# THE GAS GIANTS

Jupiter and Saturn are the two biggest planets in our Solar System. They are both made up of gas.

## 1. Jupiter

Jupiter is a giant planet made of many gases including hydrogen, helium, methane and ammonia. We can only see the top layer of Jupiter's atmosphere as swirling clouds forming bands of colour. We don't know for sure yet what lies below the clouds. It could be a huge ocean of liquid hydrogen. Can you see the Red Spot on Jupiter?

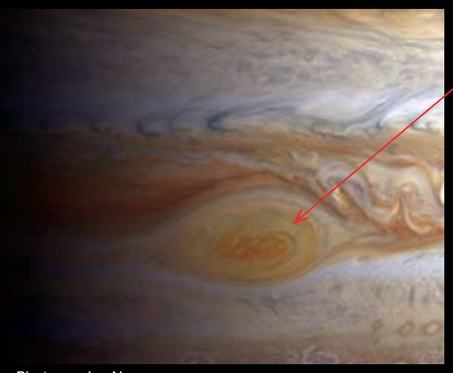

Shadow of one of Jupiter's many moons

The Great Red Spot

Jupiter is so big that if you rode a bicycle around Jupiter, it would take 5 years!

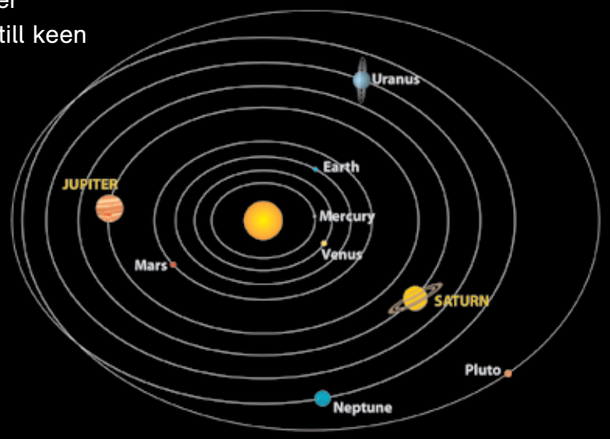
## 2. If you went to visit Jupiter …

Well, first of all, you wouldn't be able to breathe, because of the hydrogen, methane and ammonia in the atmosphere. Secondly, you would not be able to move because the pull of gravity is so strong. Jupiter is mostly made of gas, so you'd have nothing to stand on. There are awful storms roaring across the oceans of hydrogen on Jupiter. Daytime would only be five hours long, but it wouldn't help you because no light gets in through the thick clouds anyway. The pressure of the atmosphere would crush you as you dropped through the clouds. It gets much hotter and much colder on Jupiter than it does on Earth. Are you still keen to visit there?



A close-up photo of the Great Red Spot of Jupiter. Scientists believe this spot shows clouds around a hurricane three times larger than Earth. Wind speeds on Jupiter can reach over 400 kilometres an hour.

Photographs: Nasa




Where are Jupiter and Saturn in our Solar System?


Saturn and its rings of ice

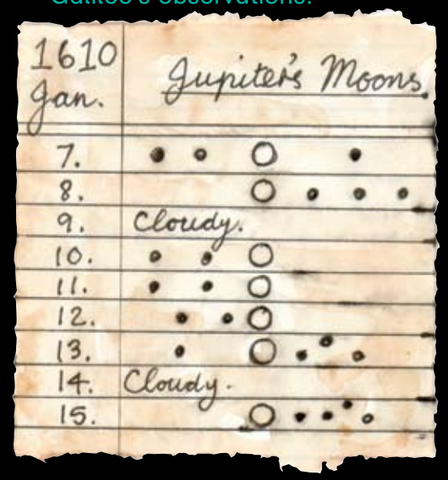
## 3. Saturn

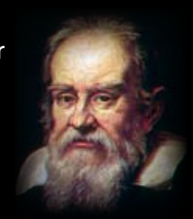
Saturn is also a giant planet made of gas, just like Jupiter. The whole planet consists mainly of hydrogen and helium gas. We also know that there are thousands of narrow rings made up of lumps of ice and rock orbiting around Saturn like tiny little moons. Some of the bits are as big as a taxi; others are as tiny as grains of sand. The other three giant planets – Jupiter, Neptune and Uranus – also have rings, but Saturn's are bigger and very much easier to see.

