

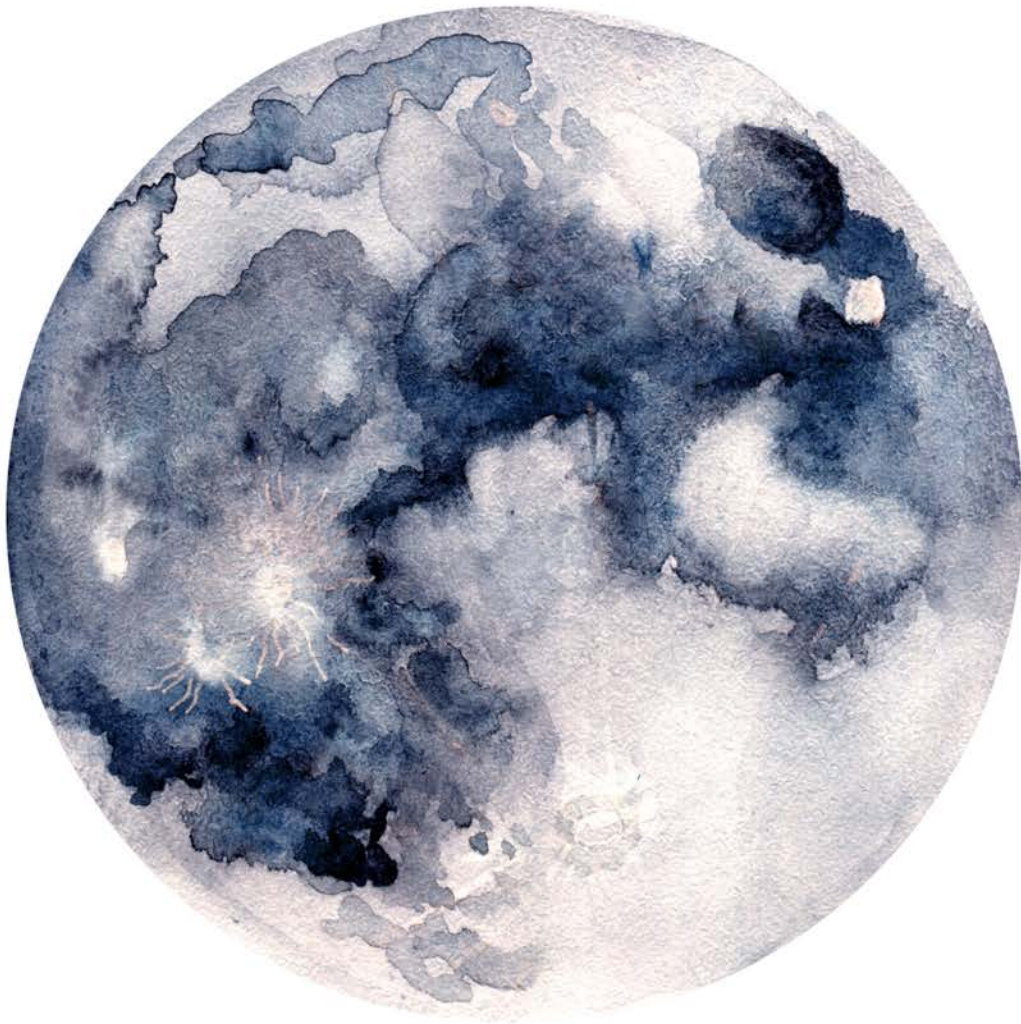


THE SCHOOLS'  
OBSERVATORY

PROUD TO BE PART OF



LIVERPOOL  
JOHN MOORES  
UNIVERSITY



# Let's Explore The Moon!

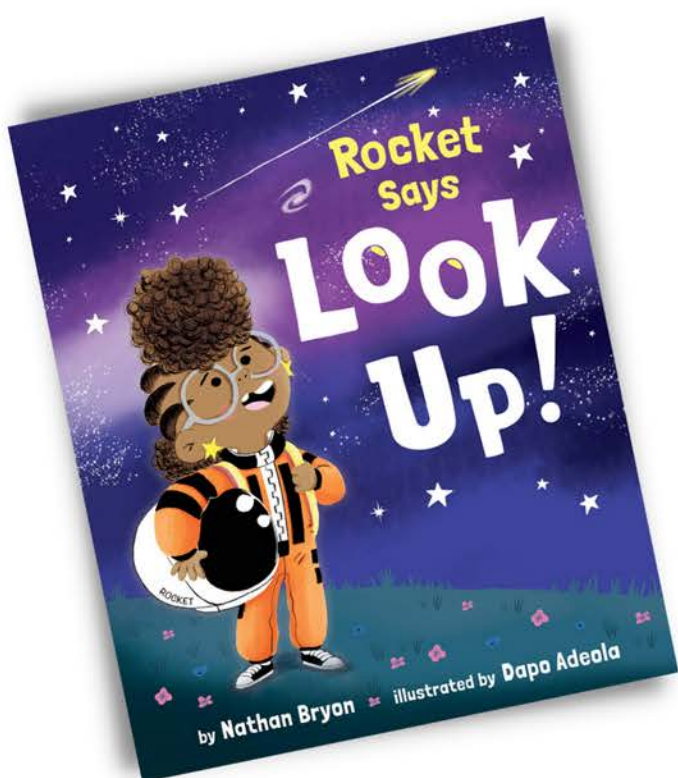


## Background information

The Schools' Observatory use the wonders of space to inspire the next generation of scientists, programmers and engineers. They provide resources for schools, support for teachers and free use of the world's largest robotic telescope through their website, [schoolsobservatory.org](http://schoolsobservatory.org).

The Schools' Observatory is proud to be part of Liverpool John Moores University and are based in LJMU's Astrophysics Research Institute in Liverpool, UK.

In partnership with Durham Book Festival's Little Read, The Schools' Observatory have created packs of themed resources for Early Years Foundation Stage children. These can be used at home or in nursery settings to engage children with the story, "Look up" by Nathan Bryon.



The main character in "Look up" is Rocket. Rocket is very interested in space and the night sky and is looking forward to a meteor shower. Children may not have seen a meteor before but they have probably seen the Moon and some stars. They may even have seen a planet without realising it!

When stargazing, it's easiest to start by looking for the brightest objects in the night sky. These include stars, planets and the Moon. This activity pack focuses on the Moon.

This booklet has astronomy information for you on pages 3 to 7, ideas for activities to do with the children on pages 8 to 12 and finally additional resources and weblinks we think you might be interested in on pages 13 to 15.

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Please note: the images used in this document are not to scale.

# The Moon

## Why does the Moon shine?

The Moon is the brightest object in the night sky, but it doesn't make its own light like a star. The Moon shines because its surface reflects light from the Sun. We only see the part of the Moon that the Sun shines on.

