All About the Moon Primary Resource

This Science primary resource contains fascinating facts and detailed information about the moon. When and how did the moon form? How long is a lunar day? What lies below the moon's surface? What would Earth be like without the moon…?

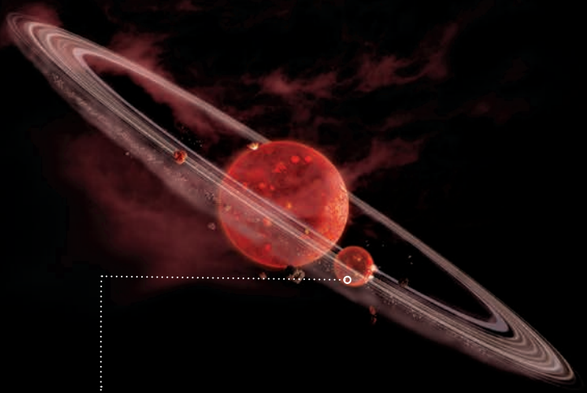
Pupils will gain an in-depth understanding of the moon in this primary resource - from the history of this celestial body to the huge effect it has on our planet.

The teaching resource can be used in study group tasks and discussions about the moon, Earth and space. It can be used as a printed handout for each pupil to review and annotate, or for display on the interactive whiteboard for class discussion.

Activity:

Using the information in the primary resource together with their imagination, get the pupils to write an account entitled "*My Mission to the Moon!*". Encourage them to be as descriptive as possible as they talk about their exciting adventure! How does the moon's surface look, and what does it feel like? How is it different to Earth? How warm/cold is it on the moon? Can they see our planet and, if so, what does it look like?

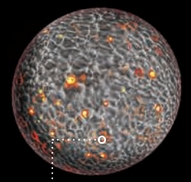
The children could also carry out their own research to help with their account and descriptions. What other fascinating facts and information can they discover?!



EVOLUTION OF THE MOON TIMELINE

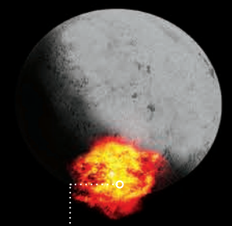
ABOUT 4.5 BILLION YEARS AGO

A giant collection of **tiny rocks** floating in space is captured by Earth's newly expanded **gravitational field** (the **force that causes objects to fall towards its centre**). These rocks form into a **ring structure** that looks a lot like **Saturn's rings**. It's thought that a **Mars-sized object** then **smashes** into **Earth**, sending more **debris** hurtling into space. This collects into a **spinning hot**, **liquid blob** – **our early Moon**.



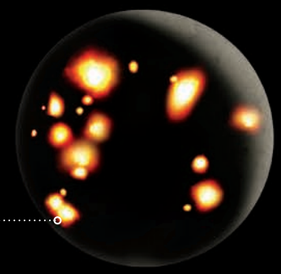
SOME 4.4 BILLION YEARS AGO

When this spinning blob slows down, it starts to **cool**, and its surface transforms into a **solid crust**. The Moon begins to take a slight **lemon-like shape**, with **bulges** pointing towards and away from Earth. (From Earth, the Moon deceptively looks like a perfectly round ball, like the one above, because of the angle we view it from.)



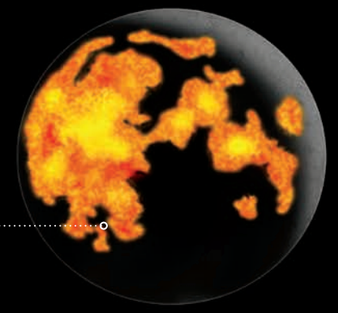
ROUGHLY 3.9 BILLION YEARS AGO

A massive **asteroid** about **200km in diameter** slams into the far side of the Moon, creating the **Aitken Basin** on the Moon's **South Pole**. Some **2,570km in diameter** and approximately **13km deep**, it's one of the largest known impact craters in the **entire solar system**.