## 4. Looking at Jupiter's moons and Saturn's rings of ice

Long ago Galileo, an Italian scientist, used a telescope to observe the moon and the planets. He was the first person to observe four of Jupiter's many moons. In January 1610 he watched Jupiter night after night. When he saw Saturn's rings for the first time he thought they were handles, or ears!

Galileo's observations:



Galileo Galilei

## 5. Saturn, uCanzibe

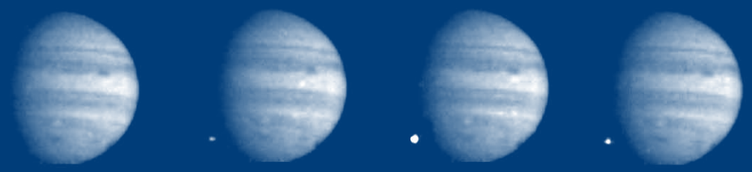
*The Xhosa people called Saturn uCanzibe – they use the same name for the month of April. The name commonly used today, Saturn, comes from long ago. Saturn was the Roman god of the harvest.*

## 6. If you went to visit Saturn…

Imagine trying to live on Saturn. You would just sink through the surface because Saturn is mostly made of gas and liquid with a small, dense core at the centre. Saturn's atmosphere contains hydrogen gas, helium gas and methane gas – so you can't breathe it! Saturn is also very cold.

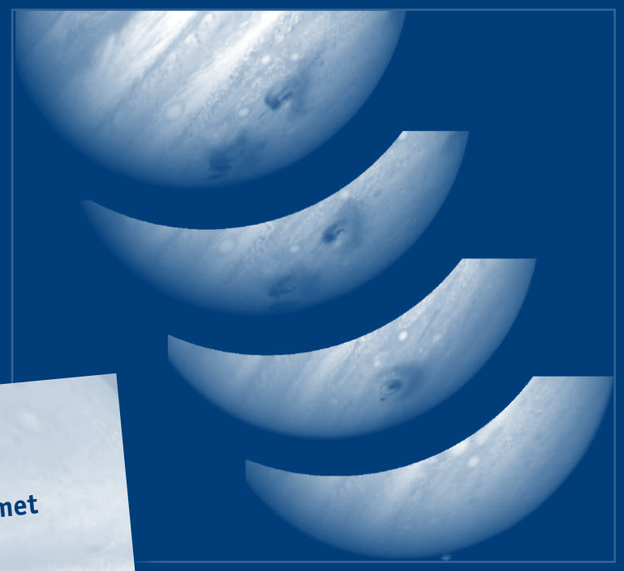
## COOL FACTS

| | JUPITER | SATURN |
|---|---|---|
| How far from the Sun? | 778 million kilometres | 1 400 million kilometres |
| Size (diameter)? | 142 984 kilometres | 120 660 kilometres |
| How fast does it travel around the Sun? | 13 kilometres /second | 5, 4 kilometres/second |
| How long is the day and night? | 9 Earth hours and 51 Earth minutes | 10 Earth hours and 12 Earth minutes |
| How long is the year? | 11,9 Earth years | 29,5 Earth years |
| Moons? | At least 63 | At least 47 |



**Look at these photos of Jupiter. You can see the comet Shoemaker-Levy 9 moving closer to Jupiter before the collision. These photos were taken by the spacecraft Galileo on 22 July 1994. The spacecraft was 238 million kilometres from Jupiter at the time and 621 million kilometres from Earth.**

**This picture shows what happened after the comet Shoemaker-Levy 9 collided with Jupiter. You can see how it changed from 5 minutes after the crash to 5 days later.**



## ACTIVITY 1. A comet hits Jupiter

*Learning areas: Languages and Arts and Culture*

### Imagining the force of a collision with a comet

**About comets**

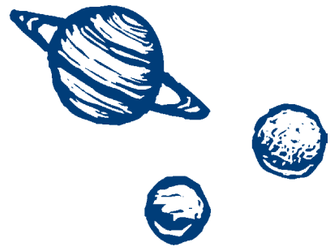
A comet is a large ball of dust and ice. Comets sometimes come into our Solar System from far beyond our Solar System. It is possible that they can crash into a planet. But this is very unusual and does not happen often.

