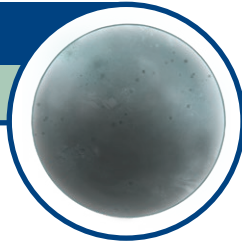


Facts about Mercury



1. Mercury is the closest planet to the Sun.
2. Mercury has no moons.
3. One day on Mercury takes as long as 176 days on Earth!
4. One year on Mercury is much shorter than an Earth year. It only lasts 88 Earth days!
5. Daytime temperatures on Mercury can reach 400°C.
6. Diameter: 4900km
7. Distance from the Sun: 58 million km

Using the information, calculate Mercury's scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

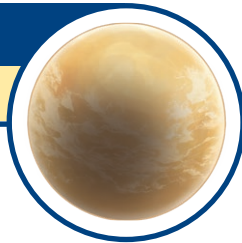
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Venus



1. Venus is the second planet from the Sun.
2. Venus has no moons.
3. Venus spins in the opposite direction to Earth.
4. One day on Venus lasts 243 Earth days but a Venus year only lasts 225 Earth days.
5. Daytime temperatures on Venus can reach 460°C.
6. Diameter: 12 000km
7. Distance from the Sun: 110 million km

Using the information, calculate Venus' scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Earth



1. Earth is the third planet from the Sun.
2. The Earth has one moon.
3. The Earth is the only known planet in the solar system that can support life.
4. About 71% of the Earth's surface is covered by water.
5. Daytime temperatures on Earth average 15°C.
6. Diameter: 12 700Km
7. Distance from the Sun: 150 million km

Using the information, calculate Earth's scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

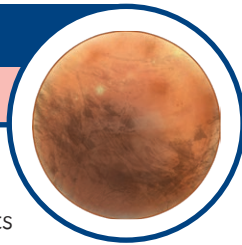
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Mars



1. Mars is the fourth planet from the Sun.
2. Mars is known as the 'Red Planet' because of its distinctive red colour.
3. One year on Mars is longer than an Earth year. It lasts 687 Earth days.
4. Like Earth, Mars has ice caps at its north and south poles.
5. The average temperature on Mars is -63°C .
6. Diameter: 6800km
7. Distance from the Sun: 230 million km

Using the information, calculate Mars' scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

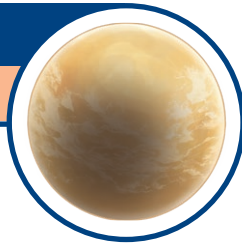
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Jupiter



1. Jupiter is the largest planet in our solar system. It is the fifth planet from the Sun.
2. Jupiter has 75 moons. The most well-known of these are called Io, Europa and Callisto.
3. One year on Jupiter lasts 11.9 Earth years.
4. However, one day on Jupiter only lasts 10 hours.
5. The 'Great Red Spot' on Jupiter is actually a storm that is twice the size of Earth and has been raging for over three centuries.
6. Diameter: 140 000km
7. Distance from the Sun: 780 million km

Using the information, calculate Jupiter's scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

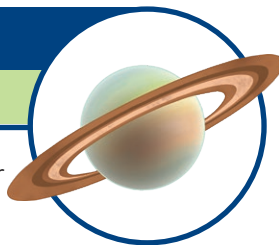
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Saturn



1. Saturn is the second largest planet in our solar system. It is the sixth planet from the Sun.
2. Saturn is a gas giant – a giant planet that is mainly made up of gases such as hydrogen and helium. The other gas giant in our solar system is Jupiter.
3. One day on Saturn lasts ten hours.
4. Saturn takes 29 Earth years to orbit the Sun.
5. Saturn is orbited by rings made up of small pieces of ice and rock.
6. Diameter: 120 000km
7. Distance from the Sun: 1400 million km

Using the information, calculate Saturn's scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

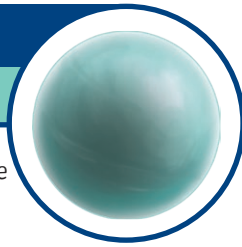
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Uranus



1. Uranus is the seventh planet from the Sun and the third largest planet in the solar system.
2. Uranus is an ice giant – a type of gas giant planet with a mantle of frozen or slushy liquid and an icy core.
3. It has the coldest atmosphere of all the planets in the solar system.
4. One year on Uranus lasts 84 Earth years. However, one day on Uranus only lasts 17 hours.
5. It is the only planet in the solar system that spins on its side.
6. Diameter: 51 000km
7. Distance from the Sun: 2900 million km

Using the information, calculate Uranus' scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

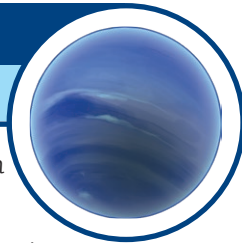
Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Facts about Neptune



1. Neptune is the eighth and most distant planet from the Sun.
2. Neptune is an ice giant. Its atmosphere is mainly made up of hydrogen, helium and methane.
3. Neptune has 13 known moons.
4. A day on Neptune lasts only 16 hours. Neptune takes 165 Earth years to orbit the Sun.
5. Neptune has five main rings that orbit the planet. They are thinner than the rings of Saturn and hard to see from Earth.
6. Diameter: 49 000km
7. Distance from the Sun: 4500 million km

Using the information, calculate Neptune's scaled diameter and distance from the Sun in the boxes below. Round your answers to one decimal place.

Diameter

Scale 1cm:2000km

Distance

Scale 1m:200 million km

Modelling The Solar System Answers

Mercury	Diameter:	$4900 \div 2000 = 2.5\text{cm}$
	Distance:	$58\,000\,000 \div 200\,000\,000 = 0.29\text{m}$
Venus	Diameter:	$12000 \div 2000 = 6.0\text{cm}$
	Distance:	$110\,000\,000 \div 200\,000\,000 = 0.6\text{m}$
Earth	Diameter:	$12\,700 \div 2000 = 6.4\text{cm}$
	Distance:	$150\,000\,000 \div 200\,000\,000 = 0.8\text{m}$
Mars	Diameter:	$6800 \div 2000 = 3.4\text{cm}$
	Distance:	$230\,000\,000 \div 200\,000\,000 = 1.2\text{m}$
Jupiter	Diameter:	$140\,000 \div 2000 = 70.0\text{cm}$
	Distance:	$780\,000\,000 \div 200\,000\,000 = 3.9\text{m}$
Saturn	Diameter:	$120\,000 \div 2000 = 60.0\text{cm}$
	Distance:	$1400\,000\,000 \div 200\,000\,000 = 7.0\text{m}$
Uranus	Diameter:	$51\,000 \div 2000 = 25.5\text{cm}$
	Distance:	$2900\,000\,000 \div 200\,000\,000 = 14.5\text{m}$
Neptune	Diameter:	$49\,000 \div 2000 = 24.5\text{cm}$
	Distance:	$4500\,000\,000 \div 200\,000\,000 = 22.5\text{m}$

