In this unit we will

- 1. Look at evidence for the shape of the Earth, Moon & Sun
- 2. Understand the relative sizes of Earth, Moon & Sun and learn about the heliocentric model of our solar system
- 3. Develop an understanding of the planets in our solar system
- 4. Understand how the rotation of the Earth causes night and day
- 5. Understand how the movement of the Earth in its orbit causes the seasons

Science Skills that we will develop:

Explaining Science

- 1. I use complex science words correctly
- 2. I use a science model to describe and explain
- 3. I draw & annotate diagrams to help describe/explain

Data, Table & Graphs

1. I join plotted coordinates with straight lines







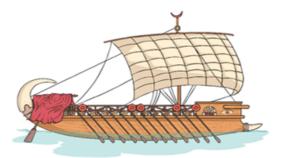


What shape is the Earth? How do you know? What evidence do we have?

Flat disc or spherical?

Let's explore the evidence: with your partner, look at the different observations that people have made over the years. Go through each of them one by one, discussing the evidence, and decide whether each one suggests that the Earth is flat or is a sphere. Remember to use only the evidence on the paper - do not use any other knowledge that you have.

Ancient Phoenicians

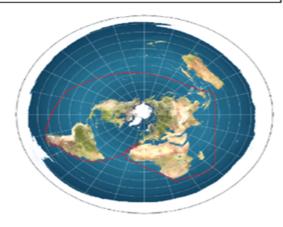


We were explorers and traders, who had developed ships that could travel long distances between countries.

We noticed that when we sailed all the way around Africa, the Sun was not above us (like it was at home), but was over to the right, even at midday.







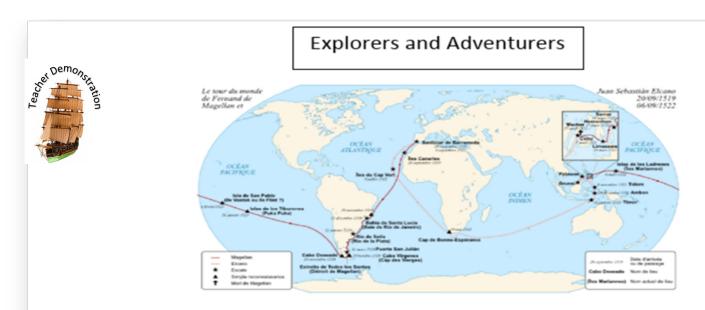
Some people think that explorers who have sailed to all the countries of the World, travelling in one direction, have simply gone round in a circle. They also say that if we sail away south from the North Pole, and keep going in a straight line, we will always end up at the South Pole (which is true). They use this evidence to reason that this must mean the North Pole is at the centre of the Earth and the South Pole must reach all the way around the edge of the ocean.





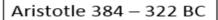


At night, we can see billions of stars, but some of the brightest ones seem to form patterns. Humans have imagined pictures that fit some of the patterns and have named them – these are the constellations. Not everyone can see the same constellations, though. People who live in the Northern half of the World see one set of constellations, and the people in the Southern hemisphere see a different set of stars.



Ever since ships were built big and strong enough to survive very long journeys, explorers and adventurers have been able to sail off to visit other countries. Eventually, after always sailing in the **same direction**, some were able to end up back home, without ever having to turn back.

The picture shows the journeys of two explorers, Ferdinand Magellan in 1519 and Juan Elcano in 1522









Ship sailing towards horizon.mp4

I was a Greek philosopher (someone who thought a lot about the world around us), and I noticed something strange when ships sailed away from my home town by the sea. Instead of just getting smaller and smaller, as they sailed away, their hulls (the bottom part) seemed to sink into the sea! The further away they got, the more of the ship that seemed to disappear, with the top part of the sails vanishing last. I knew that they hadn't really sunk though, because the ships came back again!

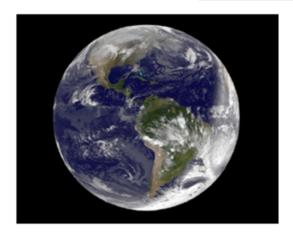
Jet Aeroplanes



Planes regularly fly all over the Earth, and no-one has ever reported that they have flown over an 'edge'.

albglobal3_28_p1.mp4

Satellite Images





Ever since the first humans were sent up into space, we have been able to take photographs of our planet. Every single picture (no matter which part of the Earth can be seen) shows either a complete circle or a circle with a curved shadow on it.

Ancient Greeks, Sumerians, Babylonians, Egyptians and Vikings



We travelled on land by foot, horse or cart. We had boats that could only travel quite short distances on the sea – we could not cross any oceans; they were too big.

We all noticed that wherever we travelled, we would eventually come to the sea, no matter what direction we went in. If we climbed up to the top of a hill or mountain, we could see that the land in front of us was more or less flat, with a few bumps here and there.

Having seen the evidence, it's pretty obvious that the Earth is indeed a sphere, but which one do **you** think is the strongest piece of evidence? Today, we will be using the 'double-develop' method of explanation:

Step 1 - State your opinion and imagine someone saying, "So what?" Use evidence to explain your idea.

Step 2 - Imagine someone saying, "So what?" again. Explain your idea even further.

Example

An ancient Sumerian or Babylonian person might argue...

nobody who sails away to look for the edge ever comes back.

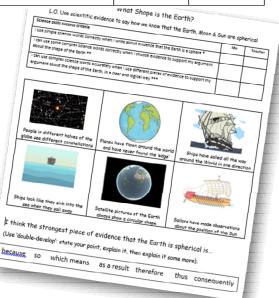
From the top of the hill where I am standing, I can see that the land is flat, which means that the Earth must be flat. Furthermore, the land ends at the sea (and I have heard other people who have travelled far away say that the land also ends at the sea in other places), and the water stretches away all the way to the horizon. This can only mean that the World consists of flat land, surrounded by water on all sides. Perhaps the Earth is round, and the sea flows over the edge, which is why

L.O. Use scientific evidence to say how we know that the Earth is spherical

Science skills success criteria	Me	Teacher
I use simple science words correctly when I write about evidence that the Earth is a sphere *		
I can use some complex science words correctly when I choose evidence to support my argument about the shape of the Earth **		
I can use complex science words accurately when I use different pieces of evidence to support my argument about the shape of the Earth, in a clear and logical way ***		

because which means
so
thus therefore
as a result consequently

You could even draw and label a diagram to help.



So now we're sure that the Earth is a sphere, what about the

Moon and the Sun?





It is a bit more complicated to find out who discovered the Sun and Moon were spherical.

We know that according to the Ancient Greek beliefs, the 'heavens' were perfect, and so was the sphere. Therefore, they came to the conclusion that

the Sun and Moon must be spherical rather than flat. One of the most obvious pieces of evidence for the Moon being a sphere is the curved shadow on its surface.



Scientists have spent years measuring the Sun using satellites in space, and have found that it is almost a perfect sphere:

