

Missions

Home Learning Pack 007



Welcome to the Home Learning pages of *Checkpoint Kids*.

In Issue 10 - Missions we look at several games which use space rockets and satellites as their focus. We also interview some of the European Spacecraft Operations Centre (ESOC) team who launch and control artificial satellites which orbit the Earth.

You can listen to the interviews in the magazine.

Although you can see artificial satellites from Earth with the naked eye, they only appear as tiny dots among the stars. However, there is one natural satellite we can observe - the Moon! Men first walked on the surface of the Moon over fifty years ago and the National Aeronautics and Space Administration (NASA) are sending astronauts back to the surface in 2024.

To prepare for this amazing event we thought you could begin learning about the Moon and making some observations.

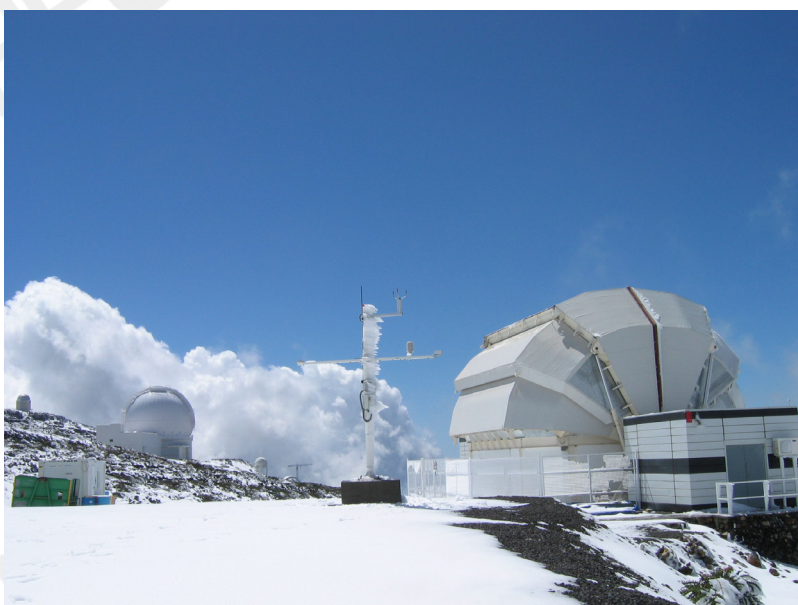
We also thought it might be fun for you to imagine you have set up an astronomical observatory and send data back to us at the Checkpoint Space Agency.

DID YOU KNOW?

For more information about data collection, check out HLP004 (Exploration) and Issue 6 (City Builder) where we took a look at the Halley VI Research Station in the Antarctic.

So, what we would like you to do this time is to imagine that you are in an observatory. Your mission is to record the position of the moon in the sky and how much of it can be seen. You will need to name your observatory and design a logo. To understand more about the rotation of the Moon, we have included plans for making your own model, or orrery. (Don't worry if you don't want to do this because it is not essential for the mission.)

We would like you to share your observations and your drawings of the Moon with the Checkpoint Space Agency, here at Checkpoint Kids magazine. But don't forget to complete a permission slip!



An astronomical observatory is a location where events that happen in space are viewed. Check out the National School's Observatory at:

<https://bit.ly/3rpq3lD>

Home learning guidance

1. Research

BEFORE YOU collect data about the Moon, you need to know some facts. Do you know the answers to the following questions?

- How was the Moon formed?
- What is the Moon made of?
- Why can we only see one side of the Moon?

To answer these questions, you could type them into your search bar and see what you find. Alternatively, visit the following websites.

To answer all the questions, watch this video clip from National Geographic:

<https://www.youtube.com/watch?v=6AviDjR9mmo>.

Don't worry if you're still a little confused.

