



# Beyond Earth: Colonising Space

YEAR 5  
EARTH AND SPACE SCIENCES



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# Future Makers

Future Makers is an innovative partnership between Queensland Museum Network and Shell's QGC business aiming to increase awareness and understanding of the value of science, technology, engineering and maths (STEM) education and skills in Queensland.

This partnership aims to engage and inspire people with the wonder of science, and increase the participation and performance of students in STEM-related subjects and careers — creating a highly capable workforce for the future.

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# ELABORATE

## Beyond Earth: Colonising Space

### Teacher Resource

Humans have dreamt of colonising space for decades. While building a permanent human settlement in space poses huge biological, technological and economic challenges, there has never been a time in history where human knowledge, understanding and desire to colonise space has been greater. Today, human settlement in space is closer to becoming a reality than ever before, and your students could be some of the first humans to inhabit a planet other than Earth.

In this persuasive writing task, students determine where humans should create the first space colony, using prior learning and research to justify their decisions. This task could be presented as a video, podcast, multimodal presentation or written report. Students could work in pairs to complete this task.

Students should compare options and choose the planetary body they believe would best suit the needs of humans. This could include:

- a) Atmosphere
- b) Gravity
- c) Availability of resources
- d) Distance from Earth

Students may use the Future Makers planet posters to gather information about the planets in our solar system. If desired, students may also investigate the moons of our solar system when deciding where the first human settlement should be.

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### Curriculum Links

#### Science

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##### Science Understanding

The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078)

##### Science as a Human Endeavour

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE081)

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

##### Science Inquiry Skills

Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACSIS093)

#### English

YEAR 5

##### Literacy

Clarify understanding of content as it unfolds in formal and informal situations, connecting ideas to students' own experiences and present and justify a point of view (ACELY1699)

Identify and explain characteristic text structures and language features used in imaginative, informative and persuasive texts to meet the purpose of the text (ACELY1701)

Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources (ACELY1703)

Plan, draft and publish imaginative, informative and persuasive print and multimodal texts, choosing text structures, language features, images and sound appropriate to purpose and audience (ACELY1704)

##### General Capabilities

###### Literacy

Composing texts through speaking, writing and listening

###### Critical and Creative Thinking

Generating ideas, possibilities and actions

Reflecting on thinking and processes

# Beyond Earth: Colonising Space

## Student Activity

Today, human settlement on another planet is closer to becoming a reality than ever before. You could be some of the first humans to inhabit a planet other than Earth. Where would you go?

In this persuasive task you should answer the question:

### **Where should humans create the first space colony?**

You should choose the planet/moon you believe would best meet the needs of humans and justify your decision. In your answer you should also compare your chosen planet/moon to others in the solar system.

Your answer should consider:

