



Welcome to the

Ingleborough Estate

Nature Trail's

PLANET TRAIL

**You are about to travel millions of miles,
through our solar system, towards the Sun.**

The countdown to launch has begun
10, 9, 8, 7, 6, 5, 4, 3, 2, 1, - Lift off!

“Space is big. You just won't believe how vastly, hugely, mind-bogglingly big it is. I mean, you may think it's a long way down the road to the chemist's, but that's just peanuts to space.”

— Douglas Adams,
The Hitchhiker's Guide to the
Galaxy



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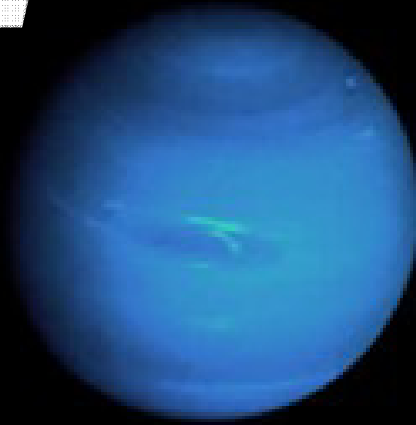
The Planet Trail facts have been brought to you by
Fred Stevenson at “Go Stargazing”

The distances between the planets featured in this trail have
been measured to scale.

The sizes of the planets are to scale (in comparison to each
other) so you'll have to look out for the smaller ones!



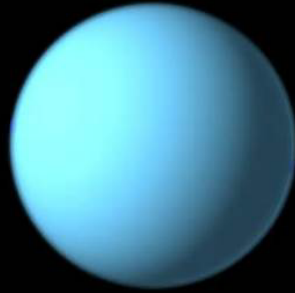
Neptune



- * Neptune has winds that blow at over 1400 km per hour! Faster than the speed of sound (on Earth).
- * Even though farther from the Sun than Uranus the surface temperature (top of atmosphere, as it is a 'gas giant') is warmer than Uranus since it generates considerable internal heat.
- * Although traditionally referred to as a gas giant, Neptune is mostly composed of water, methane and ammonia ice – similar to Uranus.
- * Neptune orbits the Sun every 165 years – only one orbit since its discovery.
- * Neptune's average distance from the Sun is 30 times that of the Earth.
- * Neptune has 14 known moons.
- * Neptune has 3 thin dark rings meaning that all of the gas giants have rings of some sort.



Uranus



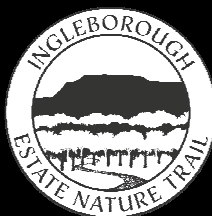
- * The first planet to be discovered by an astronomer – William Herschel in 1781 – all those closer to the Sun were known by the ancients as they can be easily seen without a telescope.
- * Far out from the Sun the temperature of Uranus is a frigid -200 C.
- * Uranus 'rolls' around the Sun on its side – it has an axial tilt of 98 degrees.
- * This means that Uranus experiences very long seasons – equivalent to half an orbit or 42 Earth years.
- * Although traditionally referred to as a gas giant, Uranus is mostly composed of water, methane and ammonia ice.
- * Uranus has thirteen thin dark rings – discovered from Earth as a distant star went behind them and dimmed as it passed behind each ring.
- * Uranus's average distance from the Sun is 20 times that of the Earth.
- * Uranus has 27 known moons.



Saturn



- * The ringed planet – trillions of icy moonlets orbit in a thin plane – like the thinnest tissue paper – over 200,000km wide but only 1km thick.
- * The rings are probably made out of material from a moon that strayed too close to Saturn and was torn to shreds by tremendous tidal forces.
- * Saturn is several times the size of Earth but isn't very dense – if you could find a bathtub big enough it would float.
- * Saturn has more known moons than any other planet – current count 82.
- * Saturn is the most distance planet that can be seen easily without a telescope (Uranus is on the verge of visibility).
- * Titan the largest moon of Saturn is larger than the planet Mercury.
- * Saturn is about ten times farther from the Sun than the Earth – about twice as far as Jupiter.
- * Saturn takes nearly thirty years to orbit the Sun.



Jupiter



- * The biggest planet – ten times the Earth’s diameter and 318 times the mass of the Earth.
- * Jupiter is 5 times farther from the Sun than the Earth.
- * Jupiter has a family of 79 moons. The four largest were discovered by Galileo in about 1610 – these are amongst the largest moons in the solar system – the largest being bigger than the planet Mercury.
- * The ‘great red spot’ – a vast storm system in Jupiter’s atmosphere is the size of the Earth – it has been raging for at least 350 years.
- * Jupiter spins on its axis in only 10 hours giving it a larger equatorial bulge than any other planet - 4,500km larger across the equator than pole to pole.
- * Jupiter has rings but they are very thin and dark compared to Saturn’s rings.
- * Jupiter is the second brightest planet in the sky after Venus.



Mars



- * Mars is nearly 250 million km from the Sun and has a day roughly the same as Earths (24.5 hours)
- * Early astronomers thought they saw canals on Mars – built by intelligent aliens – so began the idea of ‘Martians’ and other aliens inhabiting other worlds (unfortunately there is no evidence for any yet).
- * Known since ancient times as the ‘red planet’ – it looks orange in the night sky – caused by a covering of rusty dust particles.
- * Mars has lots of craters like the Moon but also has the largest volcano in the solar system – Nix Olympica – 28km high. Three times the height of Everest on a planet about half the size of Earth.
- * Mars has no liquid water on its surface but plenty of water as ice in its crust and also in the polar regions. There are polar caps of frozen water and carbon dioxide.
- * Billions of years ago when the volcanos were active there could have been a thick enough atmosphere to enable the ice to melt and produce shallow oceans – it is still an open question as to whether some form of life could have evolved during this period.



Earth



- * The Earth is the only known abode for life in the universe (so far discovered).
- * Earth is the only planet known to have large areas of liquid water on its surface – oceans.
- * In fact two thirds of the surface of the Earth is covered in water.
- * The Earth has a strong magnetic field produced by electrical currents deep within its molten iron core.
- * The magnetic field deflects high energy particles from the Sun and farther afield and hence protects us from this harmful radiation.
- * The molten core also drives plate tectonics – the continents move around over long periods of time producing mountain ranges, volcanoes and earthquakes. These processes bury deposits of Carbon and this helps keep the planet a comfortable place to live (less global warming because there is less CO₂ in the atmosphere).



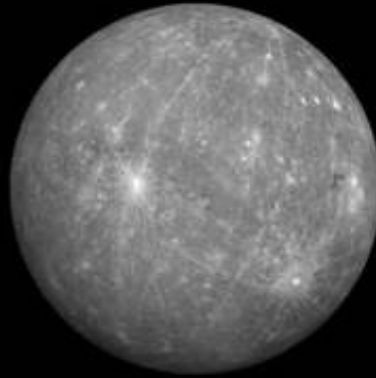
Venus



- * Venus is the brightest planet in the night sky. Always seen within 45 degrees of the Sun's position owing to it being closer to the Sun than we are – it is hence sometimes referred to as the evening or morning 'star' (it is of course not a star – it orbits a star – the Sun)
- * Nothing is visible on Venus's surface through a telescope it is permanently covered in thick clouds.
- * Venus's atmosphere is almost all Carbon Dioxide – the huge global warming effect that this produces makes the temperature 500 C everywhere on the planet – you would be burned to a crisp and some metals like lead would melt.
- * The atmosphere is so thick that the pressure at the surface would crush you (90x Earth's).
- * The clouds are made up of sulphuric acid – they would dissolve you.
- * Venus – the goddess of love – probably the most inhospitable planet.



Mercury



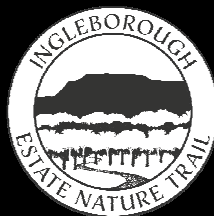
- * Mercury is the closest planet to the Sun and hence hottest, being 400C in the Sun – however it is extremely cold in the shade (-170C) with ice in permanently shaded craters (this is because of the very thin atmosphere which is unable to retain heat).
- * Mercury's closeness to the Sun (approximately one third Earths) makes it one of the hardest planets to see in the sky – always being in the twilight.
- * The smallest planet, Mercury's gravity is too weak for it to retain a significant atmosphere (it has an 'exosphere' with a pressure less than a billionth of Earths). It is most similar to the Moon in this respect.
- * Mercury has the most elliptical (egg shaped) of all major planets orbits – how the position of the ellipse changed with time helped prove Einstein's remarkable relativity theories.
- * Mercury takes 88 days to orbit the Sun - its year being shorter than three Earth months.



Congratulations!

You have reached the Sun

- * The Sun is a star – the closest to Earth – hence it is blindingly bright.
- * The Sun is huge – you could fit three times the distance to the Moon across it.
- * 99.8% of the solar system's mass is in the Sun.
- * The Sun is massive – it 'weighs' as much as 300,000 Earths.
- * The average distance of the Sun from Earth is 150 million km – 8 minutes at the speed of light.
- * The Sun is 400 times as big as the Moon but 400 times farther away so it looks exactly the same size in our sky (each being half of a degree across – equivalent to half a centimetre at 'arms length' - a lot smaller than most imagine).
- * The Sun is hot – 6000 degrees at the surface – 15 million degrees at its centre.



Here's Pluto

- * Pluto was discovered by Clyde Tombaugh in 1930 and hasn't yet completed one orbit of the Sun since then – it has an orbital period of 248 years.
- * Pluto was famously re-classified as a 'dwarf planet' in 2006 – until then it was the farthest 'planet' in the solar system. Although sometimes, because of its elliptical orbit, it can be closer to the Sun than Neptune.
- * Pluto is actually one of the largest of a whole zone of small worlds beyond Neptune – 'trans Neptunian objects' or TNOs. Approximately 2000 have been discovered to date.
- * Only 2300km in diameter Pluto is smaller than the Moon – even so it has five known moons of its own – the origin of which is uncertain – possibly a collision with another TNO in the distant past.
- * Pluto has a very tenuous atmosphere with only 1/100,000 that of Earth's pressure.



Ingleborough Cave was discovered in 1837, when brave Victorian explorers broke down a limestone dam to drain the lake and explore 1/2km of previously unexplored passages.



What curiosities can you find as you follow in the Victorian's footsteps, in the Yorkshire Dales National Park's most famous cave system?

Self-guided trips around the cave run from 10am- 4pm (last entry) daily and tickets can be purchased from the shop at the entrance to the cave.

