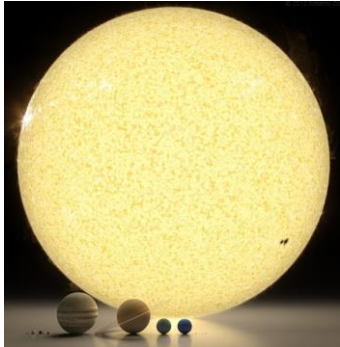


UNDERSTANDING OUR
WORLD AND BEYOND

EXPEDITION: Earth and
Space

Spring 1



OVERVIEW:

The Cosmos; The Universe; Outer Space...places that are at the far reaches of our imaginations (and often the limitations of our scientific understanding). This topic will inspire awe and wonder by exploring previously unimaginable distances and reaching back through vast amounts of time to discover and study our planet, the moon, the solar system and worlds beyond our own.

Drawing on non-fiction texts, footage from missions into space and fictional stories that are filled with scientific fact, the mysteries of Space will be filled with knowledge. The pupils will endeavour to become cosmologists: experts who will have understood lengths of time, studied elements of our physical universe and delved deeper into the lives of those involved with the exploration of stars.

Cultural capital

What you do: Virtual tours of the Science Museum, Virtual Day on Mars during science week, listening to music such as Holst's 'The Planets' and David Bowie 'Space Oddity'

How you think: Models, images and film to demonstrate the effects of the Sun, the moon and to gain an idea of distances and time.

What you know: knowledge of key dates in space exploration, vocabulary links such as 'satellite'

Who you know: knowledge of key people both in the forefront and in the background of space exploration. Biographies of Katherine Johnson and Tim Peake.

Knowledge Organisers and Assessment:

Time

The Earth to spin once on its axis. (When the Earth faces the sun it is daylight and when it faces away from the sun it is night. It makes the sun appear to travel across the sky)

24 hours

The moon to orbit the Earth (A lunar month – see Phases of the Moon)

28 days

The Earth to orbit the sun (Every 4 years there is a leap year due to the extra quarter – an extra day in February)

365 days ¼ days

The Earth's tilt on its axis is what causes the 4 seasons. Sometimes it points towards the sun and other times it points away from the sun.

Earth and Space

The Sun
A star at the centre of our solar system. 15 million degrees hot at its centre. It is 1.3 million times bigger than earth.

The Solar Eclipse
A solar eclipse is when the moon passes between the sun and the earth so the moon blocks the sunlight.
The Sun is incredibly bright. It is not safe to look directly at the sun, even when wearing sunglasses.

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
(Pluto was reclassified as a dwarf planet in 2006)

Phases of the Moon

New Moon Waxing Crescent First Quarter Waxing Gibbous Full Moon Waning Gibbous Last Quarter Waning Crescent

EARTH AND SPACE

Mini-Quiz #1

Name: _____
Date: _____

- How hot is the sun at its centre?
a) 5 million degrees
b) 15 million degrees
c) 30 million degrees
- Which planet was classified as a 'dwarf planet' in 2006?
a) Mars
b) Neptune
c) Pluto
- What comes before the last quarter during the phases of the moon?
a) waxing gibbous
b) waxing crescent
c) full moon
- What term was used to describe the idea that the earth was at the centre of our solar system?
a) geocentric
b) heliocentric
c) heliocentric
- How long does it take for the earth to spin once on its axis?
a) 24 hours
b) 28 days
c) 365 years
- Which term is used to describe the shape of the moon getting smaller during the phases of the moon?
a) waxing
b) full
c) waning
- How often is there a leap year?
a) every 4 years
b) every 40 years
c) every 400 years
- When did Neil Armstrong and Buzz Aldrin land on the moon?
a) 1869
b) 1969
c) 1996

9) Which planet is closest to Earth?
a) Uranus
b) Neptune
c) Mars

10) What term is used to describe it when the moon passes between the sun and the earth, blocking the sunlight?
a) solstice
b) solar eclipse
c) lunar eclipse

Total Score
____ out of 10

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GEO CENTRIC – People used to believe that the earth was the centre of the solar system and that the sun, and all the other planets, orbited it.

HELIO CENTRIC – Over hundreds of years, scientists began to understand that the sun was at the centre of the universe. They realised that all the planets actually orbited the sun not the earth.

Neil Armstrong
(The first man to step on the moon - 1969)

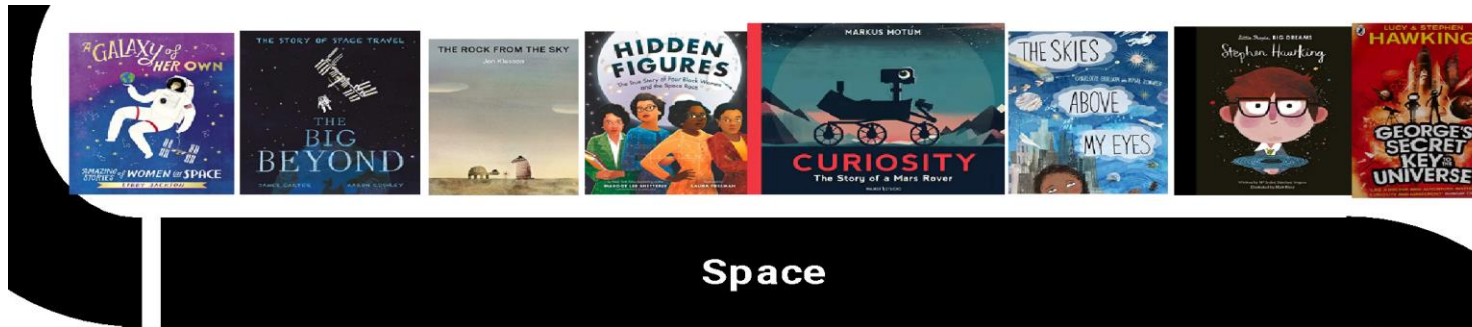
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Waning means the moon looks like it is getting smaller.

