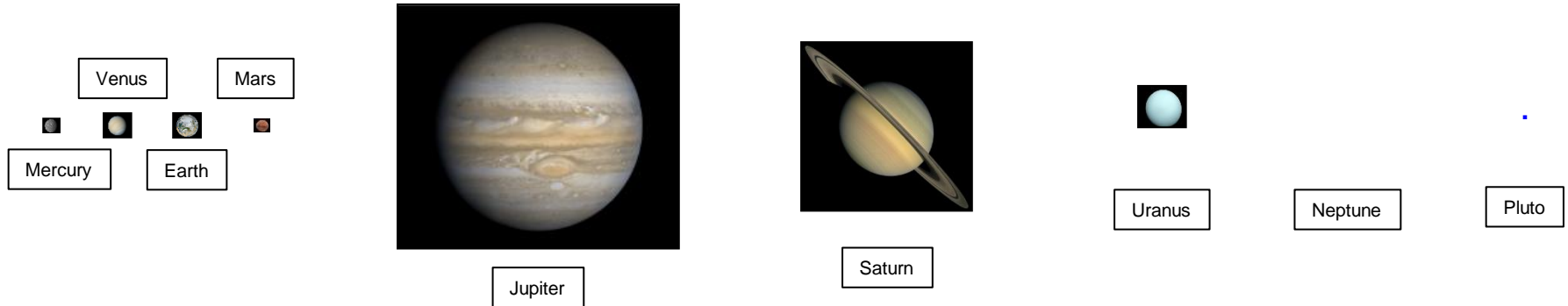


Solar System

If the Sun was the size of a standard football....

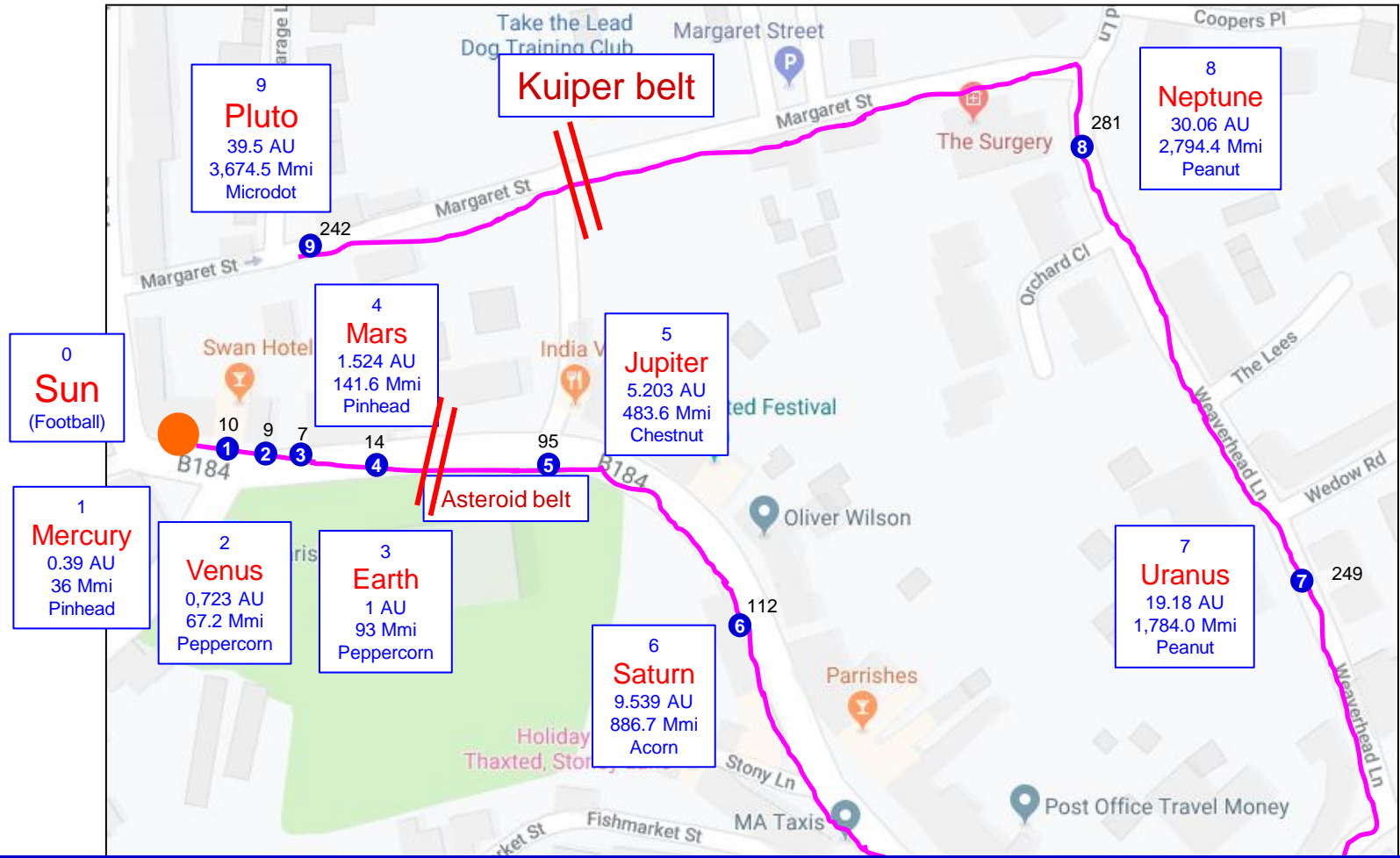
Then... the size of the Planets would be >



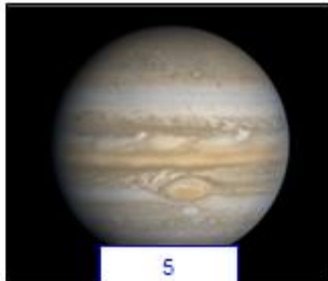
Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Pinhead	Peppercorn	Peppercorn	Pinhead	Chestnut	Acorn	Peanut	Peanut	Dot
Dia. 3,000 mi	Dia. 7,521 mi	Dia. 7926 mi	Dia. 4,224 mi	Dia. 88,846 mi	Dia. 74,897 mi	Dia. 31,763 mi	Dia. 30,775 mi	Dia. 1,471
Dia. 4,879 km	Dia. 12,104 km	Dia. 12,756 km	Dia. 6,792 km	Dia. 142,984 km	Dia. 120,536 km	Dia. 51,118 km	Dia. 49,528 km	Dia. 2,368 km
M. 0.330 10^{24}	M. 4.87 10^{24}	M. 5.97 10^{24}	M. 0.642 10^{24}	M. 1898 10^{24}	M. 568 10^{24}	M. 86.8 10^{24}	M. 102 10^{24}	M. 0.013 10^{24}
M. 0.06 Earths	M. 0.82 Earths	M 1.00 Earths	M. 0.11 Earths	M. 318 Earths	M. 95 Earths	M. 15 Earths	M. 17 Earths	M. 0.002 Earths
WF. 0.378	WF. 0.995	WF. 1	WF. 0.379	WF. 2.529	WF. 1.066	WF. 0.903	WF. 1.096	WF. 0.069
Orb. 88 Days	Orb. 225 Days	Orb. 365.24 Days	Orb. 687 Days	Orb. 4,333 Days	Orb. 10,756 Days	Orb. 30,687 Days	Orb. 60,190 Days	Orb. 90,000 Days
Orb. 3 Months	Orb. 7.5 Months	Orb. 1 Year	Orb. 1.9 Years	Orb. 11.9 Years	Orb. 29.5 Years	Orb. 84 Years	Orb. 164.8 Years	Orb. 247.9 Years
DS. 0.39 AU	DS. 0.723 AU	DS. 1 AU	DS. 1.524 AU	DS. 5.203 AU	DS. 9.539 AU	DS. 19.18 AU	DS. 30.06 AU	DS. 39.53 AU
DS. +10 Steps	DS. +09 Steps	DS. +07 Steps	DS. +14 Steps	DS. +95 Steps	DS. +112 Steps	DS. +249 Steps	DS. +281 Steps	DS. +242 Steps
DS. T10 Steps	DS. T19 Steps	DS. T26 Steps	DS. T40 Steps	DS. T135 Steps	DS. T247 Steps	DS. T496 Steps	DS. T777 Steps	DS. T1019 Steps

TAS > A Stroll Through The Solar System >

X



0
Sun
Football



1
Mercury

2
Venus

3
Earth

4
Mars

5
Jupiter

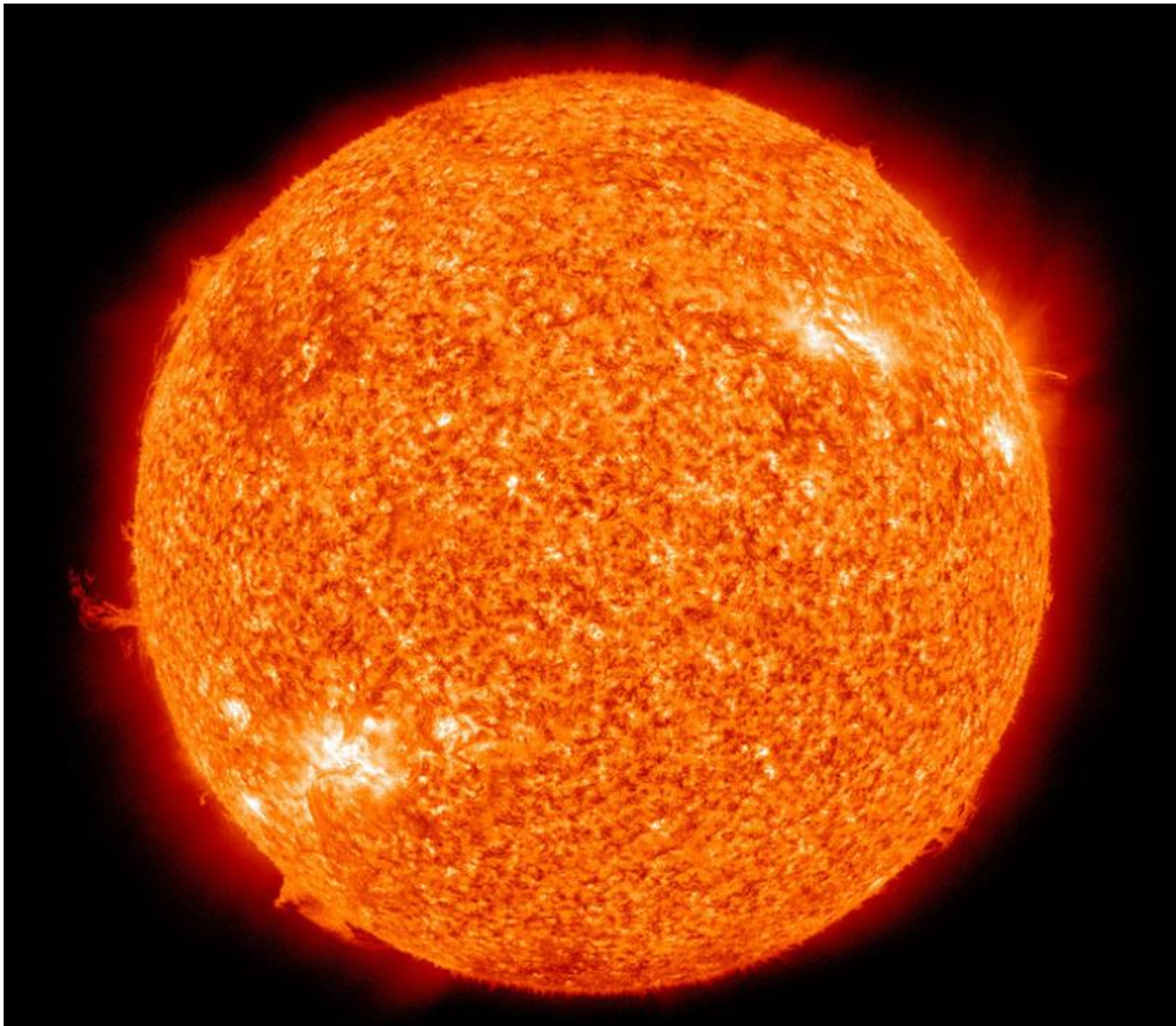
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Saturn