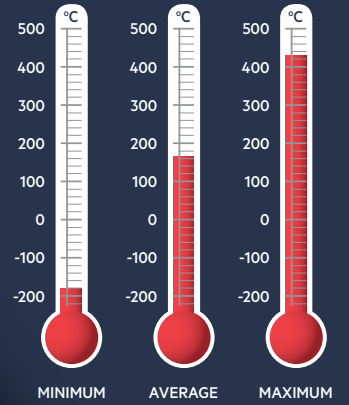
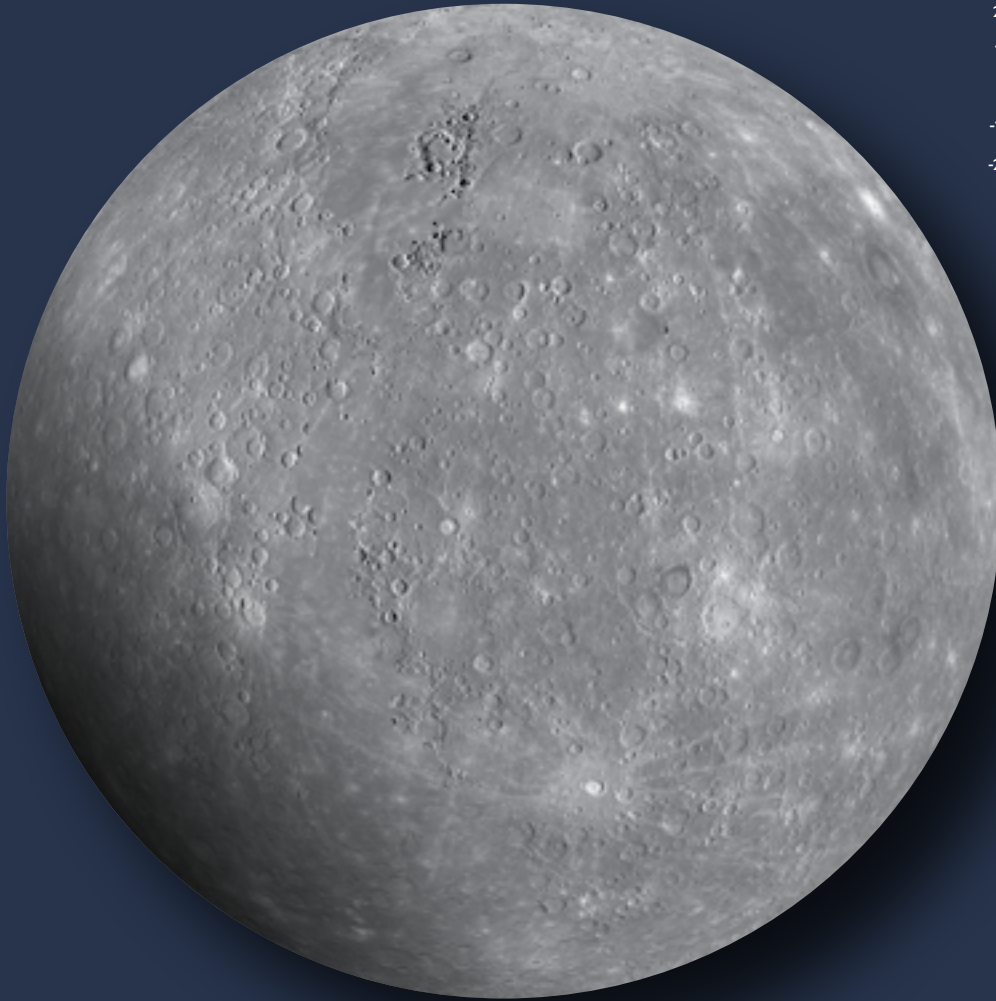
- a) Atmosphere
- b) Gravity
- c) Availability of resources
- d) Distance from Earth

# **Planet Posters**

## **Teacher Resource**

Future Makers planet posters can be downloaded from Queensland Museum Learning Resources, and printed in A3 to display around the classroom. Students may use the Future Makers planet posters to gather information about the planets in our solar system including temperature, distance from the Sun, diameter and atmosphere composition.

# Mercury



<b>Distance from Sun</b>	58,000,000 km 0.4 AU
<b>Diameter</b>	4879 km
<b>Gravity</b>	3.7 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	42% oxygen 22% hydrogen 22% sodium 6% helium 8% other
<b>Day Length</b>	1,408 hours
<b>Year Length</b>	88 Earth days

## INTERESTING FACTS

Mercury is the smallest planet in the solar system – only slightly bigger than Earth’s Moon. It also has craters and a thin atmosphere like our Moon.

From the surface of Mercury, the Sun would appear more than three times larger than when viewed from Earth, and the sunlight would be as much as 11 times brighter.

While Mercury is the closest planet to the Sun, it is not the hottest (Venus is hotter due to its dense atmosphere).



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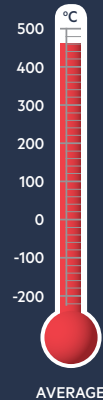


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# Venus



<b>Distance from Sun</b>	108,000,000 km 0.7 AU
<b>Diameter</b>	12,104 km
<b>Gravity</b>	8.9 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	96.5% carbon dioxide 3.5% nitrogen <1% other
<b>Day Length</b>	5,832 hours
<b>Year Length</b>	225 Earth days

## INTERESTING FACTS

With an atmosphere of 96% carbon dioxide, Venus is the hottest planet in our Solar System and an example of the Greenhouse effect gone amuck!

Venus is fascinatingly hostile. Future missions will have to contend with not only the heat, but also frequent sulfuric acid rainstorms and very high air pressure. Standing on the surface of Venus would feel like standing under 1 km of water!

Venus is a similar size to Earth and our closest neighbour, but a very different world!



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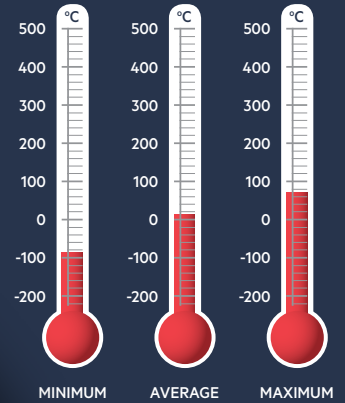


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# Earth



<b>Distance from Sun</b>	149,600,000 km 1 AU
<b>Diameter</b>	12,756 km
<b>Gravity</b>	9.807 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	78% nitrogen 21% oxygen 1% argon <1% other
<b>Day Length</b>	24 hours
<b>Year Length</b>	365.2 Earth days

## INTERESTING FACTS

Liquid water is very important for life. The Earth is located in the 'Goldilocks Zone'. This is the habitable zone around a star where the temperature is not too hot and not too cold – instead it is just the right temperature for water to exist as a liquid.

