

YOU ARE HERE Show Guide

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Spaceports

We begin our journey 100m above Dynamic Earth in Edinburgh, facing towards Salisbury Crags and Arthur's Seat in the South. Not stopping to take in the views for too long, we quickly ascend to 10km in altitude, a fairly typical cruise height for a passenger jet. Getting any higher than this above the Earth is more difficult – we need a rocket! In You Are Here, we imagine blasting off from Edinburgh in a rocket to take us towards space. While rockets don't launch from Scotland right now, spaceports are planned to be built here in the future.

Northern Lights

As our rocket ascends, we turn towards the North as we journey over Orkney and Shetland. At this stage our rocket still isn't going fast enough to let us stay in space. Gravity is latching on to us and wants to bring us back down to Earth. Once our rocket picks up enough speed, we find ourselves in orbit around our home planet after a few minutes. Still facing North, we see a wonderful green glow in front of us. This is the aurora borealis – you might know this as the northern lights.





Earthrise

Today, astronauts travel to low Earth orbit. No human being has travelled further than this into space since 1972! The astronauts that did were a part of the Apollo missions that journeyed to the Moon. Before Apollo 11 astronauts Neil Armstrong and Buzz Aldrin made that famous first small step on the Moon, the Apollo 8 astronauts orbited around the Moon studying its surface. On Christmas Eve 1968 during their fourth orbit, they saw something quite remarkable. Earthrise.

How far is the Moon?

Space is big. Distances to things far away out there in space are huge. Compared to other objects in space, our Moon is quite close. Yet for those astronauts that have journeyed there, it was an incredibly long journey – the furthest we have ever sent humans out into space. The Moon is, on average, 384,400km away. We could also think about how long it would take to send a radio signal there, a bit like a walkie talkie message. From Earth to the Moon, it would take just over a second for the signal to reach its destination.



Curiosity Rover

After a brief visit to the Moon, we hop to a planet – Mars. Mars is often nicknamed the red planet. That's because it's covered in Iron Oxide, otherwise known as rust! Us humans have yet to step foot here. Instead, we send robots to explore for us. They're usually about the size of a small car and sometimes have wheels so they can drive around the surface. We meet the Curiosity Rover, which has taught us so much about this planet during its time on Mars. When it makes discoveries it sends those back to Earth as a signal, which now takes minutes to arrive back to us!

The Scale of the Solar System

ASA/JPL-Caltech/A

Seconds to the Moon, minutes to Mars. Our destinations so far are smaller than Earth. Mars is about half the size of Earth and the Moon is half the size of Mars. These rocky planets, along with Mercury and Venus, are quite small compared to the mighty gas giants. Jupiter, Saturn, Uranus and Neptune are all huge, and we've not even mentioned our star yet – the Sun. Let's imagine our home planet is one footstep across. The Sun, which makes up more than 99% of our Solar System, is 109 footsteps wide!



Voyager

We travel back in time to talk about a grand tour. Exploring this vast Solar System of ours, the Voyager missions were two spacecraft that launched in 1977. Between them, Voyager 1 and 2 visited all the gas giant planets and snapped some photos on their way. Sending those photos back as radio signals took hours to come back to Earth from the gas giants. As it approached closer and closer to the edge of our Solar System, an astronomer called Carl Sagan wanted it to take one last photo of home, known as the Pale Blue Dot. Voyager 1 is still out there and we can still receive signals from it nearly fifty years later. It's so far away that it's now left our Solar System and those signals take about a day to travel back to the Earth now. Voyager is the furthest spacecraft us humans have ever launched into space, but it's not even close to the next nearest star – just one thousandth of the way!

Image credit: NASA

"On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives."





You Are Here Learning Resources

Visit <u>#DynamicEarthOnline</u> for fun and interactive activities to learn more about the topics in the You Are Here show.

Spaceports

dynamicearthonline.co.uk/resources/spaceports

Northern Lights dynamicearthonline.co.uk/resources/the-northern-lights

Earthrise dynamicearthonline.co.uk/resources/earthrise

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