7
Uranus

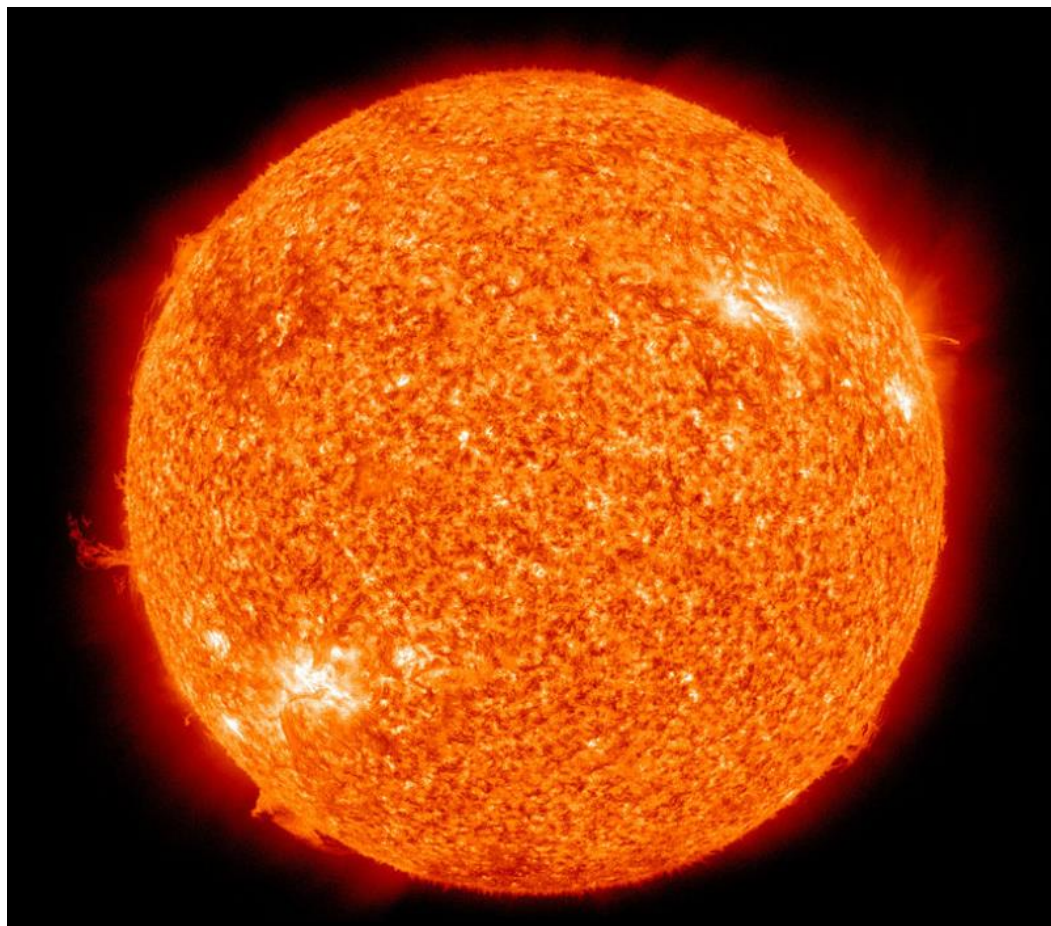
8
Neptune



Sun



The Sun > The most powerful sun god in ancient Rome was Sol Invictus, meaning “Unconquered Sun.”



Age:	4.6 Billion Years
Type:	Yellow Dwarf (G2V)
Diameter:	1,392,684 km
Equatorial Circumference:	4,370,005.6 km
Mass:	1.99×10^{30} kg (333,060 Earths)
Surface Temperature:	5,500 °C

Why is it Named > The Sun ? >

The most powerful sun god in ancient Rome was Sol Invictus, meaning “Unconquered Sun.”

Although, according to the Oxford English Dictionary, the word sun comes from many sources, including the Latin sol **and the Anglo-Saxon word sunne**; both of which attached a feminine gender to the “heavenly body.

The Sun >

Our Sun is a typical yellow dwarf star, a hot ball of glowing gases at the heart of our solar system. Its gravity holds the solar system together, keeping everything.. from the biggest planets to the smallest particles of debris.. in its orbit.

The connection and interactions between the Sun and Earth drive the seasons, ocean currents, weather, climate, radiation belts and auroras. Though it is special to us, there are billions of stars like our Sun scattered across the Milky Way galaxy.

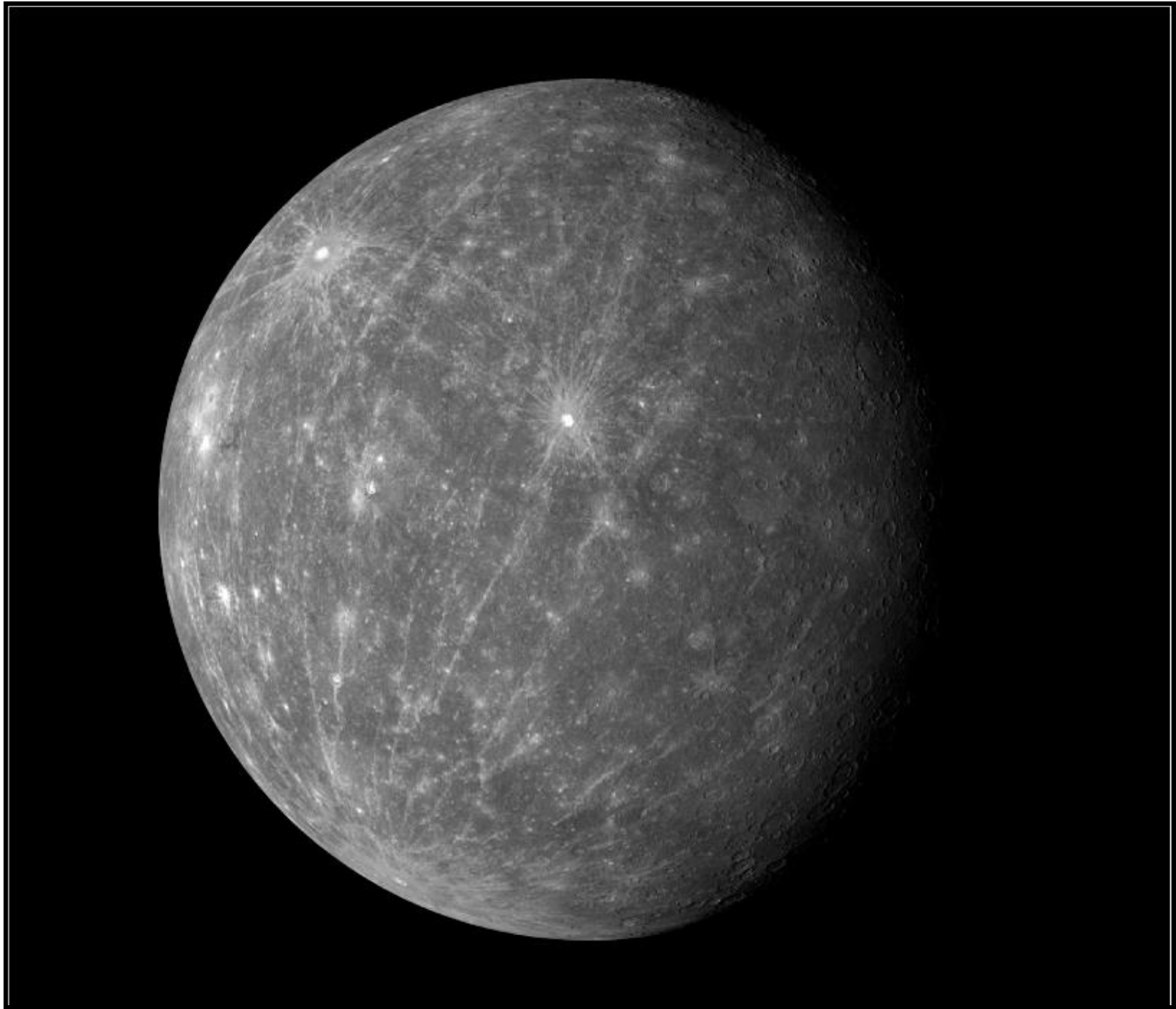
The Sun accounts for 99.86% of the mass in the solar system. It has a mass of around 330,000 times that of Earth. It is three quarters hydrogen and most of its remaining mass is helium.

If you were to fill a hollow Sun with spherical Earths, somewhere around **960,000** would fit inside. However, if you squashed those Earths to ensure there was no wasted space then you could fit **1,300,000 Earths** inside the Sun. The surface area of the Sun is 11,990 times that of Earth.

One day the Sun will consume the Earth. The Sun will continue to burn for about 130 million years after it burns through all of its hydrogen, instead burning helium. During this time it will expand to such a size that it will engulf Mercury, Venus, and Earth. When it reaches this point, it will have become a red giant star.

The Sun is almost a perfect sphere. Considering the sheer size of the Sun, there is only a 10 km difference in its polar and equatorial diameters – this makes it the closest thing to a perfect sphere observed in nature.

