GeoBus

THE GAS GIANTS

Beyond the orbit of Mars and the asteroid belt lie the gas giants: Jupiter and Saturn. They are the largest planets in the solar system, made mainly of hydrogen and helium, and can claim over 130 moons between them.

JUPITER

Distance to the Sun: 482 million km

Temperature: -110 °C

Equatorial radius: 69,911 km

Gravity: 2.53 x Earth

Orbit: 11.86 Earth years

79 moons including Ganymede, the largest moon in the solar system.

Jupiter has very faint rings made of dust.

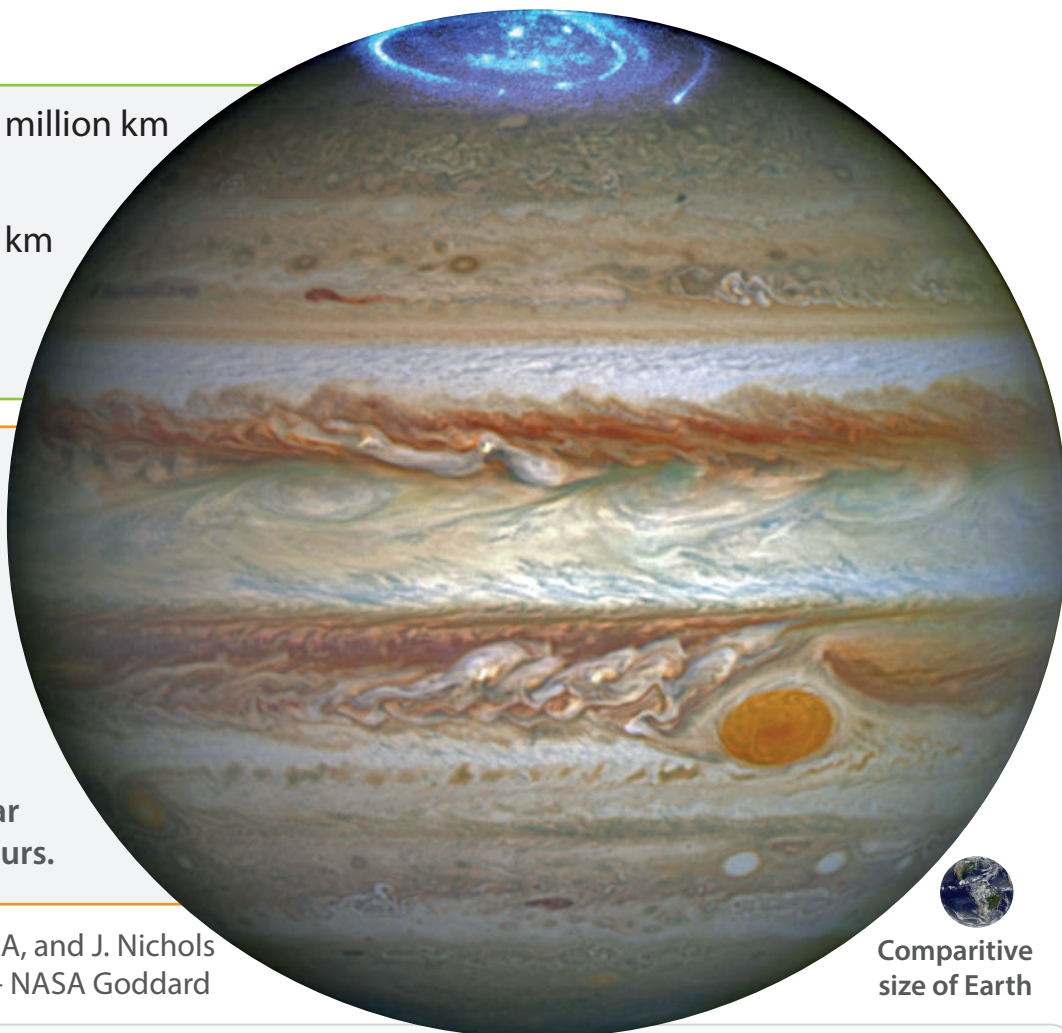Shortest day in the solar system lasting only 10 hours.