ABOUT 3.8 BILLION YEARS AGO

Something – perhaps the **movements of the outer planets** – causes **rocky debris** to fly towards the Sun. These asteroids also **pound the surface of the Moon**.



ONE BILLION YEARS AGO

The **large asteroids** that are constantly hitting the Moon **temporarily end**. But the violent activity *isn't* over. The Moon's **near side** – the side facing Earth – breaks out into **volcanic activity**, sending out **vast oceans** of **molten lava**.

ALL ABOUT THE MOON

THINGS YOU NEVER KNEW ABOUT OUR MYSTERIOUS NEIGHBOUR IN THE SKY...

The Moon is Earth's closest celestial neighbour, covered with huge craters, rugged mountains and flat, grey plains formed from lava that flowed across its surface billions of years ago. But it wasn't until **50 years ago**, on **21 July 1969** [GMT] that people finally walked on its surface – when astronaut **Neil Armstrong** became the first human to step on lunar soil. Now, scientists are anxious to go back. But why return when there are still so many unexplored spots to visit in our solar system?

Faced with threats such as **overpopulation** and the **climate crisis** on **Earth**, our easy-to-reach neighbour could help people research how to survive in the faraway future. Many experts believe that the Moon is our next step in **learning how to live in space**. Missions to the Moon might even be possible in the next **decade**.

But before YOU pack your bags and sign up to go there yourself, check out the next four pages to learn more about what some scientists call '**Earth's sidekick**.' Discover when the Moon was formed, how it compares to Earth, and find out what living on a *moonless* planet would be like. Ready for lift-off? Then read on!

RECENT HISTORY

Early astronomers, philosophers and scientists, including **Leonardo da Vinci**, mistake solidified **lava beds** on the Moon's surface as **seas** because they look **blue** when viewed from Earth. They're later named **maria** – the Latin name for '**seas**.'

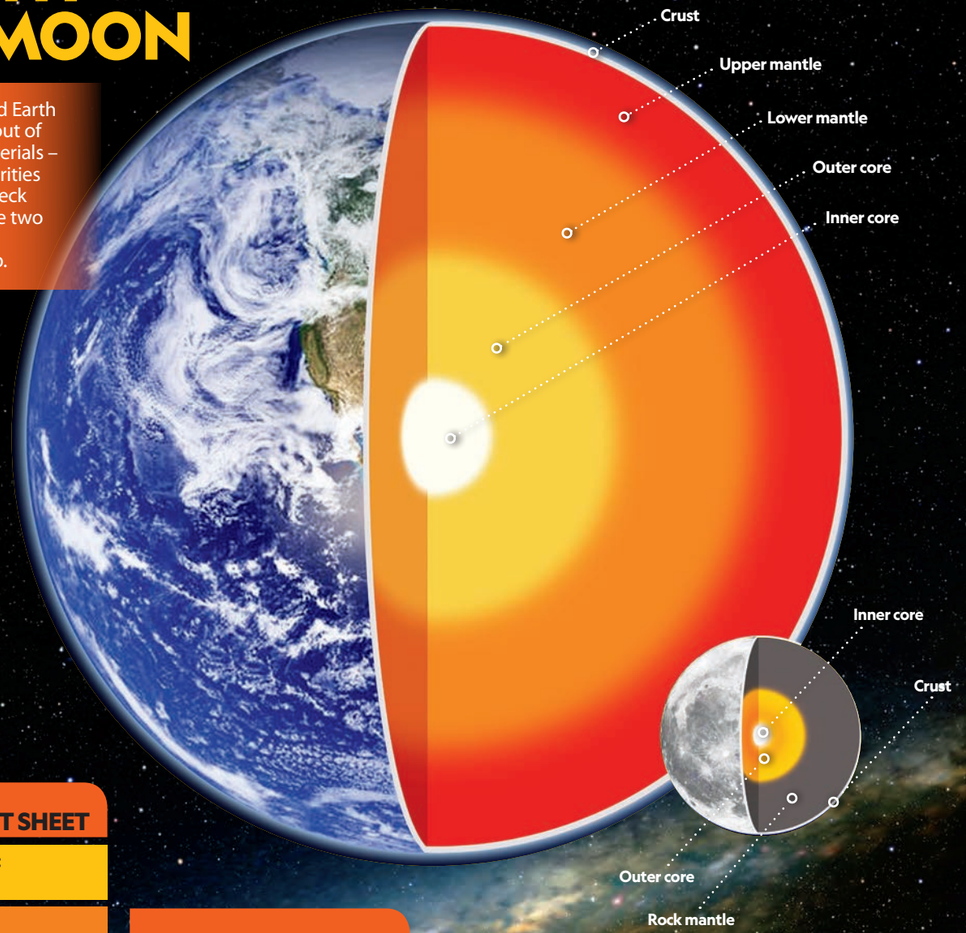
But while we now know that water doesn't flow on the Moon's surface, scientists *have* discovered **water molecules** in the Moon's **polar regions**!

