

THE MELBOURNE SOLAR SYSTEM SELF GUIDED TRAIL



Step aboard Starship St Kilda!

Now you can navigate the Solar System from our glorious Sun to the outer planets simply by following the bike and walking trail on the foreshore of the City of Port Phillip. In 2008 artists and scientists constructed a model of our Solar System to a scale of one to one billion between St Kilda and Port Melbourne. So instead of navigating 5.9 billion kilometres from the Sun to Pluto, you only walk 5.9 kilometres.



Start at the Sun

The Sun sculpture is near the white lighthouse in Marina Reserve at the south end of St Kilda Beach. From the Sun follow the foreshore trail north to visit the eight planets, accurately scaled to size and distance. You can walk to the first five planets i.e. as far as Jupiter within twenty minutes. The furthest planet of Pluto at Sandridge Beach can be reached within ninety minutes.



'This is absolutely amazing, for fifty years I have always wanted to understand how big the universe is. It's one thing to calculate or memorize that the earth is 150 million kilometers from the Sun, but it's quite another to walk and feel that distance in three-dimensional space. Just to get this glimpse of my place in the grand scheme of things has been one the most awe-inspiring realisations in my whole life. What an astonishing universe we live in.' Simon Keily, teacher

Why a Solar System?

The City of Port Phillip's foreshore has always been a superb location to view the Sun setting on the western horizon. The bay's crescent shape is perfect for a model where the 'Sun' can be viewed from every one of the nine 'planet' locations.

In December 2005 a temporary model of the Solar System was placed on the St Kilda foreshore. The response was overwhelming. The public flocked from all over Melbourne and there was great enthusiasm for a permanent display.

A vision developed for a project combining educational, environmental and artistic themes. The City of Port Phillip, Lonely Planet Foundation, Chris Lansell of Monash University, artist Cameron Robbins and Scienceworks collaborated to bring that vision to reality in 2008.



Education and Science

The Melbourne Solar System is the largest educational resource in scale in Australia, a way to communicate scientific knowledge about the Solar System and the Universe for the general public and for schools.

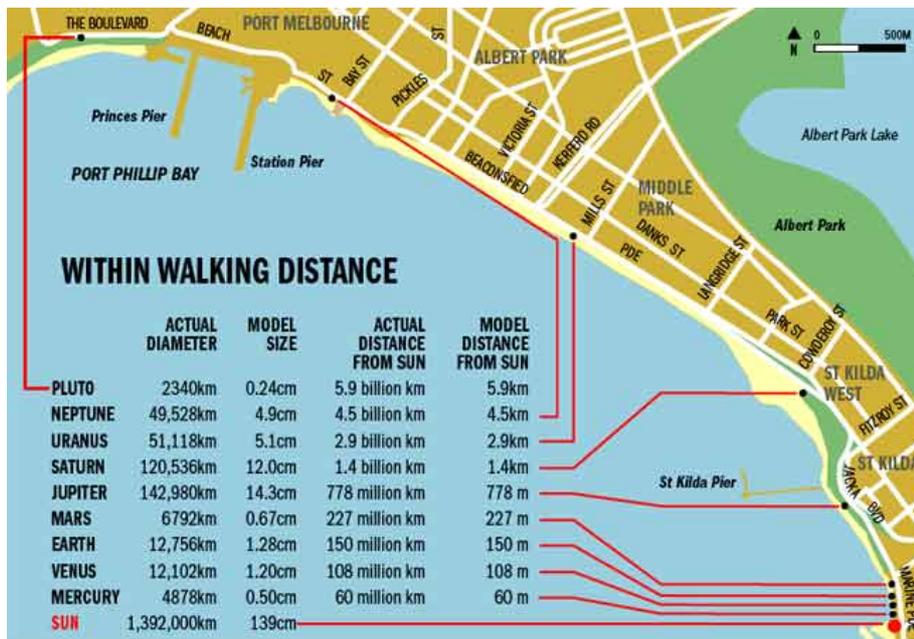
Our Environment

Seeing the Earth in its true dimensions highlights its immense isolation and vulnerability. We have no alternative choice in the vastness of space but to care for the rare and precious environment of our only home.

Sand in Space

The beach is a clue to the immensity of the universe. Pick up a handful of sand as you walk. It contains about 10,000 grains. Imagine that each grain is one star like our sun. Reflect that there are about 10 times as many stars as grains of sand on all the world's beaches and deserts combined. Wow! There are an estimated 70,000 million million million stars (seven followed by twenty-two zeros) in the observable universe.

Our Sun is just one star out of over 300 billion stars in the Milky Way galaxy. Our galaxy is just one of over 100 billion galaxies in the observable universe which is probably a minuscule fraction of the actual number.



Outer Neckarboo

On our local one to one billion scale, the nearest star would be 35,950 kilometres away. To reach Alpha Centauri, another nearby star, you must travel right around the world once, through Melbourne again and 645 km further north to Neckarboo in central NSW.