Image credit: Jupiter - NASA, ESA, and J. Nichols (University of Leicester)/ Earth - NASA Goddard
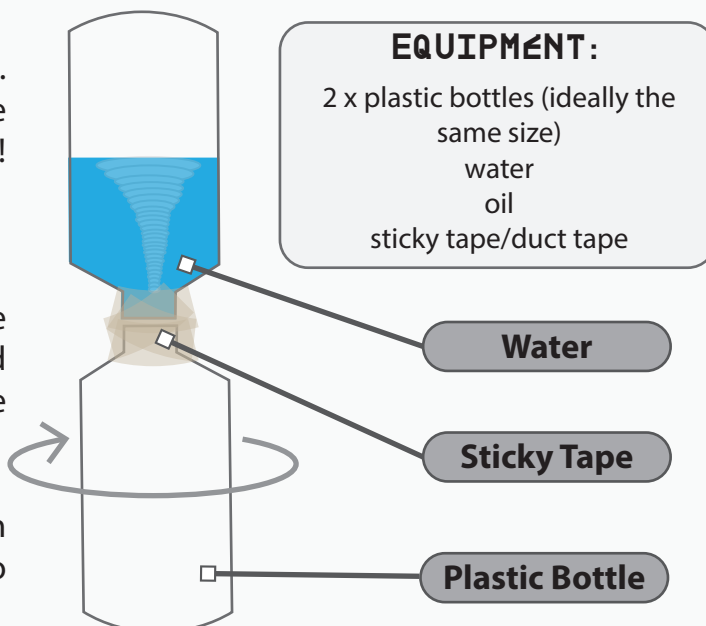
Comparitive size of Earth

STORM IN A BOTTLE

A famous feature of Jupiter is the great red spot. This spot is actually a large storm (larger than the Earth) that has been raging for hundreds of years!

Step 1: Half fill one plastic bottle with water.

Step 2: Using sticky tape, secure a second bottle on top of the first. The bottles should be secured such that no water can leak out of the necks of the bottles.

Step 3: Turn over the bottle (so the water is now in the top bottle) and twirl. This will create a tornado in the top bottle.

EQUIPMENT:
2 x plastic bottles (ideally the same size)
water
oil
sticky tape/duct tape

Water

Sticky Tape

Plastic Bottle

SATURN

Distance to the Sun: 1.4 billion km

Equatorial radius: 58,232 km

Temperature: -178 °C

Gravity: 1.06 x Earth

Orbit: 29 Earth years

Saturn is primarily made of hydrogen and helium. It's not very dense and would even float in water.

Saturn's extrordinary rings stretch 282,000 km across but they are only ~ 1 km thick.

There are 10,756 Earth days in one Saturn year.

Credit: NASA/JPL

SATURN'S AURORA

Charged particles from the Sun cause dramatic and colourful displays at the poles of Saturn called aurora. We experience aurora here on Earth (such as the aurora borealis which commonly known as the northern lights) but unlike the green hues of Earth's aurora, Saturn's aurora can only be seen in ultraviolet light.

SCALE OF SATURN

Your task is to create a model of Saturn and Earth to show the relative scale of these planets.

Step 1: Gather materials to create your model. You could create the planets out of paper, cut them out of cardboard, or sculpt them using salt dough (see Activity 2 for the recipe).

Step 2: Work out the scale of your model. Saturn's diameter is 116,460 km. If 1cm = 10,000 km, your model of Saturn would need to have a diameter of 11.6 cm (for comparison Earth would have a diameter of 1.3 cm). How wide would your model be if you were to include Saturn's rings in its diameter at this scale? How thick would the rings be at this scale?

Step 3: The final step is to create your model. Cut out your paper/cardboard to the correct shapes and colour them in to recreate the beautiful colours of the planets. What do you notice? Are you surprised by the magnitude of Saturn?

Earth • Saturn
1.3 cm

11.6 cm
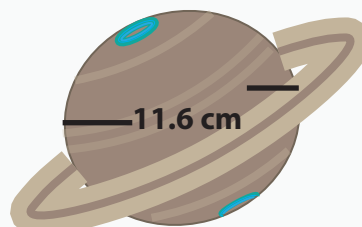
Extend this task to create a wall display or sculpture of the eight planets. Use the same scale for all the planets and discover the scale of the Solar System.