## Does the Moon move?

The Moon travels around the Earth in an oval shaped orbit. It takes about 27 days to complete each orbit. The Moon also spins around its own axis. It completes one rotation about every 27 days.

Because it takes about the same time to spin around as it does to orbit the Earth, we always see the same side of the Moon – the side facing the Earth. We have only been able to see the far side of the Moon by sending space probes or astronauts to orbit around it.

People sometimes mistakenly refer to the far side of the Moon as the 'dark side'. However, the far side of the Moon receives the same amount of light from the Sun as the side nearest to Earth. The Moon experiences day and night like the Earth does. So when we see no moon (a new moon) the far side of the Moon is all lit up. Likewise when our side of the Moon is full (all lit up) the far side of the Moon will be in total darkness.

Like the Sun, the Moon rises in the east and sets in the west each day. This is because the Earth is rotating around its axis so our viewpoint changes. Children sometimes think the Moon follows the Sun across the sky. This isn't true. Sometimes it rises before the Sun and sometimes after. Though it does move along the same path as the Sun. This imaginary line across the sky is called the ecliptic. The planets also appear along the ecliptic. This is because the Earth, Sun, Moon, and planets of our Solar System are all in the same plane.

# The Moon

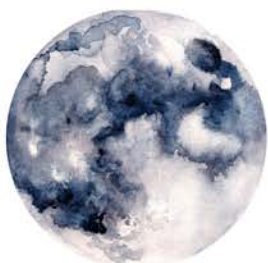
## Why do we see different phases of the Moon?

Children may notice that the Moon appears to change shape and gets smaller and bigger during the month. The important thing to note is that the Moon itself doesn't change shape or size. We only see the part of the Moon that is lit up by the Sun. The other part remains dark. The Moon receives the Sun's light from different angles as it orbits the Earth. This makes it look like the Moon is changing shape. We call these changes, the phases of the Moon.