Mercury

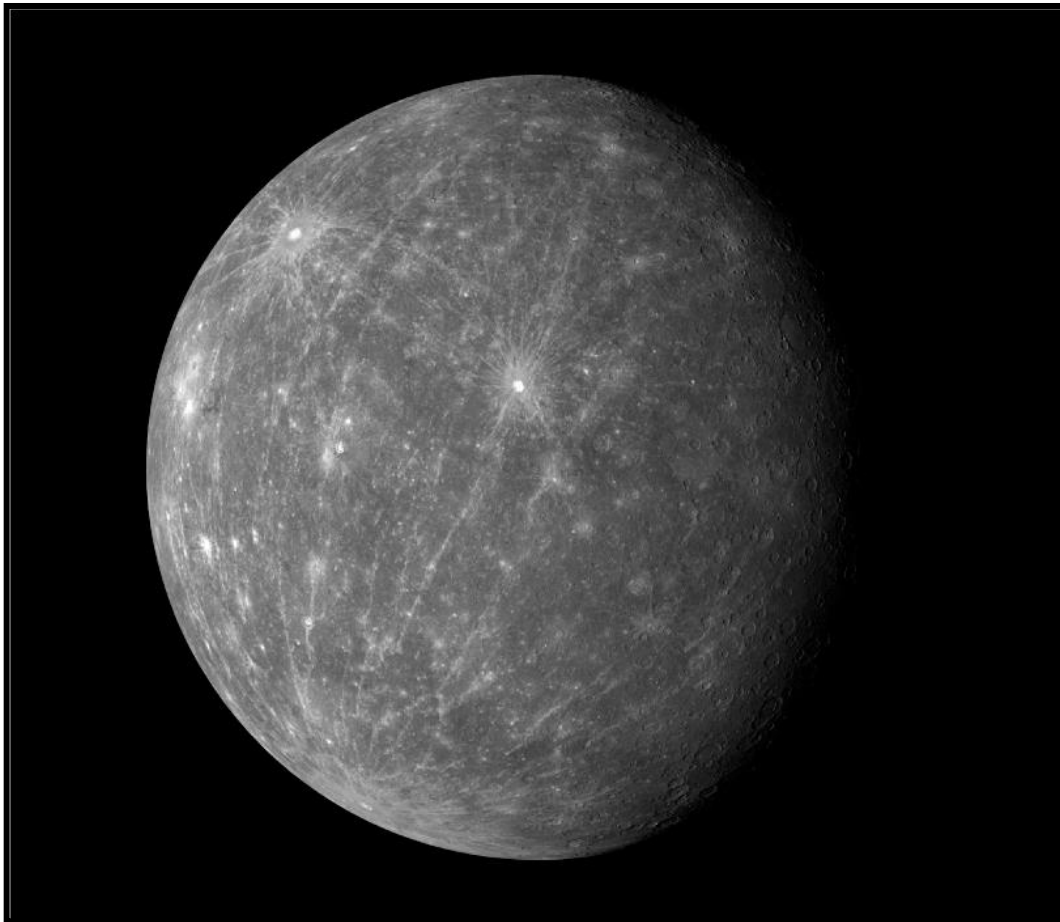


TAS > Mercury >

<https://space-facts.com/planets/>

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Mercury > Named after the Roman deity Mercury, the messenger of the gods.



Diameter:	4,879 km
Mass:	3.29×10^{23} kg (0.06 Earths)
Moons:	None
Orbit Distance:	57,909,227 km (0.39 AU)
Orbit Period:	88 days
Surface Temperature:	-173 to 427°C

TAS > Mercury >

<https://space-facts.com/planets/>

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Mercury > Named after the Roman deity Mercury, the messenger of the gods.

Mercury is the smallest planet.

Mercury does not have any moons or rings.

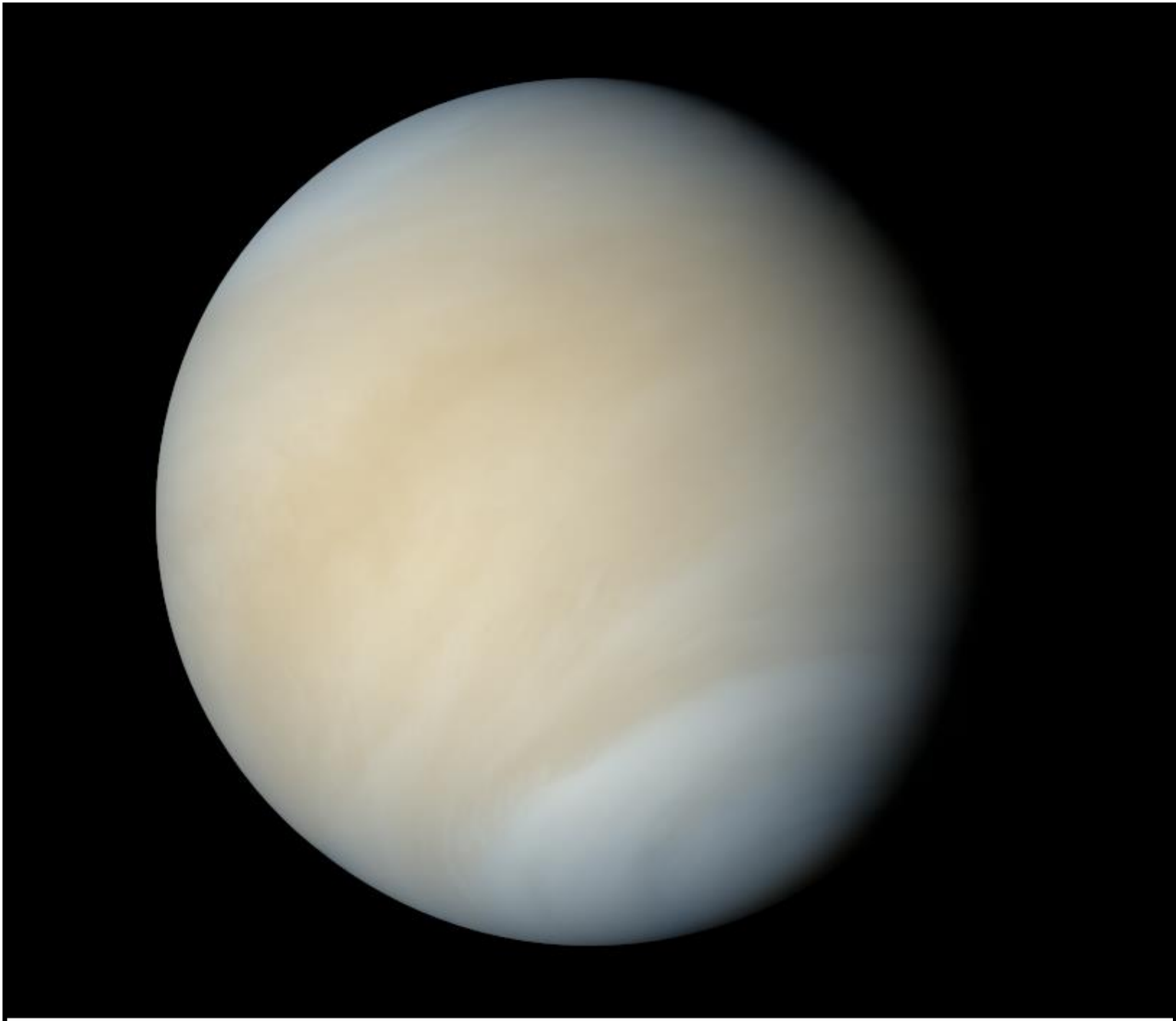
Mercury is only the second hottest planet. Despite being further from the Sun, Venus experiences higher temperatures. The surface of Mercury which faces the Sun sees temperatures of up to 427°C, whilst on the alternate side this can be as low as -173°C. This is due to the planet having no atmosphere to help regulate the temperature.

Mercury is the **most cratered planet in the Solar System**. Unlike many other planets which “self-heal” through natural geological processes, the surface of Mercury is covered in craters. These are caused by numerous encounters with asteroids and comets. Most Mercurian craters are named after famous writers and artists. **Any crater larger than 250 kilometres in diameter is referred to as a Basin**. The Caloris Basin is the largest impact crater on Mercury covering approximately 1,550 km in diameter and was discovered in 1974 by the Mariner 10 probe.

Mercury has an atmosphere (sort of). Mercury has just 38% the gravity of Earth, this is too little to hold on to what atmosphere it has which is blown away by solar winds. However while gases escape into space they are constantly being replenished at the same time by the same solar winds, radioactive decay and dust caused by micrometeorites



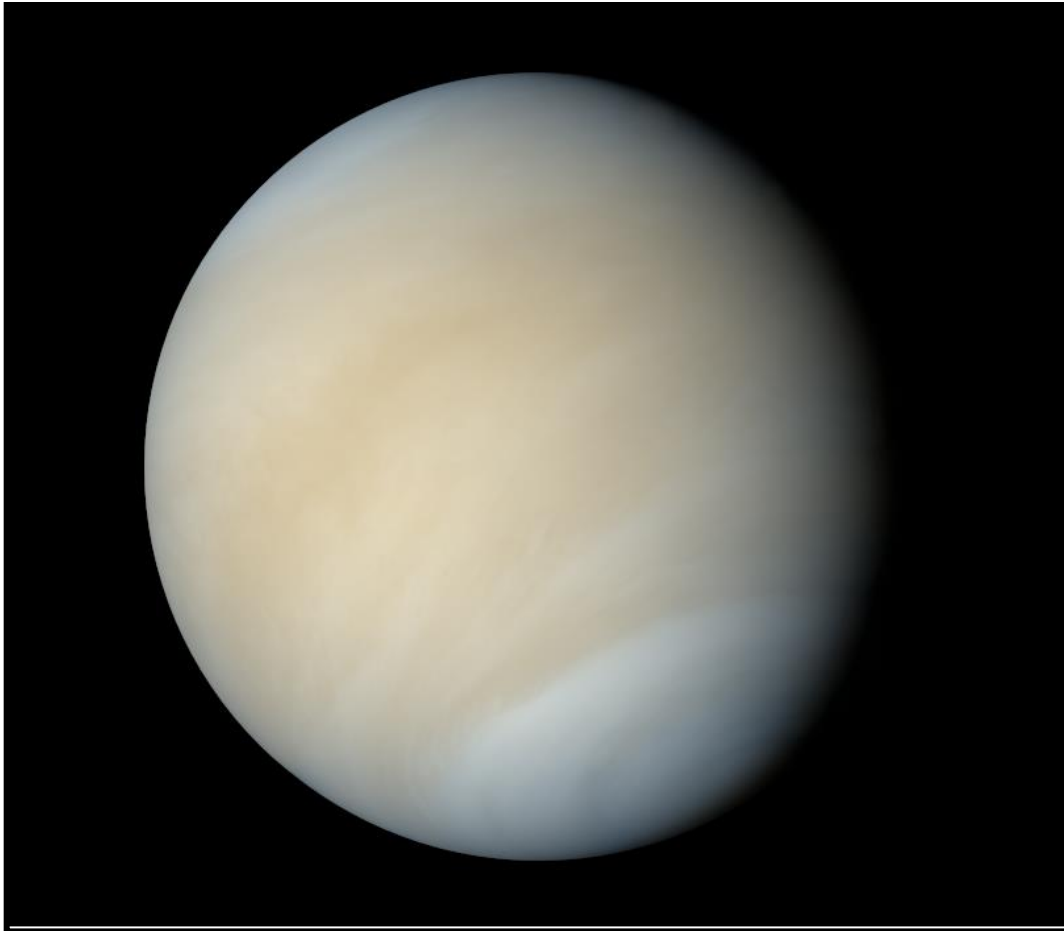
Venus



TAS > Venus >

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Venus > Named after the Roman goddess of love and beauty



Diameter:	12,104 km
Mass:	4.87×10^{24} kg (0.82 Earths)
Moons:	None
Orbit Distance:	108,209,475 km (0.73 AU)
Orbit Period:	225 days
Surface Temperature:	462 °C

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Venus > Named after the Roman goddess of love and beauty

Venus rotates in the opposite direction to most other planets. This means that Venus is rotating in the opposite direction to the Sun, this is also known as a retrograde rotation. One possible reason for this might be a collision with an asteroid or other object.