LESS THAN A BILLION YEARS AGO

New asteroids smash into the Moon's surface, forming many of the **small** and **medium-sized craters we see today**. These younger craters have **star-like patterns radiating** from their **centres**. They're created when huge impacts cause **light-coloured rock** lying **under the Moon's surface** to blast out, then gently settle back down onto the surface.

EARTH VS. MOON

The Moon and Earth were forged out of the same materials – but the similarities end there. Check out how these two very different rocks stack up.



EARTH FACT SHEET

Length of day: 24 hours

Diameter: 12,756 km

Highest surface temperature: 56.7°C

Lowest temperature: Minus 97.8°C

MOON FACT SHEET

Length of lunar day: 27.3 Earth days

Diameter: 3,476 km

Surface temperature (day): 133.8°C

Surface temperature (night): Minus 153.8°C

From Earth, we always see the same side of the Moon. That's because it's in 'synchronous rotation' with us.

The Moon isn't round! It has a bulge on either side, giving it a slight lemon shape.

The word 'lunar' comes from 'luna', which is Latin for moon.

LIFE WITHOUT THE MOON

Without our Moon, life on Earth would be totally different. **Days would be shorter**, for instance. Without the Moon and its **gravitational pull** slowing down the rotation of the Earth, our day might only last **six** to **eight hours** instead of 24!

And forget about **autumn leaves** – the **seasons wouldn't exist**. Without the Moon's pull on it, Earth might **wobble on its axis** like a dangerously **spinning top**, creating **200-kmph winds** and massive **hurricanes** one day, with relatively calm weather and totally different temperatures the next. Plus, it would be almost **pitch-black** every night of the year.

Oh, and **humans might not even exist**. That's because without the Moon, most creatures would call the **ocean** home. Less than half a billion years ago, **all life on Earth was living in the seas**. Bizarre and colourful creatures swam freely through the water or scurried around the ocean bed. Mounds of hardened black lava poked above the waves. There were no trees – only a few species of hardy green plants had made the transition onto land.

So how did the Moon help more species adapt to life on land? The gravitational pull of the Moon creates **high and low tides** in the ocean. During **low tide**, water recedes back into the ocean, **exposing tide pools** – shallow pools of salt water on beaches and nearby rocks – to the air. Millions of years ago, the resilient life-forms that lived in tide pools **evolved new adaptations** that helped them **survive dry spells**.

Eventually they left the oceans to **live on land**. These early land explorers evolved into **amphibians**, **dinosaurs**, **birds**, **insects**, **snakes** and **mammals**. (Hi, **humans**!) But without the Moon, low tide wouldn't exist, and these creatures might have stayed underwater forever. Yikes!

The interior of both the Earth and the Moon are hot. Magma (hot, liquid rock) from Earth's mantle still erupts onto its surface. But it doesn't do that on the Moon.

The Moon is about one-quarter of the size of Earth. It's a natural satellite that orbits our planet.