Our online animation shows why we see different phases of the Moon:

<https://www.schoolsobservatory.org/things-to-do/why-does-moon-have-phases>

Each shape (or phase) has a name (see picture below). When the Moon appears to be getting bigger each day, we say the Moon is waxing. When the Moon appears to be getting smaller each day, we say the Moon is waning.



**Full  
Moon**



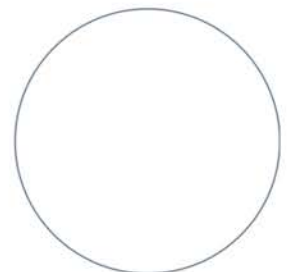
**Gibbous  
Moon**



**Quarter  
Moon**



**Crescent  
Moon**



**New  
Moon**

Children may wonder if different countries see a different phase of the Moon. The answer is no. The Moon shows the same phase to the whole Earth. However, the Moon will rise and set at different times depending on where you are. Also, the angle we see the Moon from changes depending on where we are. The Moon seen from the Southern Hemisphere would look 'upside down' to someone used to seeing it from the Northern Hemisphere.

# The Moon

## Can you see the Moon in the daytime?

We see the Moon when it is above the horizon and reflecting enough light from the Sun to be brighter than the surrounding sky. This means we can often see the Moon in the daytime.

However, we don't see every phase of the Moon in the daytime. When it is a New Moon, the side of the Moon facing us is in shadow, so it is not bright enough to be visible. When it is a Full Moon, the Moon is above the horizon only during the night-time.

## Why does the Moon sometimes look bigger?

The Moon doesn't change size, though it can sometimes appear to be larger. This optical illusion occurs when the Moon is low in the sky, close to the horizon.

A simple way to show that the Moon remains the same size is to hold a small pebble, a coin, or your thumb at arm's length with 1 eye closed. It will cover the Moon. You can repeat this when the Moon appears much larger to show the object will still cover it.

Sometimes the news reports there will be a 'supermoon'. The Moon's orbit is oval shaped. This means that sometimes it is slightly closer to Earth than at others. We call the closest point to Earth, perigee. When a full Moon is also at perigee, the Moon appears to be slightly larger and is called a 'supermoon'. However, the difference in size is very small and most of us can't tell the difference. But you may notice that the Moon is much brighter during a supermoon.

# The Moon

## What is a Blue Moon or a Blood Moon?

A Blue Moon has nothing to do with the colour of the Moon. A Blue Moon is the second Full Moon of a calendar month. There are about 29 days between each Full Moon so usually there is 1 Full Moon each month. But sometimes, if there is a full Moon right at the beginning of the month, there is a second one before the month ends. This only happens once every 2 or 3 years, hence the saying 'once in a Blue Moon'.

A Blood Moon occurs when there is a lunar eclipse. A lunar eclipse is caused by the Earth blocking the Sun's light from reaching the Moon. The Earth casts a shadow on the Moon which makes the Moon look red.

## What is the surface of the Moon like?

The Moon's surface is made of rock. The surface is covered in a layer of fine, grey dust. There is no liquid water on the Moon but there is ice. Scientists have discovered that the Moon has a very thin atmosphere. There is no life on the Moon.

The Moon's surface is covered in craters caused by pieces of space rock hitting it. The surface also contains large, dark, flat plains. These were made by ancient lava flows from volcanoes billions of years ago. The plains are called 'maria' which means seas. This is because the first astronomers thought the large dark areas were made of water. The dark maria can sometimes look like a face! The Moon also has mountains.

# The Moon

## Has anyone been to the Moon?

The Moon is the furthest anyone has travelled in space. The first people to walk on the Moon were the Apollo 11 astronauts, Neil Armstrong and Buzz Aldrin. They landed on the Moon on 24th July 1969. In total, 12 astronauts have been to the Moon. The last astronauts to visit the Moon left in December 1972. There are plans to send people back to the Moon by 2025.

Videos of astronauts on the Moon show them doing a funny hopping run. This is for several reasons: there is gravity on the Moon, but it's not as strong as on Earth, so they feel lighter; there is no air pushing down on them; and they are wearing bulky space suits. All this means if they tried to take normal steps they might accidentally fly up into the air and fall over.