Venus is the second brightest object in the night sky. Only the Moon is brighter. With a magnitude of between -3.8 to -4.6 Venus is so bright it can be seen during daytime on a clear day.

Atmospheric pressure on Venus is 92 times greater than the Earth's. Due to this crushing small asteroids when they enter its atmosphere Venus has not small craters. The pressure felt on Venus' surface is equivalent to that deep beneath the sea on Earth.

Venus is often called the Earth's sister planet. The Earth and Venus are very similar in size with only a 638 km difference in diameter and Venus having 81.5% of the Earth's mass. Both also have a central core, a molten mantle and a crust.

Venus is also known as the Morning Star and the Evening Star. Early civilisations thought Venus was two different bodies. These were called Phosphorus and Hesperus by the Greeks, and Lucifer and Vesper by the Romans. When Venus' orbit around the Sun overtakes Earth's orbit, it changes from being visible after sunset to being visible before sunrise. Mayan astronomers made detailed observations of Venus as early as 650 AD.

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Guide To Observing
Venus

Introduction

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Earth



The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Earth > Named after Anglo-Saxon word erda, which means ground or soil



Equatorial Diameter:	12,756 km
Polar Diameter:	12,714 km
Mass:	5.97×10^{24} kg
Moons:	1 (The Moon)
Orbit Distance:	149,598,262 km (1 AU)
Orbit Period:	365.24 days
Surface Temperature:	-88 to 58°C

Why is it Named > The Planet Earth ? >

The name **Earth** derives from the eighth century Anglo-Saxon word *erda*, which means ground or soil.

It became *eorthe* later,

and then *erthe* in Middle English.

Earth is the only planet that wasn't named after a Greek or Roman god or goddess

Why Do They Call The Earth Terra firma?

Terra firma is a Latin phrase, literally meaning "firm land."

In the 1600s, terra firma primarily referred just to the section of Italy that was ruled by Venice at the time, but eventually it came to designate all of earth's dry land, separate from the air or the oceans.

In post-classical Latin astronomical terminology, Earth is often referred to as "Terra".

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Earth > Named after Anglo-Saxon word erda, which means ground or soil

The Earth's rotation is gradually slowing. This deceleration is happening almost imperceptibly, at approximately 17 milliseconds per hundred years, although the rate at which it occurs is not perfectly uniform. This has the effect of lengthening our days, but it happens so slowly that it could be as much as 140 million years before the length of a day will have increased to 25 hours.

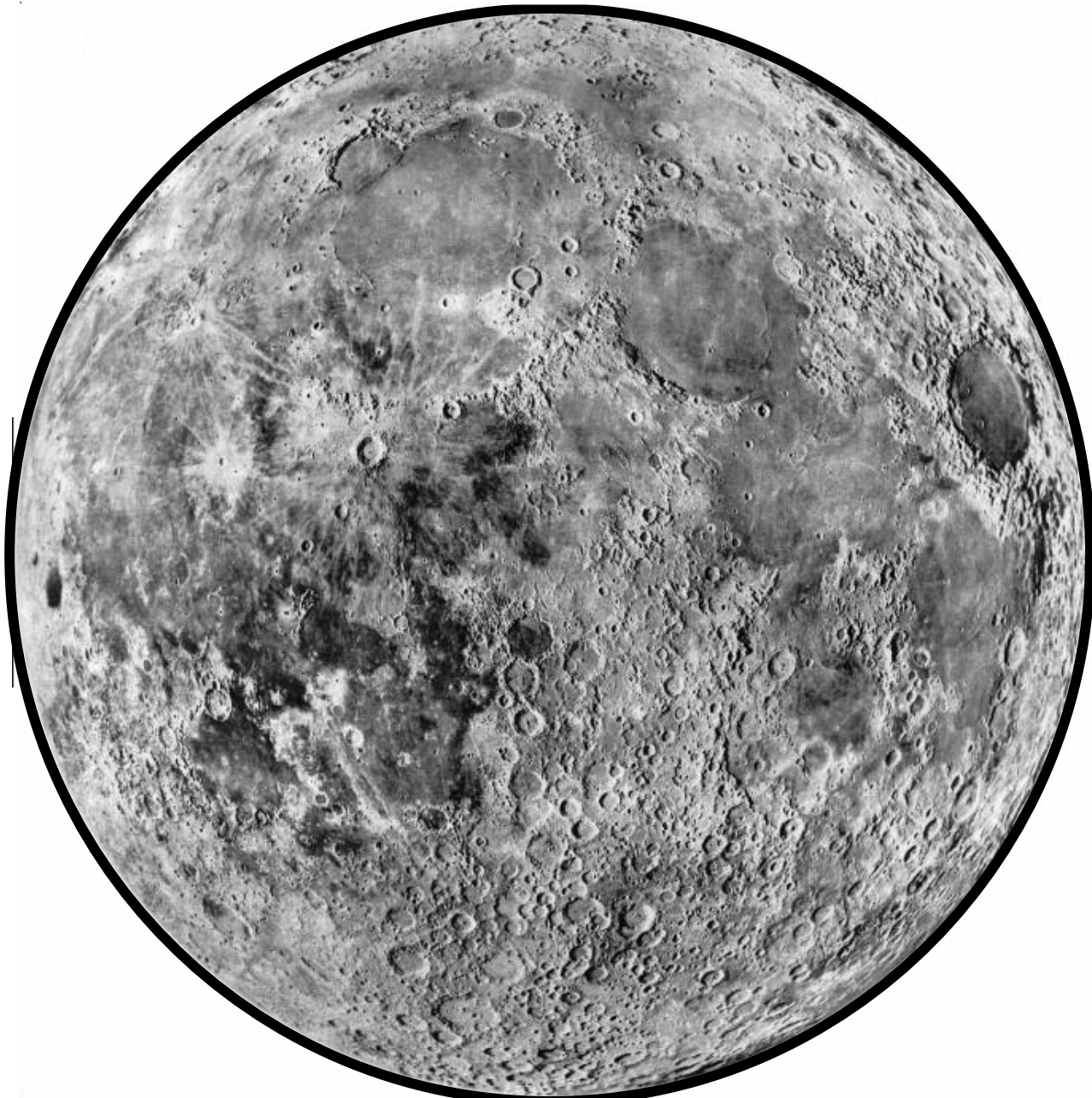
The Earth was once believed to be the centre of the universe. Due to the apparent movements of the Sun and planets in relation to their viewpoint, ancient scientists insisted that the Earth remained static, whilst other celestial bodies travelled in circular orbits around it. Eventually, the view that the Sun was at the centre of the universe was postulated by Copernicus, though this is also not the case.

Earth has a powerful magnetic field. This phenomenon is caused by the nickel-iron core of the planet, coupled with its rapid rotation. This field protects the Earth from the effects of solar wind.

The Earth is the densest planet in the Solar System. This varies according to the part of the planet; for example, the metallic core is denser than the crust. The average density of the Earth is approximately 5.52 grams per cubic centimetre.

When astronauts first went into the space, they looked back at the Earth with human eyes for the first time, and called our home the Blue Planet. And it's no surprise. 70% of our planet is covered with oceans. The remaining 30% is the solid ground, rising above sea level.