- Read more about comets on the card called: ***Comets, Meteors and Asteroids***

**A very unusual event**

In July 1994 scientists were watching Jupiter. They saw the comet Shoemaker-Levy 9 coming closer to Jupiter. Astronomers had been watching this comet for months beforehand. Astronomers knew that the comet had broken into pieces and predicted that it would collide with Jupiter. The impacts produced more energy than if all the nuclear weapons on Earth had exploded at the same time.

1. Imagine you are living on Jupiter when the comet collided with Jupiter.
2. Draw and write to tell what you experienced on Jupiter.



## ACTIVITY 3. Make a model of Saturn

*Learning area: Arts and Culture*

### Constructing a three-dimensional model

Make a model of Saturn and its rings using any materials you like.

Make the model as big as possible.

Colour your model.

Hang it up in the classroom or display it in a suitable place.

Possible materials to use:

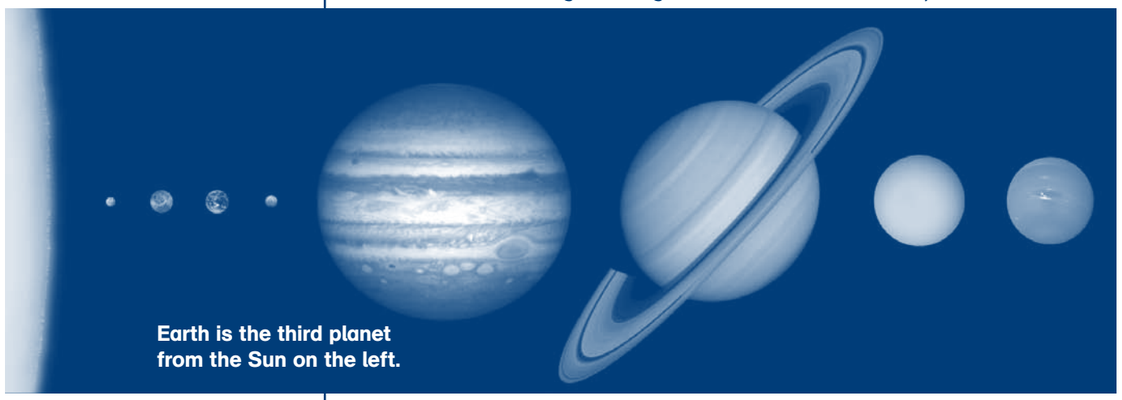
- Balloons
- Paper and card
- Styrofoam
- Play dough
- Plastic
- Pins

## ACTIVITY 2. Sizes and distances in space

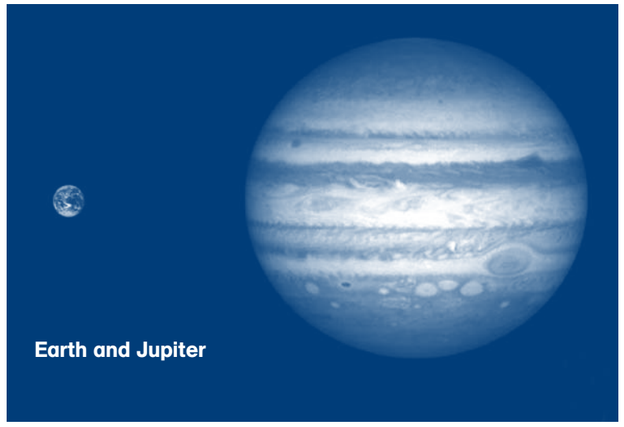
*Learning area: Mathematics*

### Compare sizes and distances

1. Look at the drawing showing the sizes of the Sun and planets:



**Earth is the third planet from the Sun on the left.**



**Earth and Jupiter**

   a) How many Earths can fit across the diameter of Jupiter?
   b) How many Earths can fit across the diameter of Saturn?
2. The following are some distances in our lives; match them up correctly and then sort them from smallest to largest.

| | |
|---|---|
| Height of Table Mountain | About 1 400 kilometres |
| Height of a doorway | About 100 metres |
| Height of Mount Everest | About 2,5 metres |
| Distance to the second-nearest star | 1 078 metres |
| Length of a soccer field | 8 078 metres |
| Distance to the Sun | 40 million million kilometres |
| Distance from Cape Town to Johannesburg | 150 000 000 kilometres |



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