EARTH

EARTH

EARTH

MERCURY

MERCURY

MERCURY

VENUS

VENUS

VENUS

MARS

MARS

MARS

JUPITER

JUPITER

JUPITER

SATURN

SATURN

SATURN

URANUS

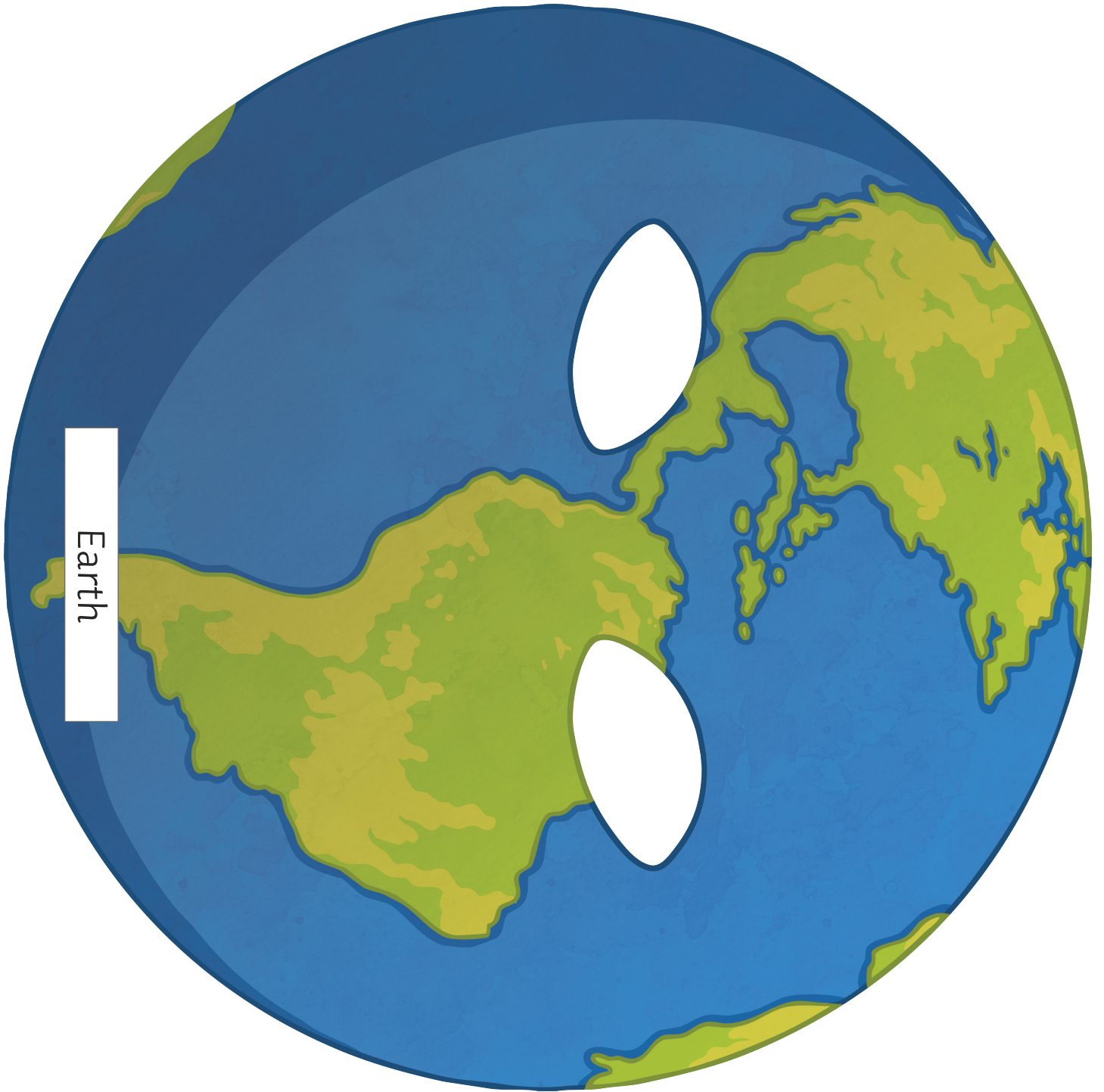
URANUS

URANUS

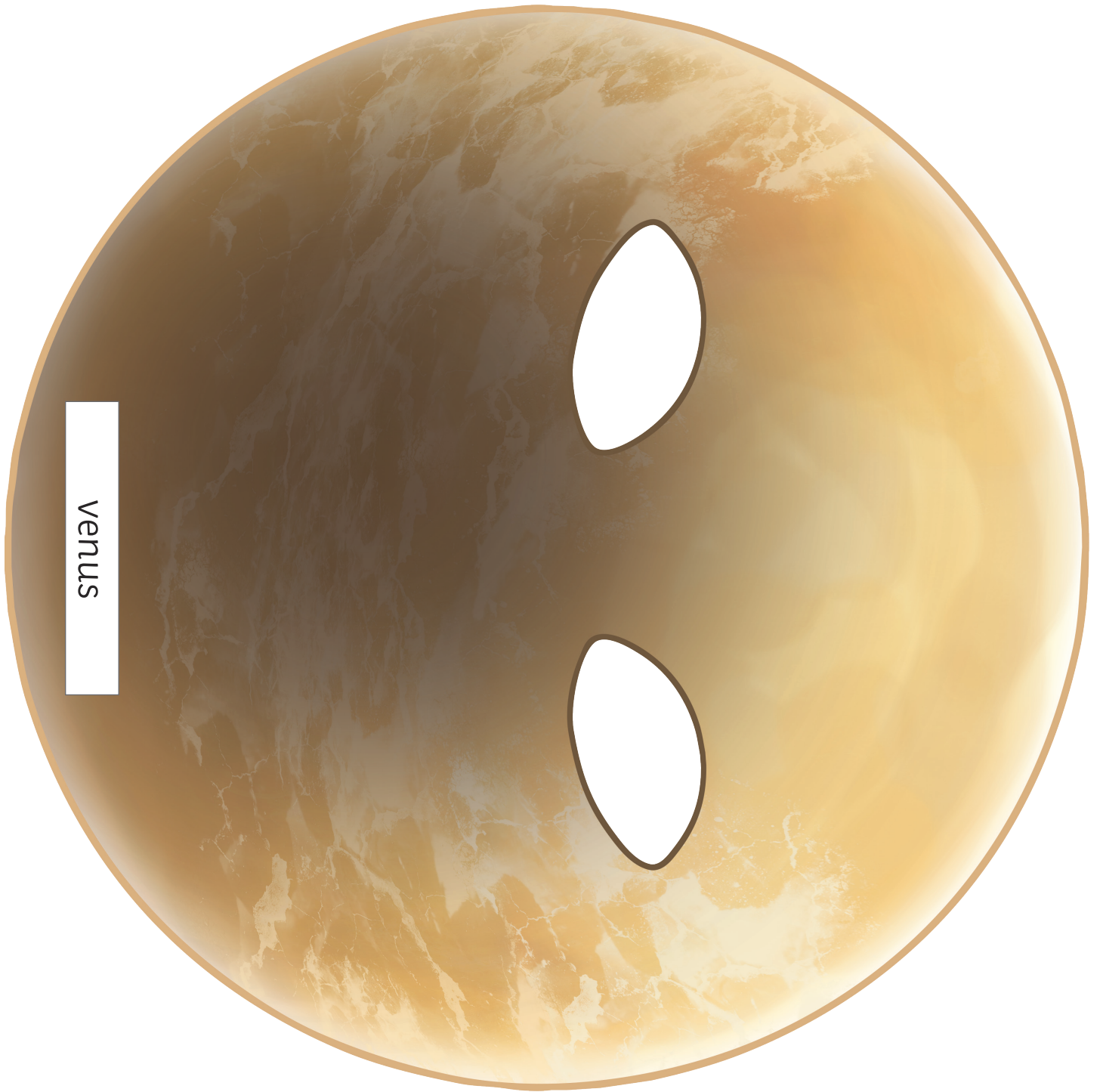