Moon



Apollo
Landing
Sites >

A11
Tranquility

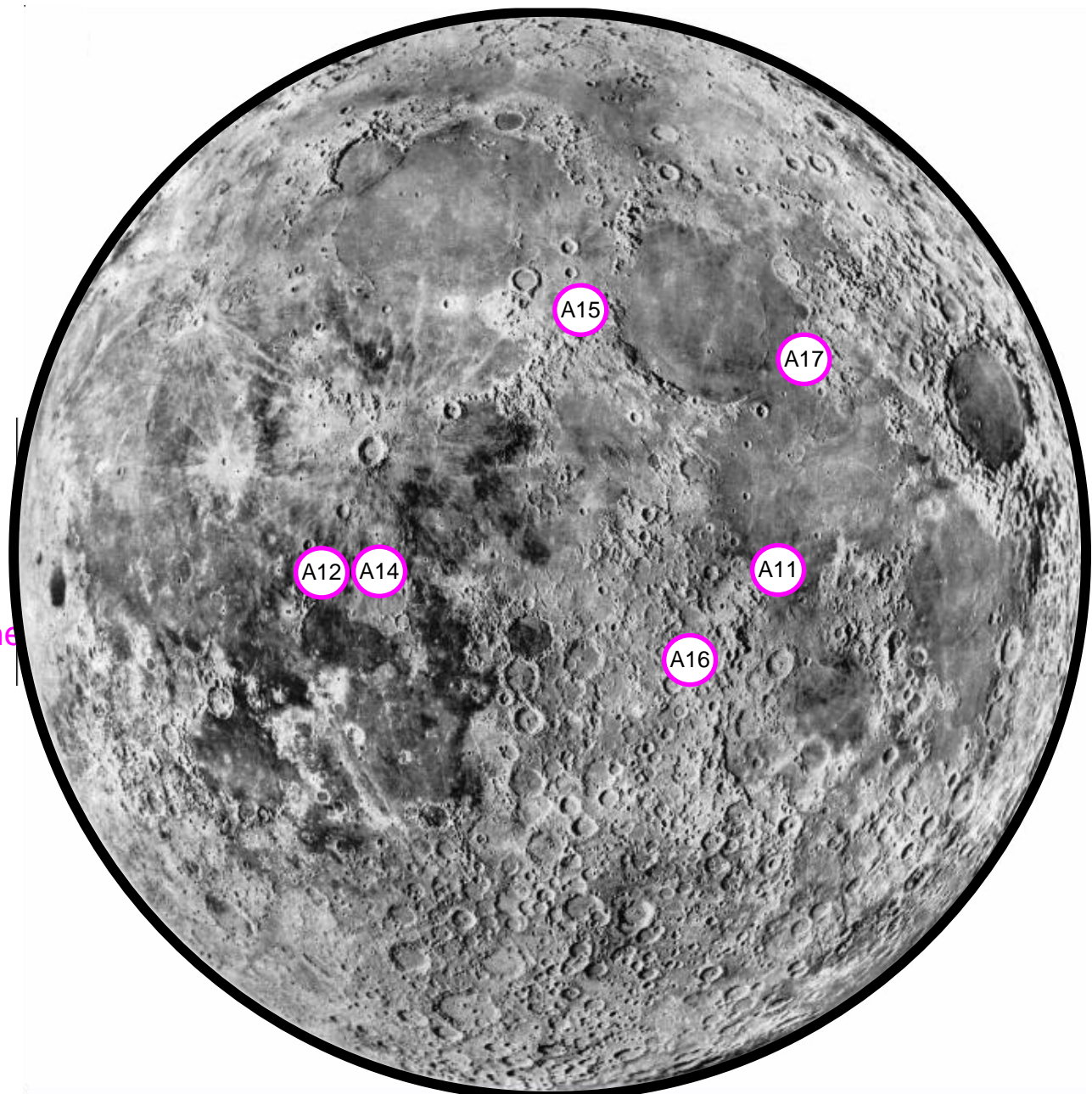
A12
Procellarum

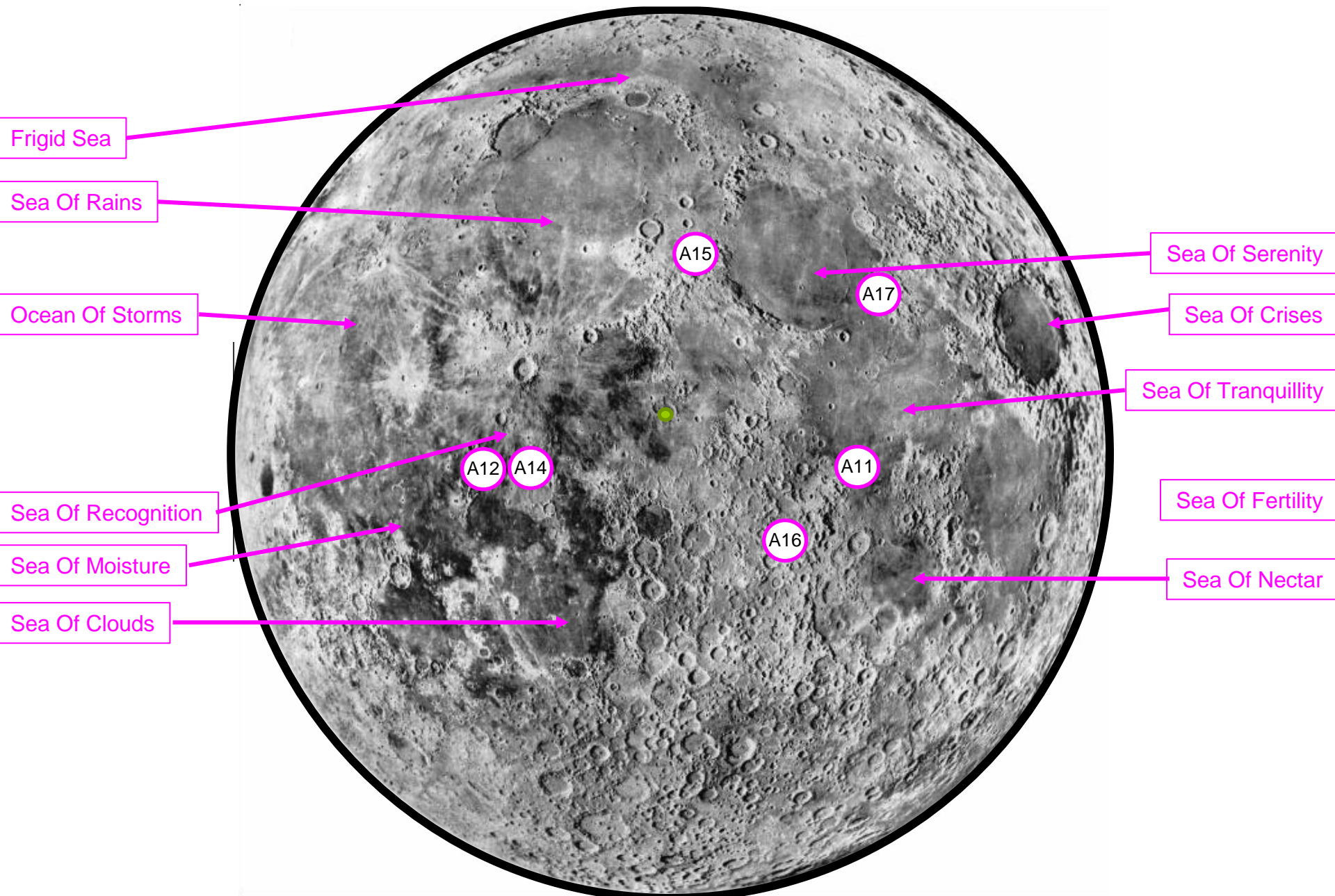
A14
Fra Mauro

A15
Hadley-Apennine

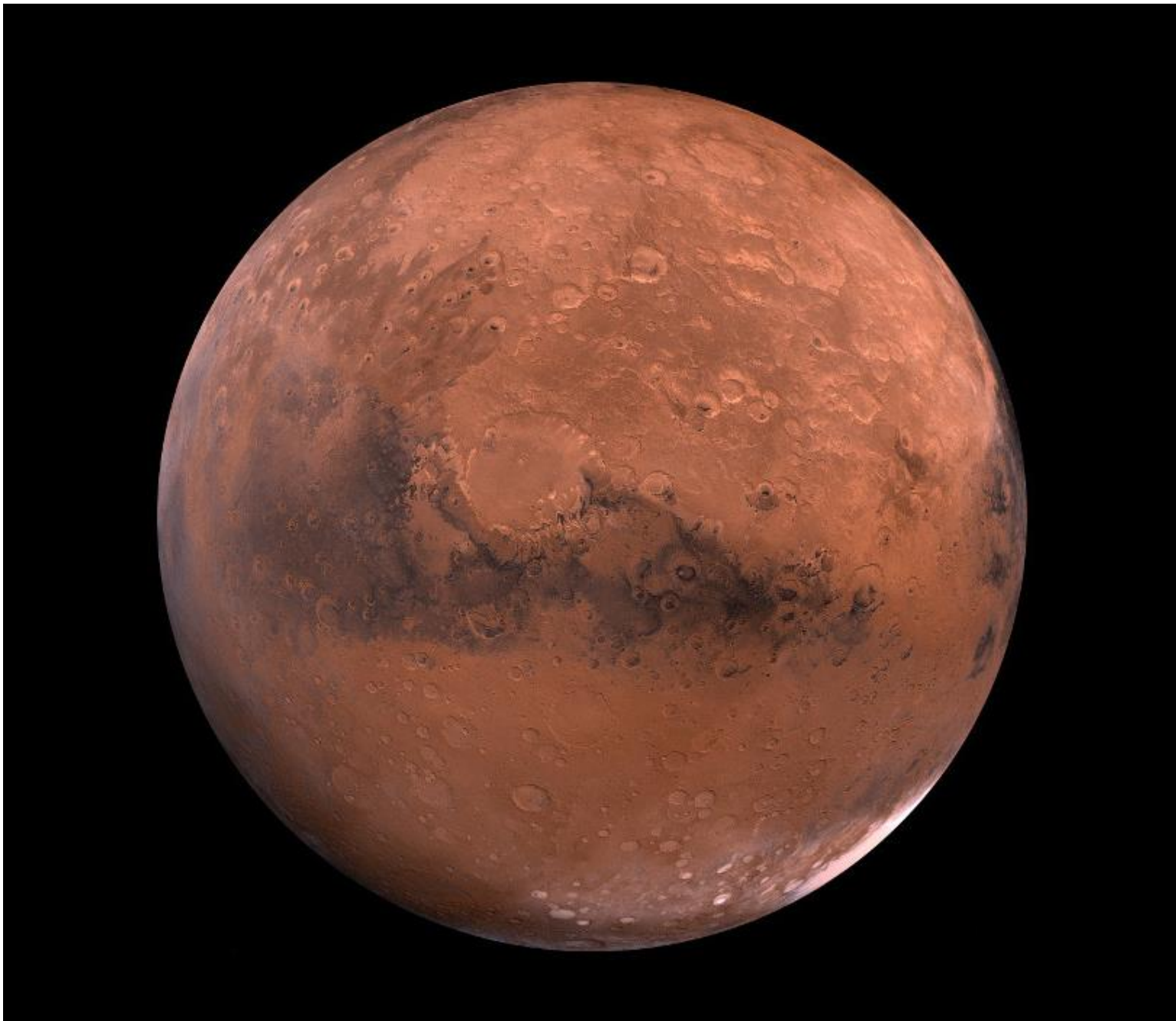
A16
Descartes

A17
Taurus-Littrow



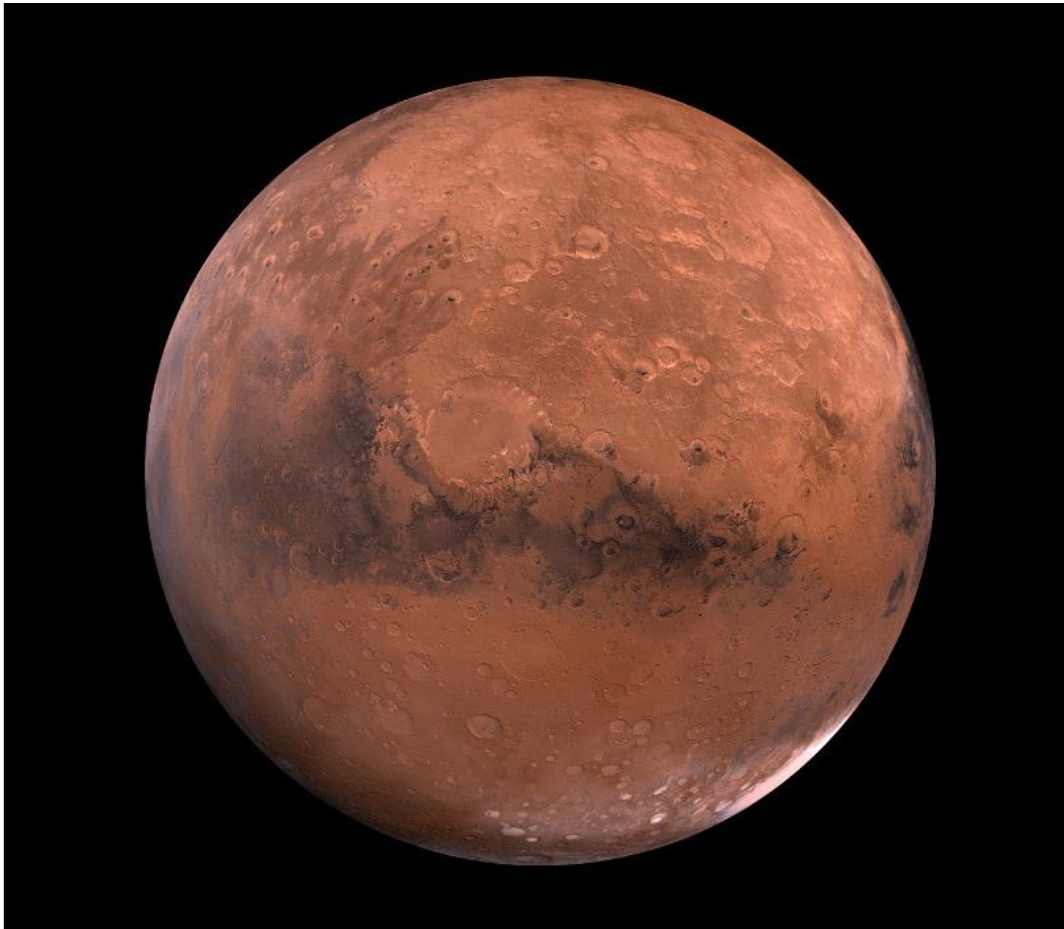


Mars



The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Mars > Named after the Roman god of war



Equatorial Diameter:	6,792 km
Polar Diameter:	6,752 km
Mass:	6.39 × 10 ²³ kg (0.11 Earths)
Moons:	2 (Phobos & Deimos)
Orbit Distance:	227,943,824 km (1.38 AU)
Orbit Period:	687 days (1.9 years)
Surface Temperature:	-87 to -5 °C

The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal

Mars > Named after the Roman god of war

Mars and Earth have approximately the same landmass. Even though Mars has only 15% of the Earth's volume and just over 10% of the Earth's mass, around two thirds of the Earth's surface is covered in water. Martian surface gravity is only 37% of the Earth's (meaning you could leap nearly three times higher on Mars).