You can explore the topics of astronauts and space travel using our **Astronaut Activity Pack** and **Rocket Activity Pack**.

## Feedback

We welcome feedback from practitioners. If you want to let us know how much your children have enjoyed our activity or how we could improve it, please send us some feedback using the details below.

Share your lunar creations with The Schools' Observatory!  
Email [SchoolsObs@ljmu.ac.uk](mailto:SchoolsObs@ljmu.ac.uk) or tag [@SchoolsObs](https://www.instagram.com/SchoolsObs) on social media.

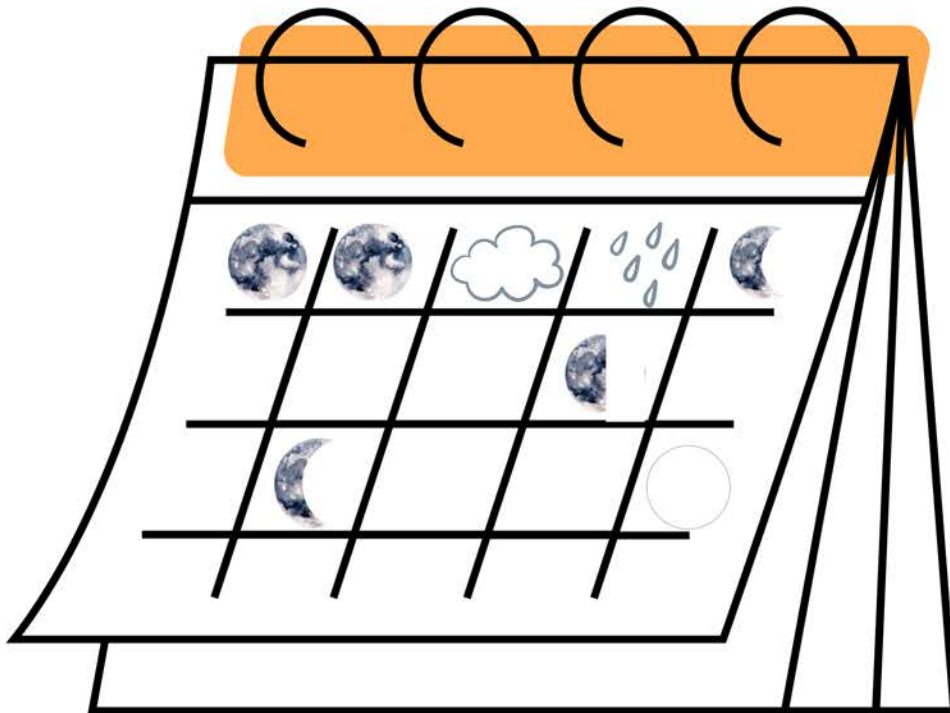


# The Moon - Activities

## Activity 1 - Keep a Moon Diary

Keep a Moon Diary in your learning environment. This helps children to notice the changing phases of the Moon.

- Ask the children to notice what the Moon looks like each day and record it in a diary for 28 days. You can use our Moon Diary template or create your own:
  - <https://www.schoolsobservatory.org/things-to-do/keep-moon-diary>
- Try and start the diary during the daytime when the Moon is visible. Then encourage children to keep observing the Moon in the evenings at home.
- Encourage the children to look at the Moon closely. They may be able to see the darker outline of the part of the Moon which isn't being lit up by the Sun. This helps reinforce that the Moon doesn't change shape and is always a sphere.



# The Moon - Activities

## Activity 2 - Making craters on the Moon

Children explore why the Moon has craters on its surface.

### Instructions:

1. Fill the container with the flour or sand.
2. Smooth the surface so it is quite level.
3. Sprinkle over a thin layer of your different coloured powder, like cocoa.
4. Tell the children that this is “the surface of the Moon”.
5. Give each child a few pebbles – these are their “meteorites”.
6. They take turns to drop their pebbles on the Moon.
7. Help the children to carefully lift up the meteorites to reveal the craters underneath.
8. Compare your Moon’s surface with the photo of the Moon.