NEPTUNE

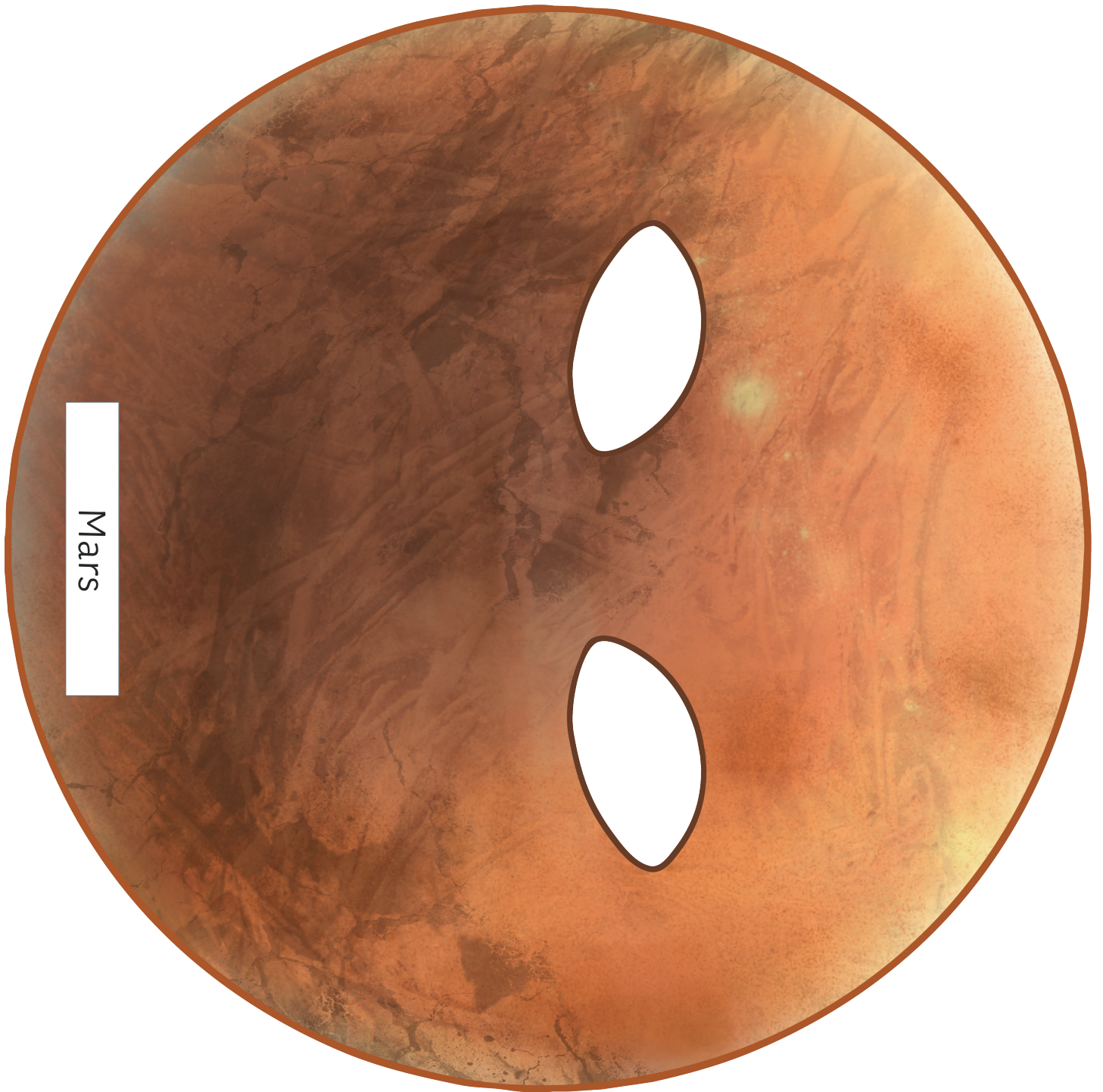
NEPTUNE

NEPTUNE



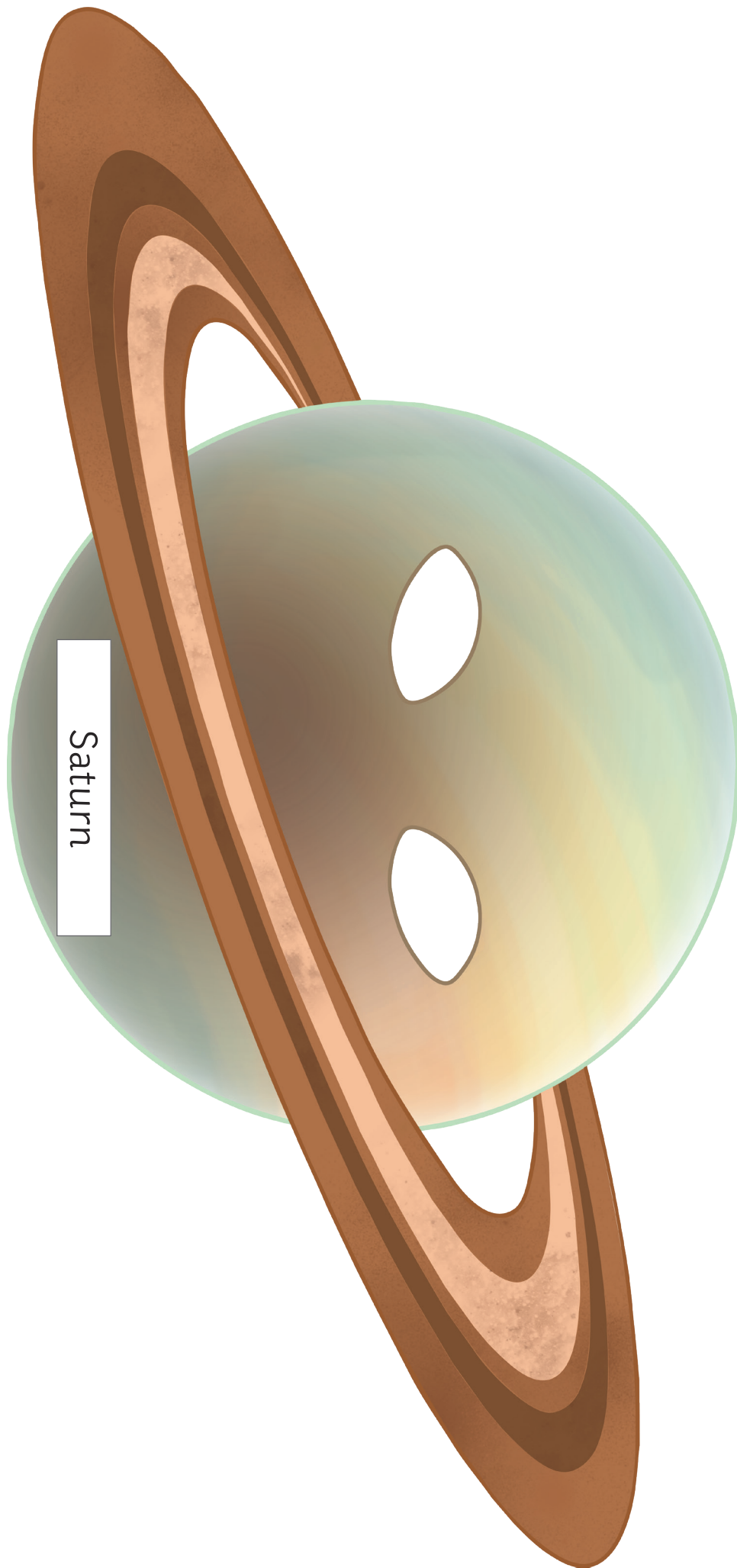


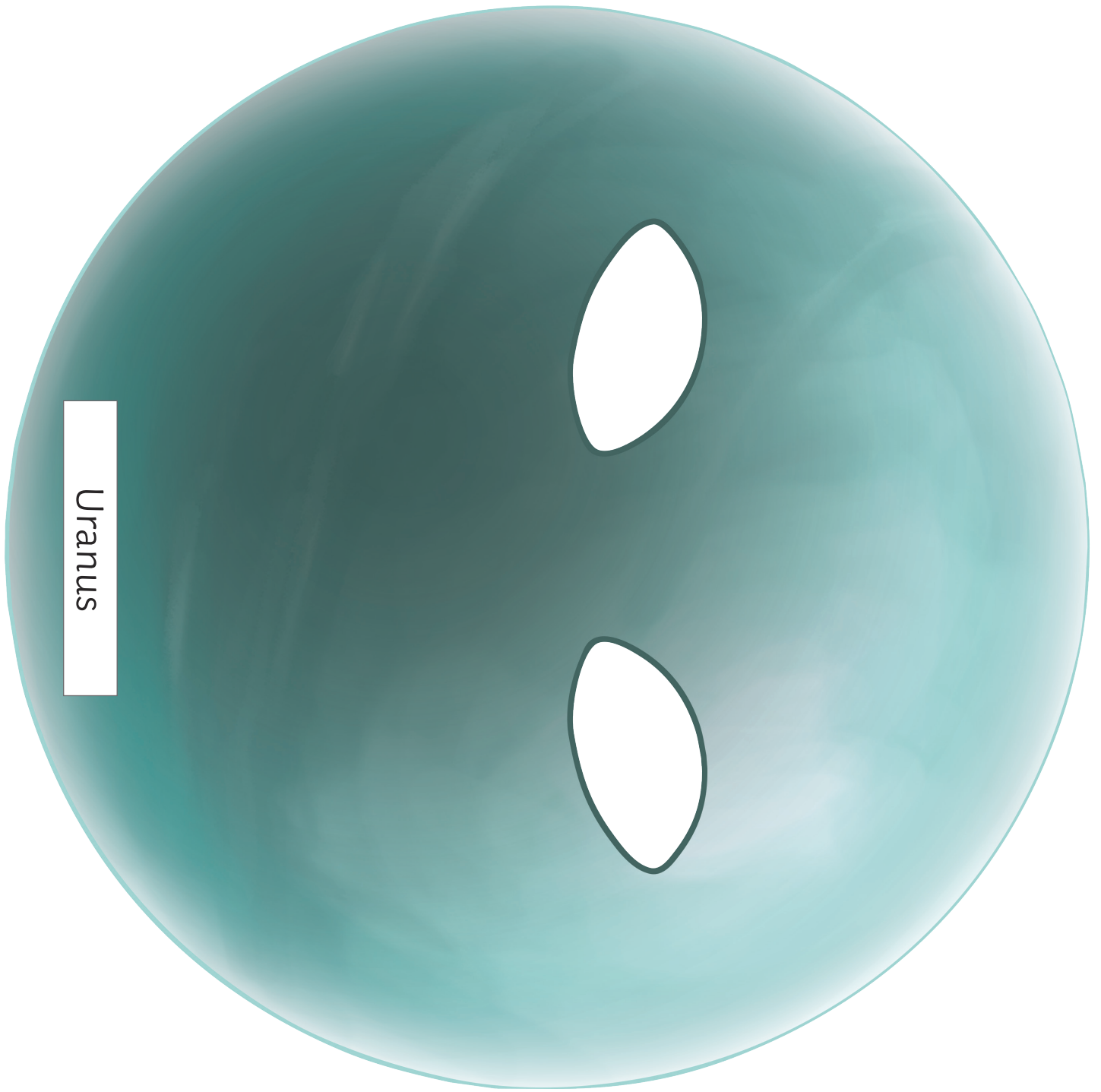


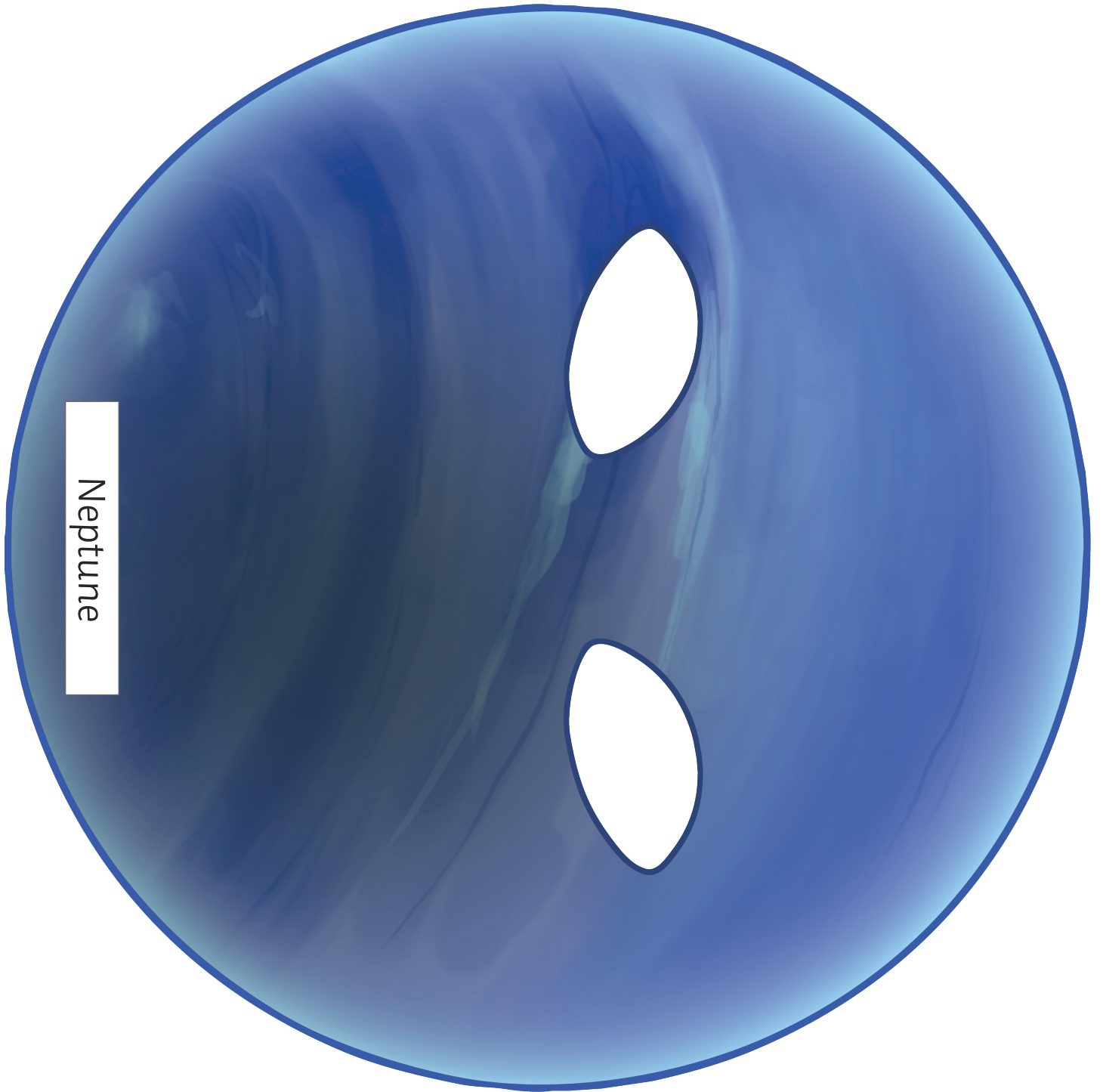




Jupiter

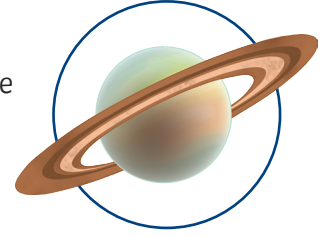






Planets Mnemonic

A mnemonic is a way of remembering a set of information. We can make a sentence out of the first letter of each word in a sequence to help us remember it.



M

V

E

M

J

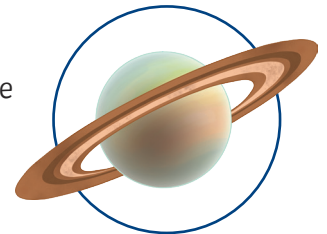
S

U

N

Planets Mnemonic

A mnemonic is a way of remembering a set of information. We can make a sentence out of the first letter of each word in a sequence to help us remember it.