While 70% of the Earth is covered in water only 2.5% is fresh water, and most of this is inaccessible in glaciers and icecaps.

Earth's atmosphere is 160 km thick and composed of 78% nitrogen and 21% oxygen.



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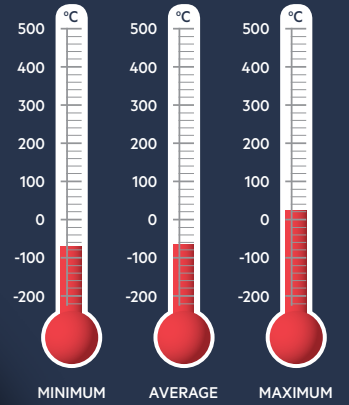
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# Mars



<b>Distance from Sun</b>	227,900,000 km 1.5 AU
<b>Diameter</b>	6792 km
<b>Gravity</b>	1.6 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	95% carbon dioxide 2.7% nitrogen 1.6% argon 0.7% other
<b>Day Length</b>	25 hours
<b>Year Length</b>	687 Earth days

## INTERESTING FACTS

Olympus Mons, an extinct volcano on Mars, is the highest mountain in the Solar System – 2.5 times bigger than Mt Everest! Mars also has the biggest valley (Mariner Valley).

Mars is known as the Red Planet. Iron in the soil and atmosphere oxidises (rusts) giving Mars this distinctive colour.

Similar to Earth, Mars experiences seasons. It also experiences thousands of tornados or 'dust devils' every year which can get up to 2 km wide and 10 km high.



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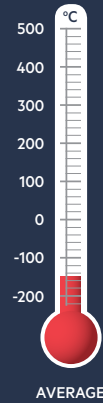


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# Jupiter



<b>Distance from Sun</b>	778,600,000 km 5.2 AU
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<b>Diameter</b>	142,984 km
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<b>Gravity</b>	23.1 m/s <sup>2</sup>
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<b>Atmosphere Composition</b>	89.8% hydrogen 10.2% helium
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<b>Day Length</b>	10 hours
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<b>Year Length</b>	12 Earth years
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## INTERESTING FACTS

Jupiter is the largest planet in our Solar System – 11 Earths could fit across Jupiter's equator.

Like Saturn, Jupiter is a gas giant. Gas giants do not have a solid surface like Earth and other terrestrial planets.

The Great Red Spot is a giant cyclone-like storm on Jupiter. The storm has been continuously observed since 1830, and is twice the size of Earth. The colour bands on Jupiter are caused by powerful winds that circle the planet at 547 km/h.



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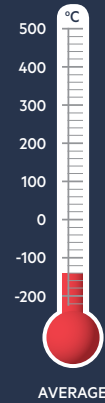


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# Saturn



<b>Distance from Sun</b>	1,433,500,000 km 9.6 AU
<b>Diameter</b>	120,536 km
<b>Gravity</b>	9.0 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	96.3% hydrogen 3.2% helium 0.5% other
<b>Day Length</b>	11 hours
<b>Year Length</b>	29 Earth years

## INTERESTING FACTS

Saturn's iconic rings are made of chunks of rock and ice. However, Saturn is slowly losing these rings as gravity pulls the rock and ice toward the planet.

53 known moons orbit Saturn, and there are more awaiting confirmation. Saturn's largest moon, Titan, is the only known world other than Earth where liquid collects on its surface. Liquid methane and ethane lakes cover the surface.

A monstrous thunderstorm appears on Saturn every 28 to 30 years, called the 'Great White Spot'.



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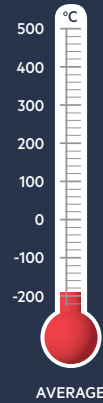


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# Uranus



<b>Distance from Sun</b>	2,872,500,000 km 19.2 AU
<b>Diameter</b>	51,118 km
<b>Gravity</b>	8.7 m/s <sup>2</sup>
<b>Atmosphere Composition</b>	82.5% hydrogen 15.2% helium 2.3% methane
<b>Day Length</b>	17 hours
<b>Year Length</b>	84 Earth years

## INTERESTING FACTS

Uranus is the only planet in our Solar System that rotates on its side – it almost appears to ‘roll’ around the Sun. This sideways rotation – possibly caused by a collision with a large object – causes extreme seasons. Summer for the planet’s north consists of 21 Earth years of constant daylight, while winter is 21 years of complete darkness.