The Melbourne Solar System model will be the largest in the world when it adds a model to Neckarboo. Perhaps other places in Australia and even the world will join our expanding universe by adding more models to their celestial towns!

Planets	Walking Distance From 'Sun'	Diameter
Sun	0 metres	139 cm.
Mercury	60 meters	0.5 cm.
Venus	108 meters	1.2 cm.
Earth	150 meters	1.28 cm.
Earth's moon	38 centimeters from earth	.34 cm.
Mars	227 meters	0.67 cm.
Jupiter	778 meters	14.3 cm.
Saturn	1.4 kilometers	12.0 cm.
Uranus	2.9 kilometers	5.1 cm.
Neptune	4.5 kilometers	4.9 cm.
Pluto	5.9 kilometers	0.24 cm.

Remember:

Every millimetre you walk is 1000 kilometres!

Every centimetre you walk is 10,000 kilometres!

Every metre you walk (one and a half steps) is 1,000,000 kilometres!

When you walk 5.9 kilometres from the Sun (Marina Reserve) to Pluto (Port Melbourne), you have travelled 5.9 billion kilometres!

SELF GUIDED WALK TO THE MELBOURNE SOLAR SYSTEM

Our Solar System consists of the Sun, eight planets, hundreds of moons and countless asteroids, comets, dwarf planets and other small bodies.

It formed about 5 billion years ago from a cloud of gas and dust left behind by dying stars. This cloud gravitationally collapsed into a rotating disk. Most of the material gathered at the centre to form the Sun. Smaller amounts further out formed the planets. As planets orbited they swept the area around them clear of rock.

Of the eight planets, the inner four are rocky while the outer planets - Jupiter, Saturn, Uranus and Neptune - are gas giants. Spacecraft missions since the 1970s including the Voyager missions, Mariner 10, Cassini and Pioneer have hugely increased our knowledge of the planets. Spacecraft cannot land on the gas giants, only 'inside' them.



1. The Sun

The sun is a star one of 300 billion in the Milky Way galaxy and is about five billion years old. All life on Earth depends on the light and heat from the Sun. It is 110 times the Earth's diameter. It has an estimated surface temperature of 5,800C and a core temperature of 20,000,000C. It is a middle-aged star, at least 4.6 billion years old but has an expected lifespan of 10-12 billion years. The Sun contains 99.86% of the total mass of the solar system and its gravity holds all of the planets in orbit.

2. Mercury is the closest planet to the Sun. Like the Earth's moon it is a grey barren world covered in a thick layer of dust and heavily scarred with impact craters. These craters never erode because of the lack of atmosphere. Mercury at times can be seen close to the Sun, just after sunset or just before sunrise. The ancient Greeks believed it to be two separate objects: Apollo in the morning and Hermes in the evening.

< Sun 60 metres



3. Venus is similar in size to Earth. It is a hellish world with crushing pressures, scorching temperatures and sulfuric acid rain. The Russian 'Venera 13' spacecraft survived only 2 hours and 7 minutes after arrival. Venus shines brilliantly because of a thick atmosphere of carbon dioxide. The 'evening' or 'morning' star, as it is often called, appears soon after sunset or not long before sunrise. Twice in every 120 years Venus passes or 'transits' between the Earth and the Sun including 1874, 1882 and 2004. Watch for it next in 2012.

The Transit of Venus played a major role in Australian history. Captain James Cook, whose statue stands east of St Kilda Pier, claimed Terra Australis for the British crown in 1770 during a journey to observe the 1769 Transit at Tahiti.

< Mercury 48 metres

Earth 42 metres >



4. Earth is very special, the only place we know of in the solar system and galaxy that supports life. It lies within the Sun's 'habitable zone' with liquid water on its surface and with life-supporting concentrations and amounts of chemicals. The core of iron is covered by a thick mantle of liquid rock. Continents and oceans float on the thin outer crust of solid rock. The atmosphere is 78% Nitrogen, 21% Oxygen, a little carbon dioxide and other gases. The moon is about one quarter the diameter of the Earth. Scientists believe it was formed after an object the size of Mars collided with the Earth when it was very young.

< Venus 42 metres

Mars 77 metres >





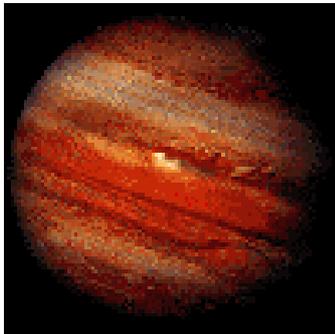
5. Mars has inspired curiosity and imagination for thousands of years including theories of advanced civilisations. There is no evidence of life however. Its famous red colour is due to iron oxide on the surface. The tilted axis creates seasons and there are often violent dust storms. Its spectacular features include the immense volcano 'Olympus Mons' (27km high) and the vast canyon 'Valles Marineris' with a length about the distance from Sydney to Perth (4000km). The two moons, Phobos and Deimos, are actually small captured asteroids.