M

V

E

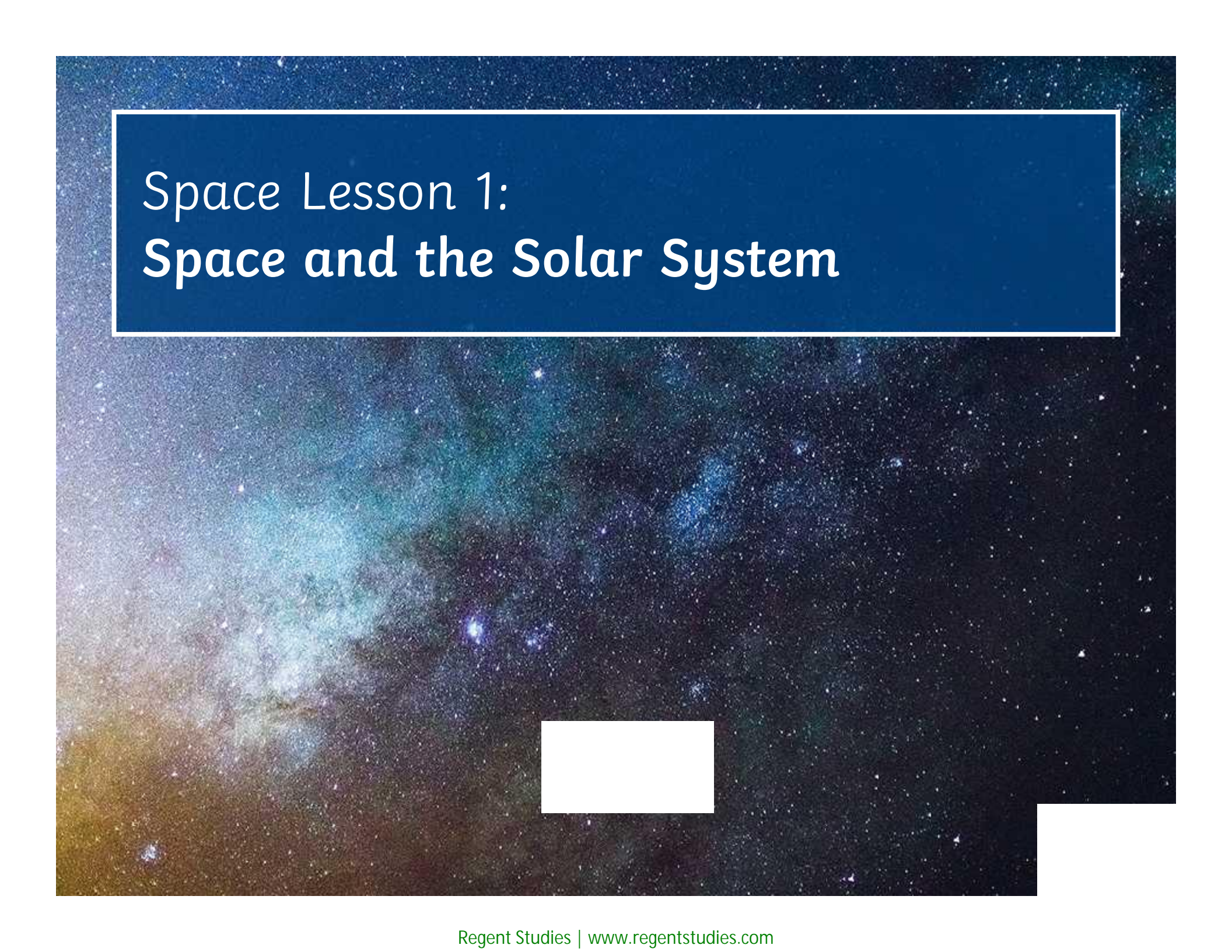
M

J

S

U

N



Space Lesson 1: Space and the Solar System

Learning Objective

- To explore space and the Solar System.

Success Criteria

- To identify the planets in our Solar System.
- To describe a planet in our Solar System.
- To create a scale model of the Solar System using a scale.

Starter: Rate Your Knowledge

There are 5 statements below. For each question, say whether you think the statement is True or False.

1. The Earth is at the centre of the Solar System.

False – the Sun is at the centre of the Solar System.

2. A light year is the distance that light travels in one year.

True

3. Stars leave the sky during the daytime.

False – during the day when the Earth is facing the Sun, we cannot see the stars because of how bright the Sun is.

4. The Moon emits light.

False – the moon is a non-luminous object and reflects the light from the Sun.

5. All stars are the same size.

False – the stars range in size. The biggest known star has a radius of 987 000 000km. The smallest known star has a radius of 167 000km.

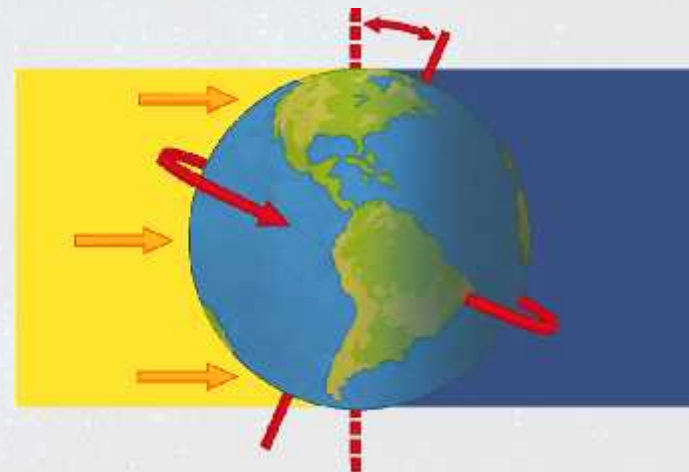
Day and Night

The Earth is tilted and spins on an invisible line called an axis.

Only half of planet Earth faces the Sun at any one time. The side facing the Sun is in daytime.

The side facing away from the Sun is in darkness and so it is night time.

It takes 24 hours for the Earth to rotate once on its axis.



If it is night time in New Zealand, what will it be in England?

It will be daytime as England is on the opposite side of the world to New Zealand and will be facing the Sun.

The Planets

In our Solar System, there are 8 planets.



Can you remember the order of the planets?

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

A mnemonic is a way of remembering something. We can make a sentence out of the first letter of each word in a sequence to help us remember it.

For example, we can remember how to spell 'because' by remembering the mnemonic: **Big Elephants Can Always Understand Small Elephants.**

With your partner, create your own **mnemonic** to help you remember the order of the planets.

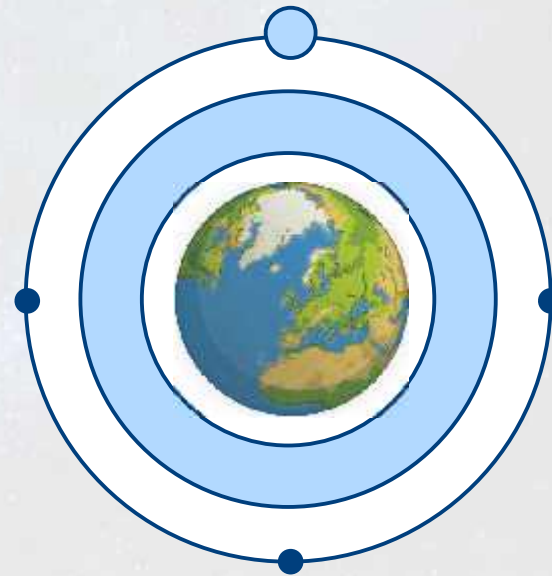
Our Solar System

In our Solar System, there are 8 planets.

What other objects might we find in space?

With your partner, you have one minute to write a list of as many objects you can think of that you may find in space.