The blue-green colour of Uranus is due to the methane in the atmosphere.



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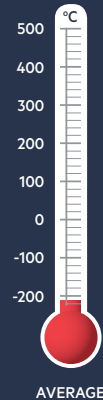
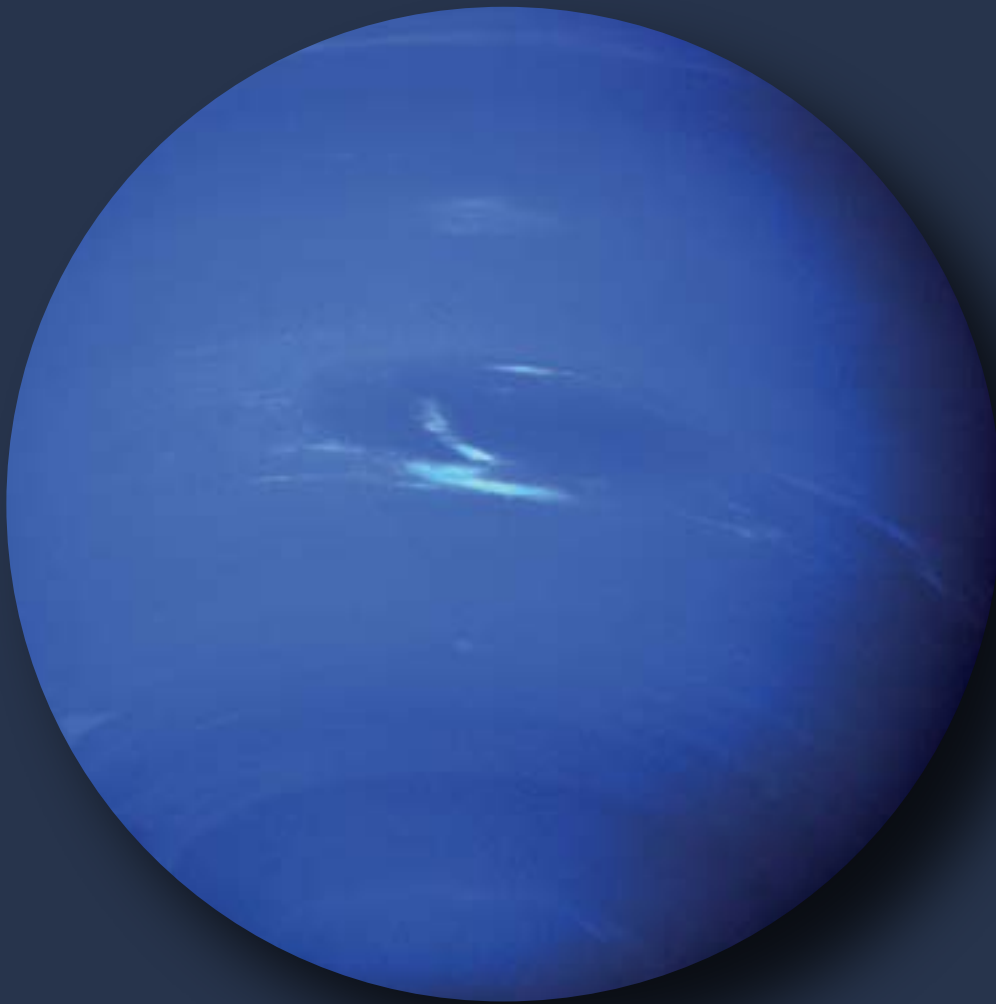


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# Neptune



<b>Distance from Sun</b>	4,495,100,000 km 30.1 AU
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<b>Diameter</b>	49,528 km
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<b>Gravity</b>	11.0 m/s <sup>2</sup>
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<b>Atmosphere Composition</b>	80% hydrogen 19% helium 1% methane
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<b>Day Length</b>	16 hours
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<b>Year Length</b>	165 Earth years
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## INTERESTING FACTS

Neptune and Uranus are ice giants – they do not have a solid surface. Instead the gasses of the atmosphere surround liquid methane, ammonia and water. The centre of the planet is a heavier solid core.

There is less friction on Neptune than on Earth and winds speed around the planet at 2000 km/h. These winds are the fastest in the Solar System, and faster than the speed of sound. Earth's most powerful winds only reach 400 km/h.



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