than the force of Earth's gravity. The effects of Saturn's large **radius** and its **mass** almost cancel each other out, making the force only a little bigger. So, if you weighed 100 lbs. on Earth, you would weigh 106 lbs. on Saturn.

Who is it named after?

Saturn is named after the Roman god of agriculture. He taught people how to farm. He was the father of Jupiter. Saturday is named after him.

Did You Know?

Days of the Week

The seven-day system we use is based on the ancient astrological idea that the seven known celestial (“heavenly”) bodies influence what happens on Earth and that each of these celestial bodies controls the first hour of the day named after it. This system was brought into Hellenistic Egypt from Mesopotamia, where astrology had been practiced for centuries and where seven had always been a propitious number. In A.D. 321 the Emperor Constantine the Great grafted this astrological system onto the Roman calendar, made the first day of this new week a day of rest and worship for all, and imposed the following sequence and names to the days of the week. This new Roman system was adopted with modifications throughout most of Western Europe: in the Germanic languages, such as Old English, the names of four of the Roman gods were converted into those of the corresponding Germanic gods:

Celestial Body	Germanic Latin	modern god	modern English	Italian
Sun	Solis	Sunday	domenica	
Moon	Lunae	Monday	lunedì	
Mars	Martis	Tiu	Tuesday	martedì
Mercury	Mercurii	Wodan	Wednesday	mercoledì
Jupiter	Jovis	Donar	Thursday	giovedì
Venus	Veneris	Freya	Friday	venerdì
Saturn	Saturni		Saturday	sabato

The Latin names for the weekdays survive in the modern Romance languages (though the weekend day names have been altered). Also, Japanese words for the days of the week also correspond indirectly to the same planets.

However, Prof. Neves of Universidade Nova de Lisboa says that there are remarkable exceptions: at least in Hebrew, in Greek, in Arabic, and in Portuguese (and in languages that were informed by those, like the Timorese Tetum), the days of the week are numbered. Sunday is number one (or day of the Lord in Portuguese - Domingo- and in Greek -Kiriaki). Friday is number six (except in Arabic, which calls it Day of the Gathering) and all 4 languages call Sabbath (Sabado,as-Sabt, etc) to Saturday.