Mars is home to the tallest mountain in the solar system. **Olympus Mons**, a shield volcano, is 21km high and 600km in diameter. Despite having formed over billions of years, evidence from volcanic lava flows is so recent many scientists believe it could still be active.

Mars has the largest dust storms in the solar system. They can last for months and cover the entire planet. The seasons are extreme because its elliptical (oval-shaped) orbital path around the Sun is more elongated than most other planets in the solar system.

On Mars the Sun appears about half the size as it does on Earth. At the closest point to the Sun, the Martian southern hemisphere leans towards the Sun, causing a short, intensely hot summer, while the northern hemisphere endures a brief, cold winter: at its farthest point from the Sun, the Martian northern hemisphere leans towards the Sun, causing a long, mild summer, while the southern hemisphere endures a lengthy, cold winter.

One day Mars will have a ring. In the next 20-40 million years Mars' largest moon Phobos will be torn apart by gravitational forces leading to the creation of a ring that could last up to 100 million years.

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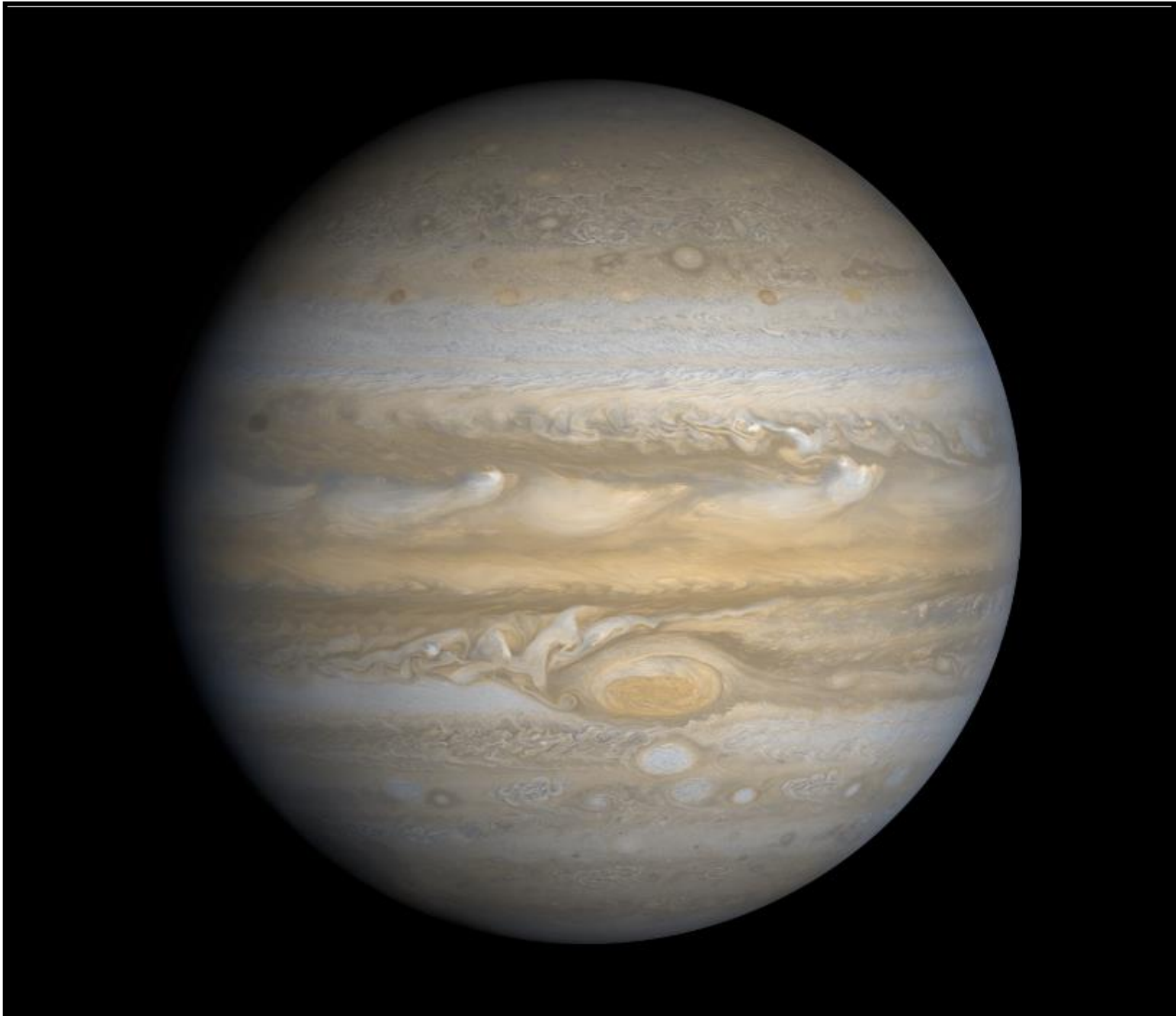
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Guide To Observing
Mars

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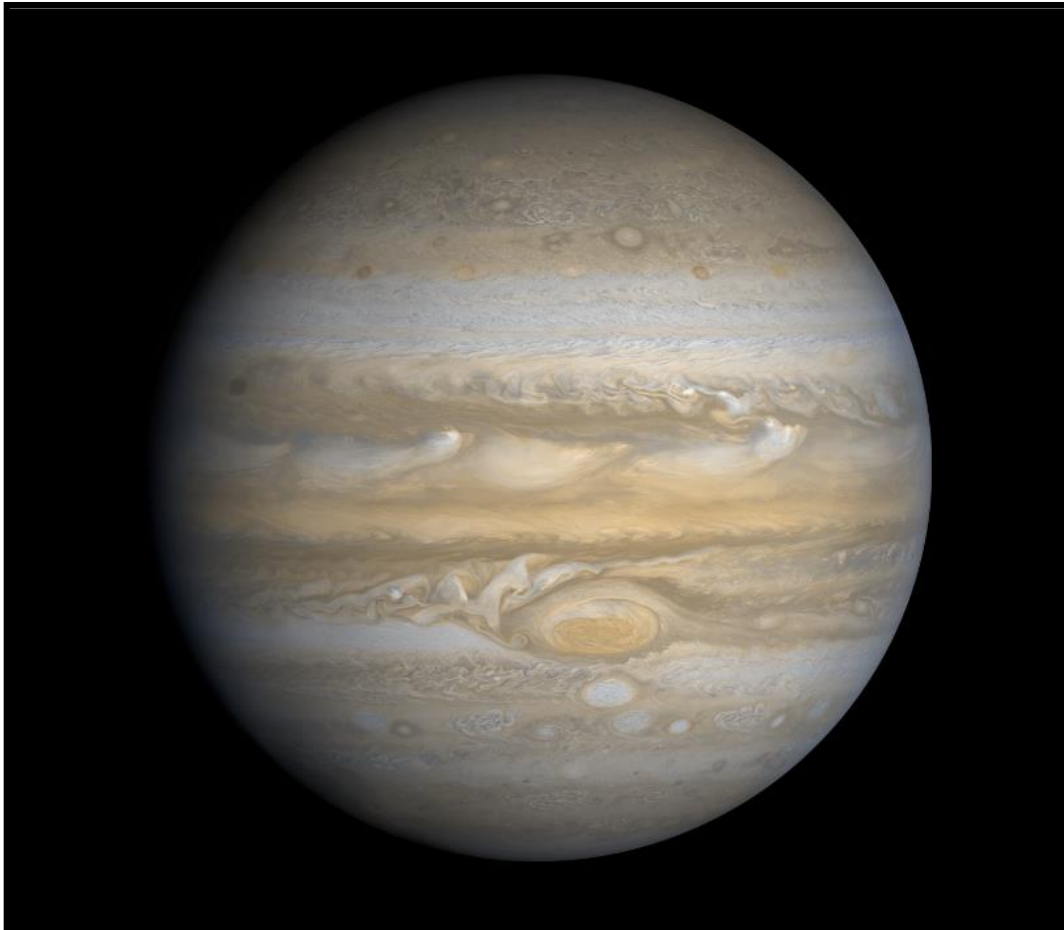
Jupiter



TAS > Jupiter >

The two largest, **Jupiter and Saturn, are gas giants**, being composed mainly of hydrogen and helium

Jupiter > Named after the Roman god Jupiter.



Equatorial Diameter:	142,984 km
Polar Diameter:	133,709 km
Mass:	1.90×10^{27} kg (318 Earths)
Moons:	79 (Io, Europa, Ganymede & Callisto)
Rings:	4
Orbit Distance:	778,340,821 km (5.20 AU)
Orbit Period:	4,333 days (11.9 years)
Surface Temperature:	-108°C

The two largest, Jupiter and Saturn, are gas giants, being composed mainly of hydrogen and helium

Jupiter > Named after the Roman god Jupiter.

Jupiter is the fourth brightest object in the solar system. Only the Sun, Moon and Venus are brighter. It is one of five planets visible to the naked eye from Earth.

The ancient Babylonians were the first to record their sightings of Jupiter. This was around the 7th or 8th century BC. Jupiter is named after the king of the Roman gods. To the Greeks, it represented Zeus, the god of thunder. The Mesopotamians saw Jupiter as the god Marduk and patron of the city of Babylon. Germanic tribes saw this planet as Donar, or Thor.

Jupiter has unique cloud features. The upper atmosphere of Jupiter is divided into cloud belts and zones. They are made primarily of ammonia crystals, sulfur, and mixtures of the two compounds.

The Great Red Spot is a huge storm on Jupiter. It has raged for at least 350 years. It is so large that three Earths could fit inside it.

Jupiter's interior is made of rock, metal, and hydrogen compounds. Below Jupiter's massive atmosphere (which is made primarily of hydrogen), there are layers of compressed hydrogen gas, liquid metallic hydrogen, and a core of ice, rock, and metals.

Jupiter's moon Ganymede is the largest moon in the solar system. Jupiter's moons are sometimes called the Jovian satellites, the largest of these are Ganymede, Callisto Io and Europa. Ganymede measures 5,268 km across, making it larger than the planet Mercury.