Waxing means the moon looks like it is getting larger. How much of the moon we see, depends on how much sunlight is hitting it. The moon reflects this sunlight.

SUPPORTING TEXTS: From our Reading Roadmap

Cosmic by Frank Cottrell Boyce



Children will be guided to read or will have read to them: *A Galaxy of Her Own- Amazing Stories of Women in Space* Libby Jackson, *Curiosity – The Story of a Mars Rover* Markus Motum, *The Big Beyond* James Carter, *Hidden Figures- The Story of Four Back Women and the Space Race* Margot Lee Shetterly and *The Skies Above My Eyes* Yuval Zoomer. *George’s Secret Key to the Universe* by Stephen Hawking

Vocabulary:

Earth, planets, Sun, solar system, Moon, celestial body, sphere /spherical, rotate /rotation, spin, night & day, orbit, opinion /fact, support /refute, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, 'dwarf' planet, accuracy, precision, scatter graphs, line graphs, geocentric & heliocentric models, star, rotate /rotation, spin, axis, night and day, shadow clocks, sundials, astronomical clocks, telescope, satellite, tide, mass, gravity, eclipse, universe, constellation, axis, celestial body, Moon, rotating, lunar, solar, telescope.

Skills and Key Questions: Covered during this expedition

Research, Note taking, Ask questions, Plan to answer a question, Create fair tests, Make predictions/hypothesis , Select equipment, Observe over time, Measure, Record /present data, Notice patterns, Make conjectures, Make comparisons, Make links, Generalise

Key Science Knowledge: Pupils will use their own research, non-fiction texts, models and videos to explore each of the areas outlined below. They will, through scientific enquiry, be able to answer:

The Earth:
 Why did people think the Earth was flat?
 What does the Earth look like from Space?
 How do Scientists believe the Earth was formed?

The Earth

- Name at least two other shapes the Earth was thought to be.
- I can identify scientific evidence that has been used to support or refute ideas.
- Plan a shadow investigation
- Observing, measure, record and identify patterns for changing shadows throughout a day
- Present scientific evidence in the form of a working ‘shadow clock’ model
- Track the Earth’s movement by making and observing a sundial
- Explore the Earth’s movement through simulation and time zones
- Explain using evidence how night and day occur.

The Moon

- Solve problems using scientific evidence
- Carry out a simulation to investigate and demonstrate why the moon appears as it does in the sky

Is there evidence that the Earth spins?

Why are there different times of day and night around the world?

The Moon:

What is a Moon?

How does the Moon effect us?

Have we visited the Moon?

The Solar System:

What is the Solar System?

What are the Names Of The Planets?

What are the differences between the planets?

Why Are Some Called Planets and others are not?

Why are planets spherical?

The Sun:

How does the Sun effect us?

What is Geocentric and Heliocentric?

What is a solar eclipse?

Are there other Suns?

The Worlds Beyond:

- Use photos as a scientific source to identify features on the moon
- Link lunar phases to the position of the Moon, Earth and Sun in the form of a diagram
- Understand how the moon creates tides.

The Solar System

- Create a scaled solar system model/diagram using spherical representations.
- Research and collate planetary data online and represent it graphically.
- Explain how the planets orbit the Sun.
- I can explain theories of planetary movement in the solar system using evidence.
- I can identify scientific evidence with support. I can identify scientific evidence.
- I can identify scientific evidence that has been used to support or refute ideas.

The Sun

- Understand the difference between geo and heliocentric solar system and how views have evolved
- I can explain how the planets orbit the Sun.
- I can distinguish between heliocentric and geocentric ideas of planetary movement.
- I know how a solar eclipse happens and can create a way to demonstrate this.
- I know the our star is called The Sun
- I know that there are much larger stars.
- I know that stars have a limited 'life span'.

The Worlds Beyond Our Own

- I know that stars are made of particles that gradually pull together.
- I know that the pressure at their centre causes a nuclear reaction.
- I know that when they explode they send matter further out into the space around them.
- This matter goes on to form new stars, planets or moons.
- As their mass increases their gravity increases.
- Gravity is a force that pulls other objects towards its centre.

Where are stars 'born'?

What is a black hole?

How can we see the stars?

What is gravity?

The Explorers:

Who has been to the moon?

How far have we travelled into space?

How far can we see into space?

The Explorers

- Know that Neil Armstrong was the first man on the moon.
- Know that he was accompanied by Buzz Aldrin
- Know that the mission was Apollo 11.
- Know that Tim Peake was the first British astronaut to live on the ISS
- Know that Valentina Tereshkova was the first woman in space.