- man made satellites – Satellites made by man and sent into space to carry out a function.
- natural satellite – The Moon is a natural satellite. It orbits Earth.
- asteroids
- comets
- dust
- dwarf planets






Modelling The Solar System

What is a scale model?

A scale model is a copy of something that is much larger or smaller than the object itself but one which maintains the original's proportions. For example, a toy car which has been made to scale to represent a real life car.

It is possible to create a human scale model of the Solar System.

Using the information on the **Planet Fact Cards** and working in groups, calculate each planet's scaled diameter and distance from the Sun. Round your answers to one decimal place.

<p>Facts about Mercury</p>  <ol style="list-style-type: none"> 1. It is the closest planet to the Sun. 2. It has no atmosphere. 3. The length of Mercury takes to rotate once around itself. 4. The temperature on Mercury is as hot as the surface of the Earth in July. 5. The distance from the Sun is 57.9 million km. 6. Diameter is 4,878 km. 7. It is named after the Roman god of commerce. 	<p>Using the information on this Planet Fact Card, calculate Mercury's scaled diameter and distance from the Sun in the below boxes. Round your answers to one decimal place.</p> <p>Diameter: _____</p> <p>Distance: _____</p>
<p>Facts about Venus</p>  <ol style="list-style-type: none"> 1. Venus is the second planet from the Sun. 2. Venus has no moons. 3. Venus rotates in the opposite direction to Earth. 4. The length of Venus takes to rotate once around itself is 243 Earth days. 5. The surface temperature is about 460°C. 6. Diameter is 12,104 km. 7. Distance from the Sun is 108.2 million km. 	<p>Using the information on this Planet Fact Card, calculate Venus's scaled diameter and distance from the Sun in the below boxes. Round your answers to one decimal place.</p> <p>Diameter: _____</p> <p>Distance: _____</p>
<p>Facts about Earth</p>  <ol style="list-style-type: none"> 1. Earth is the third planet from the Sun. 2. Earth has one moon. 3. The Earth is the only planet in the Solar System that can support life. 4. About 70% of the Earth's surface is covered in water. 5. The distance from the Sun is 149.6 million km. 6. Diameter is 12,756 km. 7. Distance from the Sun is 149.6 million km. 	<p>Using the information on this Planet Fact Card, calculate Earth's scaled diameter and distance from the Sun in the below boxes. Round your answers to one decimal place.</p> <p>Diameter: _____</p> <p>Distance: _____</p>

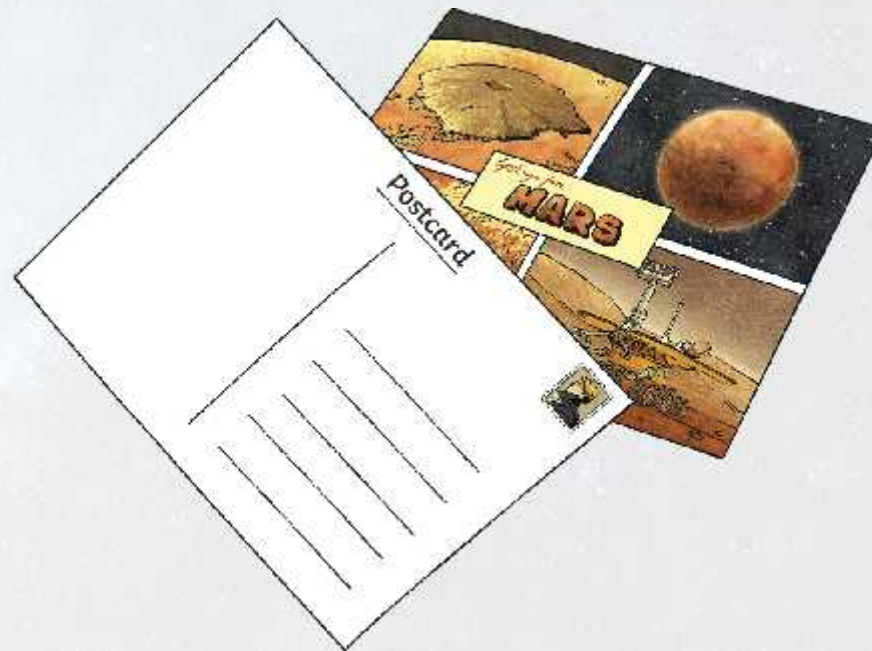
Modelling The Solar System

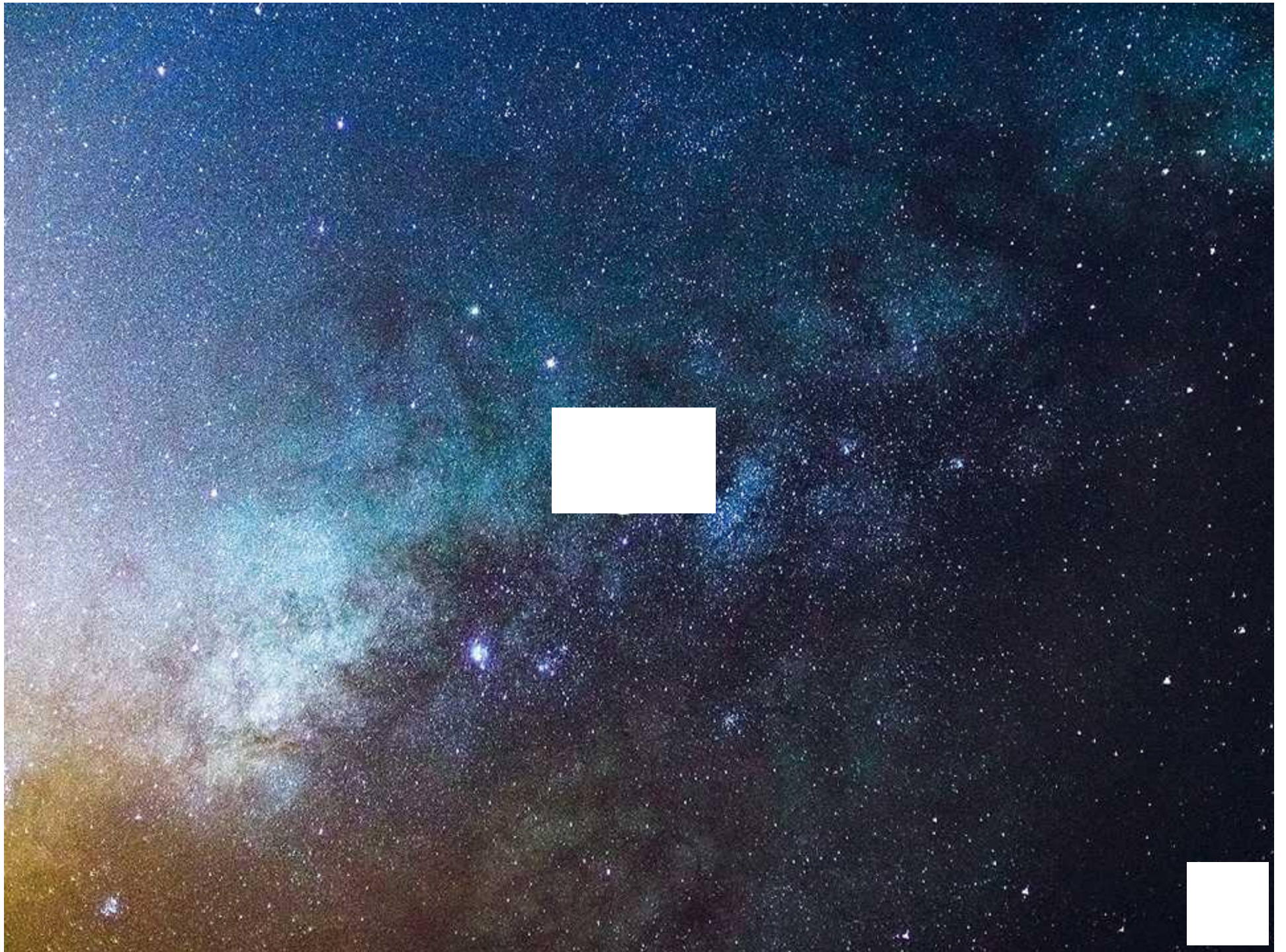
Answers

Mercury	Diameter: $4900 \div 2000 = 2.5\text{cm}$ Distance: $58\,000\,000 \div 200\,000\,000 = 0.29\text{m}$
Venus	Diameter: $12000 \div 2000 = 6.0\text{cm}$ Distance: $110\,000\,000 \div 200\,000\,000 = 0.6\text{m}$
Earth	Diameter: $12\,700 \div 2000 = 6.4\text{cm}$ Distance: $150\,000\,000 \div 200\,000\,000 = 0.8\text{m}$
Mars	Diameter: $6800 \div 2000 = 3.4\text{cm}$ Distance: $230\,000\,000 \div 200\,000\,000 = 1.2\text{m}$
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Uranus	Diameter: $51\,000 \div 2000 = 25.5\text{cm}$ Distance: $2900\,000\,000 \div 200\,000\,000 = 14.5\text{m}$
Neptune	Diameter: $49\,000 \div 2000 = 24.5\text{cm}$ Distance: $4500\,000\,000 \div 200\,000\,000 = 22.5\text{m}$

Planet Postcard

Imagine that you have taken a much-needed holiday to another planet. Using the **Planet Fact Cards**, write a postcard back to your family or friends on Earth describing the planet and the activities that you took part in. Try to use as many facts as you can about your chosen planet.





Space Lesson 1: Space and The Solar System

Teaching Ideas

Learning Objective: To explore space and the solar system.

Success Criteria:

- **To identify the planets in our solar system.**
- **To describe a planet in our solar system.**
- **To calculate a scale model of the solar system using a scale.**

Context: This is lesson 1 in a series of lessons that covers the topic of KS3 space. This lesson focuses on the planets and where they lie in our Solar System. You can teach this lesson as a stand-alone lesson or use it to form the wider unit of work on space. The choice is yours!

Resources

scissors
sticky tape
card
mini-whiteboards
A4 and A3 paper
compass
string
trundle wheel

Starter

Rate Your Knowledge

Students are required to rate their knowledge of space from the five true or false statements. You may choose to use mini-whiteboards for this activity. This is a good opportunity for self-assessment – discuss each question in turn to address any misconceptions.

Main Activities

Day and Night

Recap day and night. Explain to students that when one side of the Earth faces the Sun, it is daytime on that side; the opposite side of the Earth is in darkness and therefore night time. The Earth spins on an invisible tilted line called an axis. Remind students that there are 24 hours in a day on Earth. Different planets have different-length days depending on how long it takes for them to rotate on their axes.

The Planets

In our Solar System, there are 8 planets. Ask students if they can remember the order of the planets from their work in primary school. Ask students if they know what a mnemonic is. A mnemonic is a way of remembering something. We can make a sentence out of the first letter of each word in a sequence to help us remember it. For example, we can remember how to spell 'because' by remembering the mnemonic: Big Elephants Can Always Understand Small Elephants.

Provide students with the [Planets Mnemonic Worksheet](#) and ask them to work with a partner to create their very own mnemonic to remember the order of the planets.

Our Solar System

Ask students what other objects might be found in space. Working with a partner, they have one minute to write a list of as many objects as they can think of. A one-minute timer has been included on the slide to support with this activity. You may choose to use mini-whiteboards, with students all showing their answers as the timer ends. At this point, there is scope for discussion about space objects other than planets. The list on the slide isn't comprehensive and students may suggest other ideas.

Modelling The Solar System

Provide students with the [Planet Fact Cards](#). (You may wish for students to work in groups to complete this activity.) They need to show their working out and write their answers on the cards. They then use their answers to make a scale model of the Solar System. This activity can be split into two parts; you may choose to focus on drawing the planets to scale or, depending on the space available, you may choose to model the distance of each planet from the sun. You may wish to do both parts.

Calculating the scaled diameter - Students calculate the diameter of each planet. They can then select the size of paper needed to draw each planet. Using a compass, students should draw correctly scaled versions of the planets and cut them out.

Calculating the scaled distance - Using the information, students calculate the distance of each planet from the Sun. If students have made the scaled models of the planets, you may choose to use these as markers. If students have not made the scaled planets, they could create their own planet masks using the [Planet Masks Worksheets](#).

Take students to a suitable location. This may be a large school hall or the school field. Each group of students should have a suitable marker in place to represent the Sun, such as a cone or lamp. Using a trundle wheel, each group should map out their scale model of the Solar System and either use their scale drawings as markers or stand the correct distances from 'the Sun' while wearing their planet masks.

Plenary:

Planet Postcard

Students should imagine that they have taken a much-needed holiday to another planet. Using the [Planet Fact Cards](#), students should write a postcard back to their family or friends on Earth describing the planet and the activities that they have been taking part in. They should try to use as many facts about their chosen planets as possible.