### Equipment needed:

1. Enough flour or sand for a layer about 5 cm thick in your container.
2. Cocoa powder or a different coloured sand.
3. Small pebbles or rocks (or something of a similar weight like marbles)
4. Large container for the flour or sand
5. Something to protect the floor around the container from any mess.
6. Photo of the Moon: [www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108\\_A\\_cmod.png](http://www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108_A_cmod.png)

You can talk about how the Earth’s surface isn’t covered in craters because the Earth’s atmosphere protects us from meteorites. Children could explore if different objects make the same size craters. You can make a link between the weight of the object and the depth of the crater.

### Safety notes:

- Small objects can be a choking hazard. Test all objects using a choke tester tool.
- Children may want to throw their “meteorites”. You may want to do this outside and offer eye protection. Alternatively, you can use lighter, softer objects as meteorites.

# The Moon - Activities

## Activity 3 - Lunar Investigation Tray

Children investigate different materials.

### Equipment needed:

- Sand
- Selection of “Moon rocks” (e.g., pebbles, polystyrene packing material, balls of tin foil)
- Tray or container
- Investigating tools (e.g., magnets, magnifying glasses, torches, weighing balance)
- Mark marking materials

### Instructions:

1. Fill a tray with sand and a selection of “Moon rocks” (e.g., pebbles, polystyrene packing material, balls of tin foil).
2. Provide tools for children to study the rocks (e.g., magnets, magnifying glasses, torches, weighing balance).
3. Provide mark marking tools and encourage children to record what they find.
4. Children investigate the Moon rocks. They can:
  - sort the rocks into groups
  - count how many of each type of rock there is.
  - collect one of each type to “take back to Earth” to study
  - compare the rocks’ sizes, shapes, weights, colours, if they reflect light

### Safety notes:

- Small objects can be a choking hazard. Test all objects using a choke tester tool.

# The Moon - Activities

## Activity 4 - Lunar Artwork

1. Print out and display our Phases of the Moon Poster:  
<https://www.schoolsobservatory.org/things-to-do/moon-phases-poster>
2. Provide black paper circles and chalk or white paint
3. Encourage children to recreate the phases of the Moon.



## Activity 5 - Create a 3D Moon surface

1. Provide the pupils with an amount of Play-Doh to create a Moon roughly the size of a tennis ball.
2. Show the children a Photo of the Moon:  
[www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108\\_A\\_cmod.png](http://www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108_A_cmod.png)
3. Children use a lolly stick or similar to recreate craters and mountains on their Moon.



# The Moon - Activities

## Communication, Language, Emotions

There is a Makaton Sign for the Moon. You can watch a video here:

<https://fb.watch/aOvKuU8MxG/>

Encourage children who speak English as an additional language to share words they know that mean Moon. Display them around the learning environment.

# The Moon: Additional Resources & Web Links

## Word Bank

bright	horizon	phases
calendar	light	quarter Moon
crescent Moon	lunar	reflect
dark	month	satellite
daytime	Moon	shadows
Earth	new Moon	shine
Full Moon	night-time	spin
gibbous Moon	orbit	Sun

# The Moon: Additional Resources & Web Links

## The Schools' Observatory Links

You can use The Schools' Observatory website to search for more information about the Moon. We think these are good places to start learning:

[www.schoolsobservatory.org/search/](http://www.schoolsobservatory.org/search/)



Moon

Apollo Missions

Astronauts

Buzz Aldrin

Earth spins

Gravity

Lunar Eclipse

Moon animation

Moon orbit

Moons

Moon phases

Neil Armstrong

Orbit

Solar System

Space probes

Stars

Sun

Telescopes

# The Moon: Additional Resources & Web Links

## Other Links

Photo of the Moon taken by the Liverpool Telescope

[www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108\\_A\\_cmod.png](http://www.schoolsobservatory.org/sites/default/files/gallery/fullmoon-mn070108_A_cmod.png)

Check the phase of the Moon

[www.schoolsobservatory.org/learn/astro/nightsky/lunarmon](http://www.schoolsobservatory.org/learn/astro/nightsky/lunarmon)

Phases of the Moon Poster

[www.schoolsobservatory.org/things-to-do/moon-phases-poster](http://www.schoolsobservatory.org/things-to-do/moon-phases-poster)

NASA's Space Place – All about the Moon

<https://spaceplace.nasa.gov/search/moon/>

NASA Image Gallery – The Moon

<https://moon.nasa.gov/galleries/images/>

International Observe the Moon Night

<https://moon.nasa.gov/observe-the-moon-night/about/overview/>