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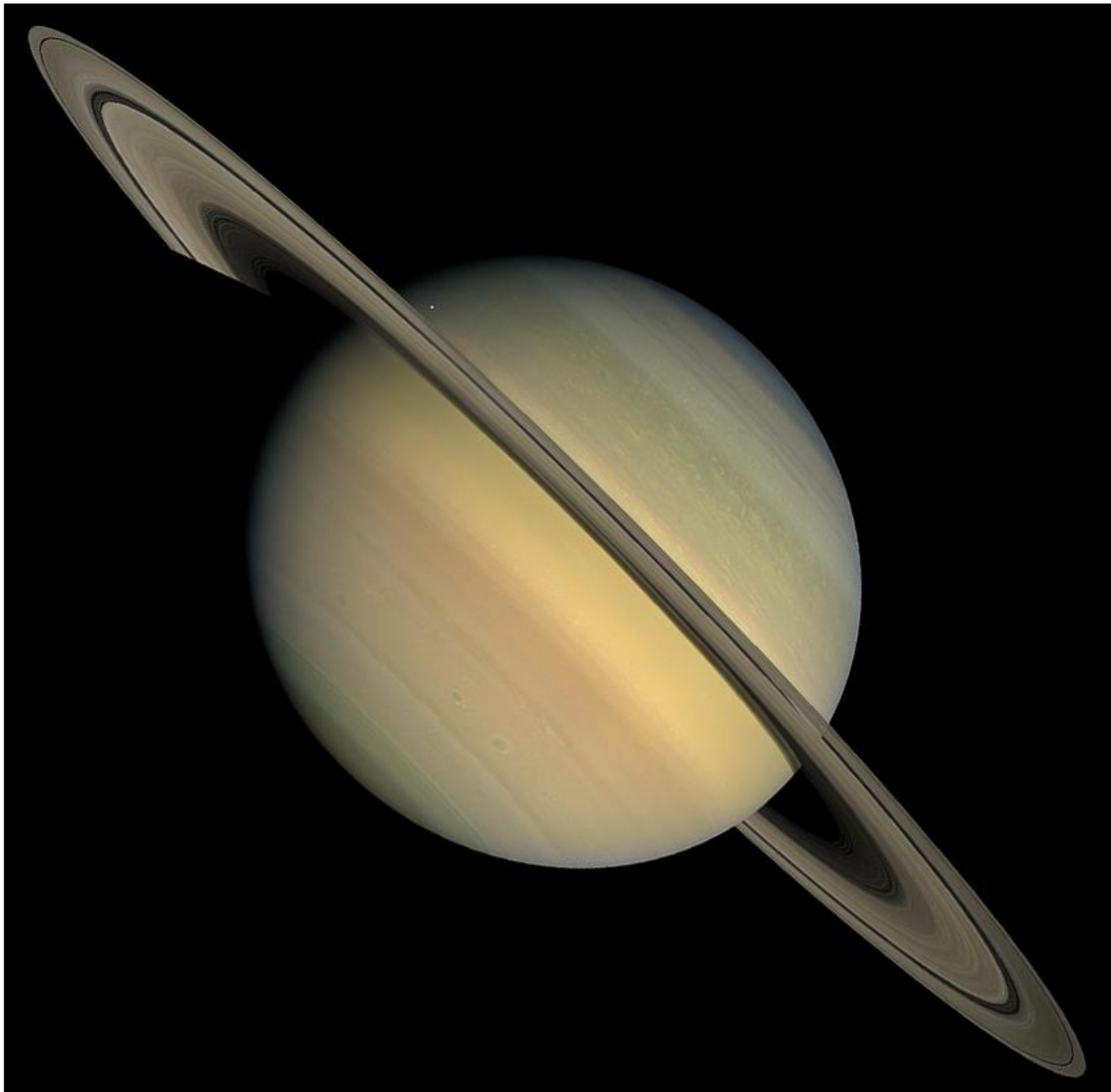
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Guide To Observing
Jupiter

Introduction

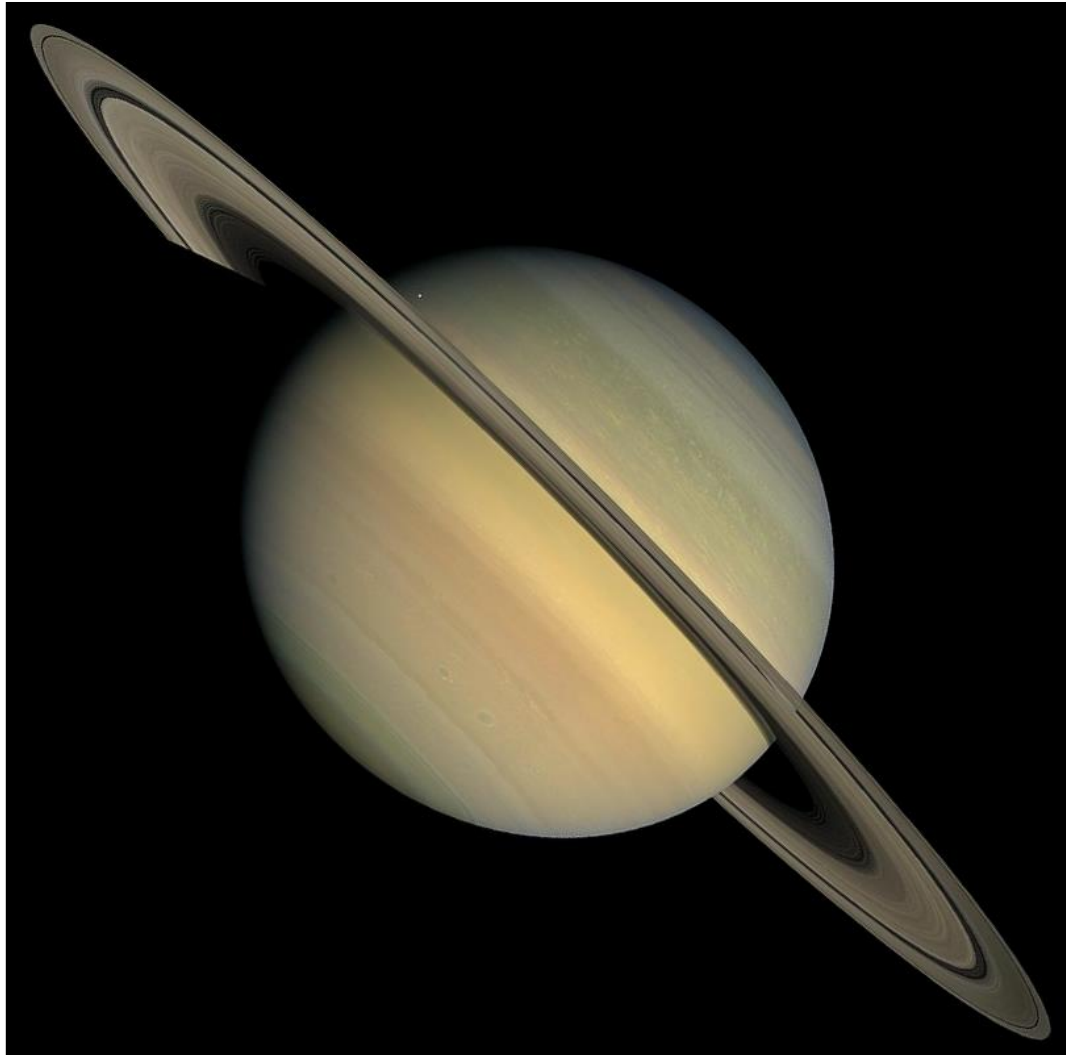
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Saturn



The two largest, Jupiter and Saturn, are gas giants, being composed mainly of hydrogen and helium

Saturn > Named after the Roman god Saturn



Equatorial Diameter:	120,536 km
Polar Diameter:	108,728 km
Mass:	5.68×10^{26} kg (95 Earths)
Moons:	82 (Titan, Enceladus, Iapetus & Rhea)
Rings:	30+ (7 Groups)
Orbit Distance:	1,426,666,422 km (9.58 AU)
Orbit Period:	10,756 days (29.5 years)
Surface Temperature:	-139 °C

The two largest, Jupiter and Saturn, are gas giants, being composed mainly of hydrogen and helium

Saturn > Named after the Roman god Saturn

Saturn was known to the ancients, including the Babylonians and Far Eastern observers. It is named for the Roman god Saturnus, and was known to the Greeks as Cronus.

Saturn is the flattest planet. Its polar diameter is 90% of its equatorial diameter, this is due to its low density and fast rotation. Saturn turns on its axis once every 10 hours and 34 minutes giving it the second-shortest day of any of the solar system's planets.

Saturn's upper atmosphere is divided into bands of clouds. The top layers are mostly ammonia ice. Below them, the clouds are largely water ice. Below are layers of cold hydrogen and sulfur ice mixtures.

Saturn has oval-shaped storms similar to Jupiter's. The region around its north pole has a hexagonal-shaped pattern of clouds. Scientists think this may be a wave pattern in the upper clouds. The planet also has a vortex over its south pole that resembles a hurricane-like storm.

Saturn is made mostly of hydrogen. It exists in layers that get denser farther into the planet. Eventually, deep inside, the hydrogen becomes metallic. At the core lies a hot interior.

Saturn has the most extensive rings in the solar system. The Saturnian rings are made mostly of chunks of ice and small amounts of carbonaceous dust. The rings stretch out more than 120,700 km from the planet, but are amazingly thin: only about 20 meters thick.

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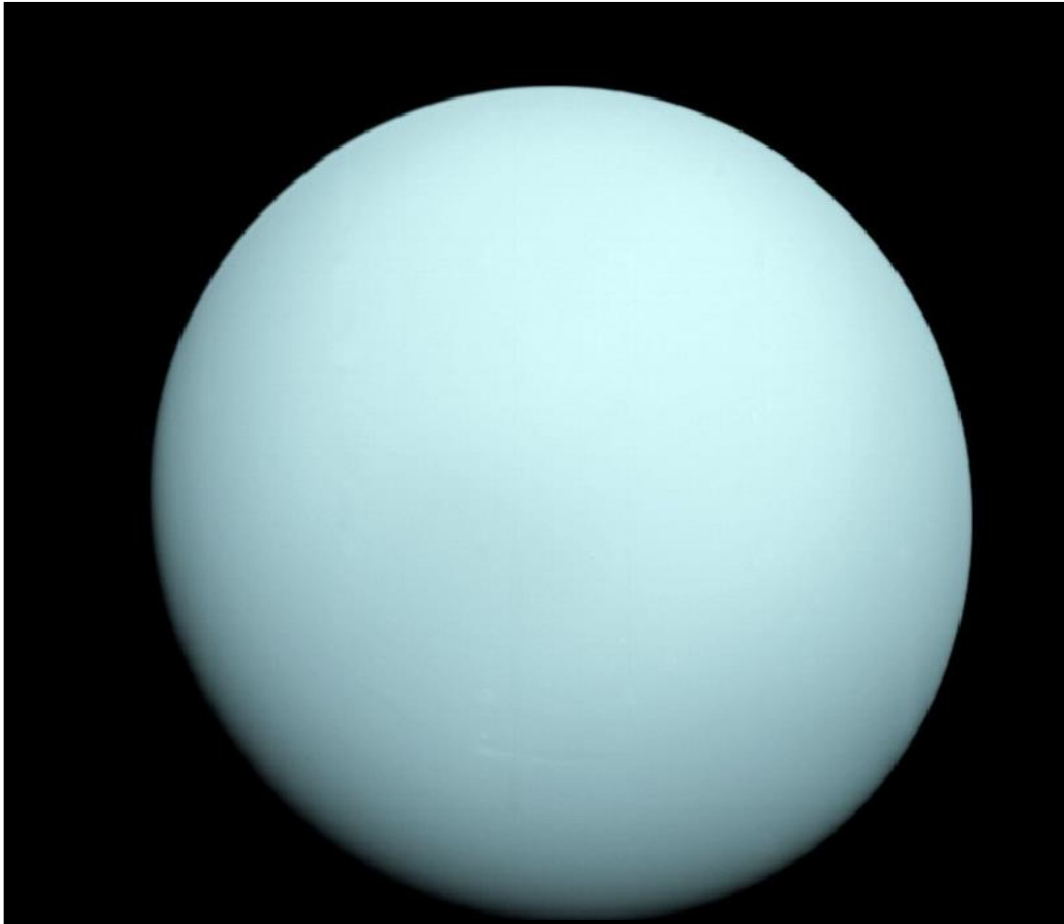
Uranus



TAS > Uranus >

The two outermost planets, Uranus and Neptune, are ice giants, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called volatiles, such as water, ammonia and methane.