< Jupiter 551 metres

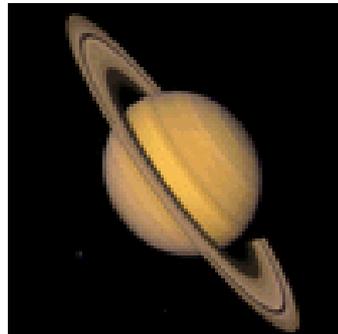
Earth 77 metres >

6. Jupiter contains more than twice as much material as all the other planets combined. The atmosphere is thousands of kilometers deep with hydrogen helium, methane and ammonia. It has at least seventy moons and a faint ring system. Of the moons, Io has active volcanos. Europa has an ice crust above an ocean of water. Ganymede, the largest moon in the solar system, is made of rock and ice. 'The Great Red Spot' is a cyclonic storm up to three times the Earth's diameter, which has been observed for at least 300 years.

< Mars 551 metres



Saturn 622 metres >



7. Saturn, one of the four gas giants, is famous for its spectacular system of rings made from billions of icy rocks, sized from small grains to kilometres wide. It has about sixty moons. Titan, the largest, is the only moon in the Solar system with an atmosphere (Nitrogen). It also has lakes of liquid methane discovered by the Huygen's probe which landed in 2005.

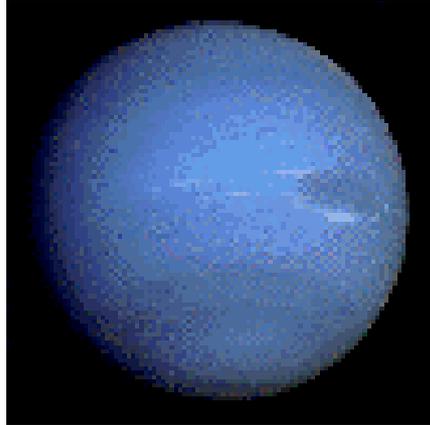
< Jupiter 622 meters

Uranus 1500 metres>

8. Uranus lies on its side causing it to ‘roll’ around the sun. Strangely, its equator has been tilted more than ninety degrees to its orbit. Perhaps early in its history it collided with a huge unknown object. In 1781 it was the first planet since ancient times to be discovered (by William Herschel). The atmosphere is mainly hydrogen with some helium and methane. Of its thirty or so moons, Titania, Oberon, Umbriel and Ariel are over 1000 km in diameter. It has a faint ring system discovered in 1977 when it moved in front of a star.

< Saturn 1500 metres Neptune 1600 metres >



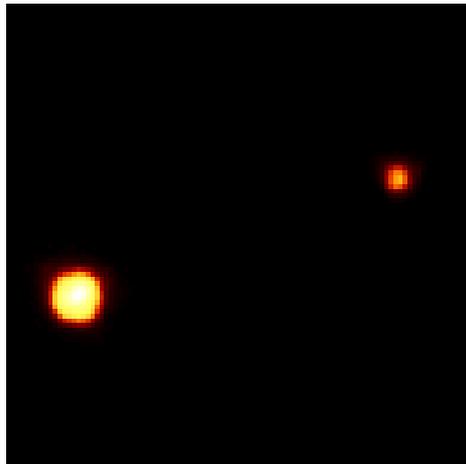


9. Neptune is a cold distant gas giant. Through a telescope it is bluer than Uranus because it has more methane. Giant storms whirl through its atmosphere with the fastest winds recorded in the Solar System, up to 2,400 km/h. One storm, nearly as large as Earth, circles the planet every eighteen hours. In 1989 the Voyager 2 spacecraft discovered eleven small moons and a faint ring system. Triton is the largest (2,700km in diameter) as well as being the coldest moon in the Solar System. Geysers of nitrogen spew from its surface.

< Uranus 1600 metres Pluto 1400 metres >

10. Pluto, discovered in 1930, is a tiny world smaller than Earth. Charon, one of its three moons, is half the size of Pluto. Beyond Neptune are thousands of asteroids of ice and rock left over from when the planets were formed called 'Kuiper Belt'. In 2005 a Kuiper Belt Object or 'KBO' larger than Pluto was located and named Eris. Now we realize that Pluto is just one of these large asteroids or 'Dwarf Planets'. The New Horizons spacecraft will reach Pluto in 2015, after a nine year voyage, to study Pluto, Charon and other 'KBO's. Pluto has an eccentric orbit which can bring it closer to the Sun than Neptune.

< Neptune 1400 metres



For more information go to:

www.melbournesolarsystem.com.au

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The project has also been assisted by:

The Astronomical Society of Victoria, Tony Wheeler, Ed Redman, Nic Lehman, John Paxinos, Richard Holt & Dr Tanya Hill

Feedback

The St Kilda Edge Strategy is the culmination of extensive and ongoing community consultation. Details can be found at www.portphillip.vic.gov.au.

Use [eServices](#) to ask us a question, request information or give us feedback online. If you prefer phone ASSIST on (03) 9209 6777 or TTy (03) 9209 6713

Planet photographs courtesy of <http://pds.jpl.nasa.gov/planets/>