Uranus > Named after the Greek god of the sky



Equatorial Diameter:	51,118 km
Polar Diameter:	49,946 km
Mass:	8.68×10^{25} kg (15 Earths)
Moons:	27 (Miranda, Titania, Ariel, Umbriel & Oberon)
Rings:	13
Orbit Distance:	2,870,658,186 km (19.22 AU)
Orbit Period:	30,687 days (84.0 years)
Surface Temperature:	-197 °C

The two outermost planets, **Uranus and Neptune, are ice giants**, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called volatiles, such as water, ammonia and methane.

Uranus > Named after the Greek god of the sky

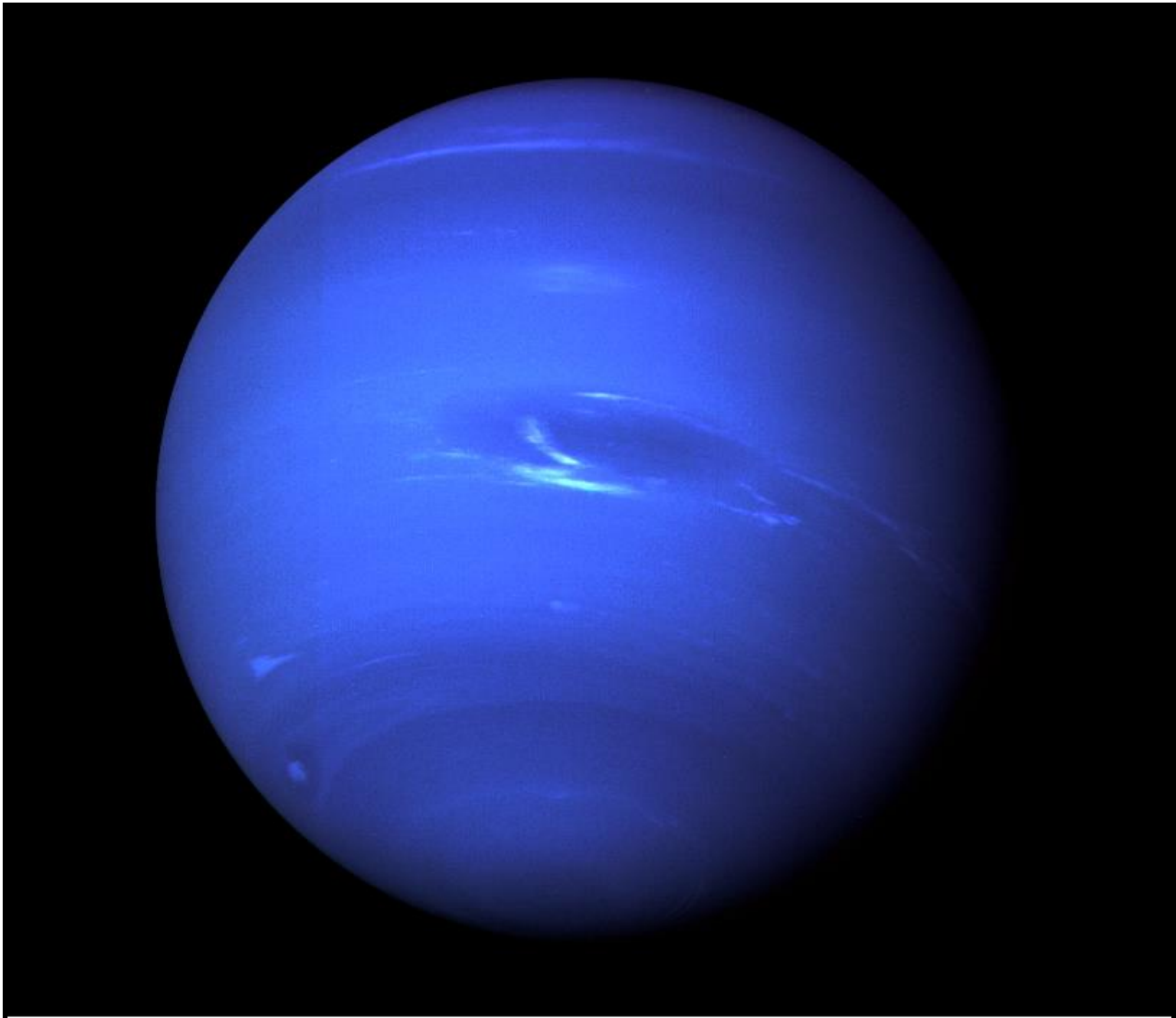
Uranus was officially discovered by Sir William Herschel in 1781. It is too dim to have been seen by the ancients. At first Herschel thought it was a comet, but several years later it was confirmed as a planet. Herschel tried to have his discovery named “Georgian Sidus” after King George III. The name Uranus was suggested by astronomer Johann Bode.

Uranus turns on its axis once every 17 hours, 14 minutes. The planet **rotates in a retrograde direction, opposite to the way Earth and most other planets turn.**

Uranus is often referred to as an “ice giant” planet. Like the other gas giants, it has a hydrogen upper layer, which has helium mixed in. Below that is an icy “mantle, which surrounds a rock and ice core. The upper atmosphere is made of water, ammonia and the methane ice crystals that give the planet its pale blue colour.

Uranus hits the coldest temperatures of any planet. With minimum atmospheric temperature of -224°C Uranus is nearly coldest planet in the solar system. While Neptune doesn't get as cold as Uranus it is on average colder. The upper atmosphere of Uranus is covered by a methane haze which hides the storms that take place in the cloud decks.

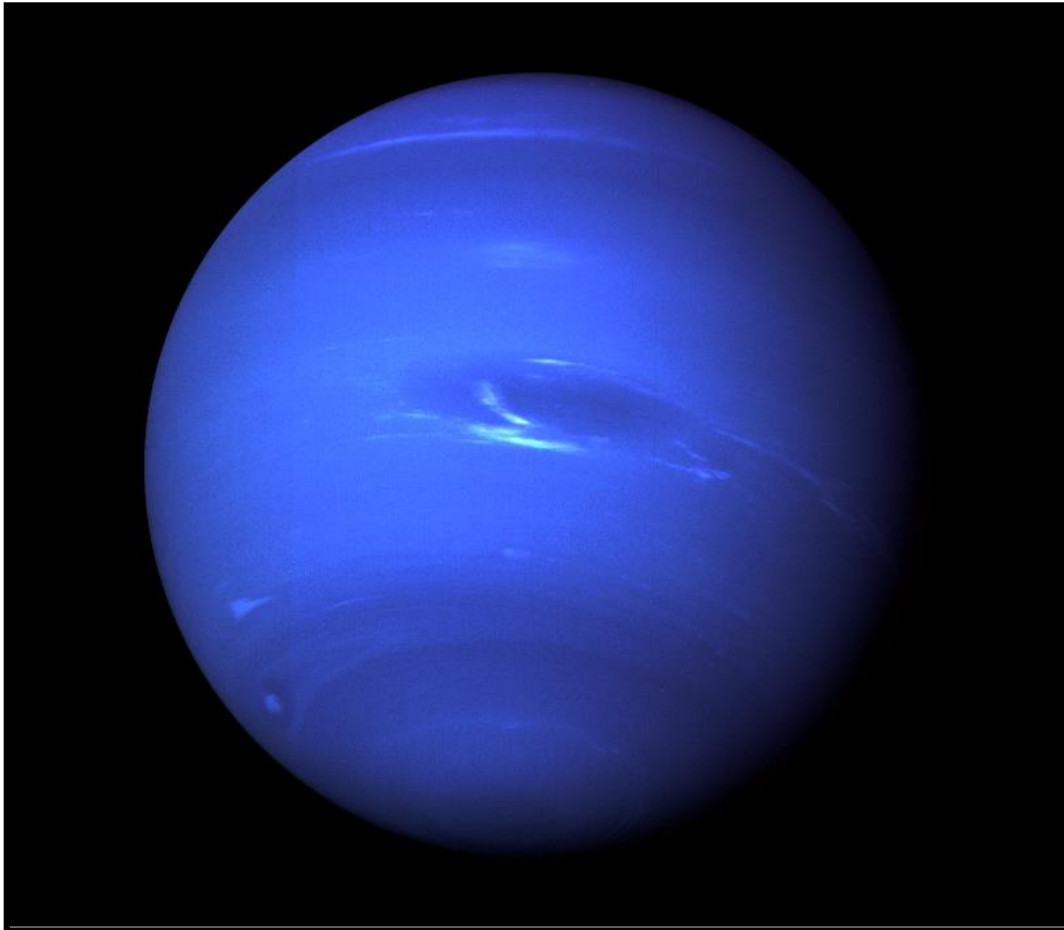
Neptune



TAS > Neptune >

The two outermost planets, Uranus and Neptune, are ice giants, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called volatiles, such as water, ammonia and methane.

Neptune > Named after the Roman god of the sea



Equatorial Diameter:	49,528 km
Polar Diameter:	48,682 km
Mass:	1.02×10^{26} kg (17 Earths)
Moons:	14 (Triton)
Rings:	5
Orbit Distance:	4,498,396,441 km (30.10 AU)
Orbit Period:	60,190 days (164.8 years)
Surface Temperature:	-201 °C

The two outermost planets, Uranus and Neptune, are ice giants, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called volatiles, such as water, ammonia and methane.

Neptune > Named after the Roman god of the sea

Neptune is the most distant planet from the Sun.

Neptune is the smallest gas giant.

A year on Neptune lasts 165 Earth years.

Neptune has 6 faint rings.

Neptune was not known to the ancients. It is not visible to the naked eye and was first observed in 1846. Its position was determined using mathematical predictions. It was named after the Roman god of the sea.

The atmosphere of Neptune is made of hydrogen and helium, with some methane. The methane absorbs red light, which makes the planet appear a lovely blue. High, thin clouds drift in the upper atmosphere.

Neptune has a very active climate. Large storms whirl through its upper atmosphere, and high-speed winds track around the planet at up to 600 meters per second. One of the largest storms ever seen was recorded in 1989. It was called the Great Dark Spot. It lasted about five years.

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