For more about why the Moon looks like it does, watch this NASA video clip:

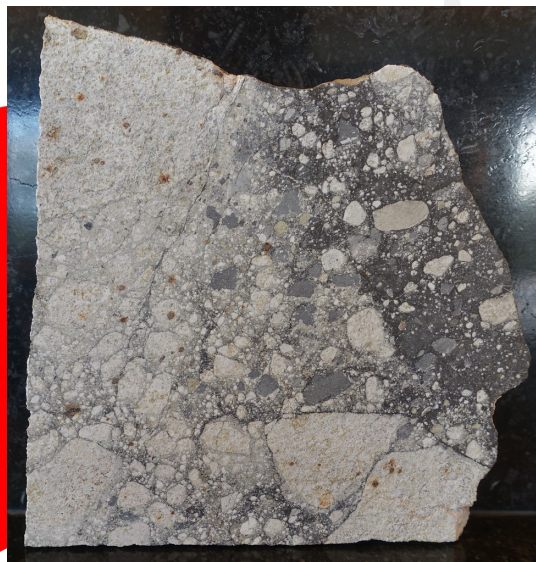
<https://www.youtube.com/watch?v=UIKmSQqp8wY>

WHEN YOU look at the Moon you will only ever see the same side. You might think that this is because the Moon is not rotating. Well, you're wrong. The Moon is spinning on its axis. Watch this video clip from MinuteEarth for an explanation: <https://www.youtube.com/watch?v=6jUpX7J7ySo>

DON'T WORRY if this is still confusing! We show you how to make a model that will help explain what is happening.

FUN FACT:

It turns out that Wallace and Gromit were wrong about the Moon. It's not made of cheese after all. It's composed of rocks called basalts and anorthosite. Here's a slice of the Moon.



PEOPLE HAVE been making models of our solar system for a long time. These models are called orreries and some are over 300 years old.

This orrery was made by John Rowley in 1712. Check it out at the Science Museum website:

<https://bit.ly/3sYzysA>

The orrery got its name because it was made for Charles Boyle, the fourth Earl of Orrery in Ireland. Watch this video from the Science Museum for an explanation:

<https://www.youtube.com/watch?v=silZbABZahY>



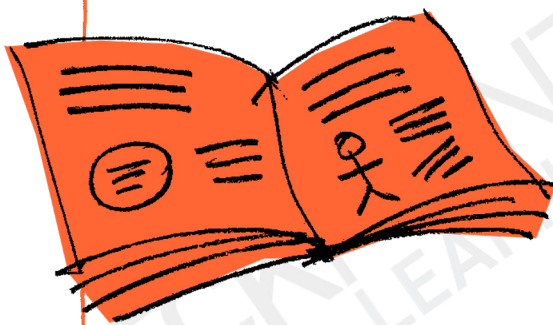
TO BUILD your own orrery print off the instructions: HLP007WS1.

ONCE YOU have made your model, why not use it to explain the movement of the Moon to someone else.

NOW YOU have a better understanding of the Moon, why not check out this NASA animation of the Moon. This video clip tracks the Moon's rotation and orbit for a whole year commencing in January 2021. You might need to mute the soundtrack! <https://www.nasa.gov/multimedia/videogallery/index.html>

FUN FACT:

Orreries are not built to scale. To see how big the planets are in relation to each other and how far apart they are check out this video from To Scale: <https://bit.ly/3PvW33W>



Remember

A LOT of designers use a notebook to keep all their ideas in when they are creating something new. It's a good idea to do this, but it doesn't have to be a book. It can be post-it notes, scraps of paper or an app. Try to use something that you can carry with you easily. That way, when you have a great idea or you see something that inspires you, you can make a note of it.

2. Plan

NOW YOU understand a little more about the Moon, it's time to prepare for making some observations.

BEFORE YOU can make observations of the Moon, you have to know where to find it. Using a compass, find a convenient window, or space that faces South. The Moon rises in the East and sets in the West. It will be at its highest point in the sky when it is in the South.

To accurately find the Moon where you live you will need a Moon Timetable. Use this one:

<https://www.timeanddate.com/moon/uk/leeds?month=5&year=2021>

or search for an App using the phrase: Moon Phases.

YOU WILL need to know what phase the Moon is in. You will also need to know what time it rises and sets.

Here is a timetable for the beginning of April 2021:

| Date | Moon Phase | When | Where | Sunset |
|------------|--------------------|----------------|-------|--------|
| April 15th | Waxing 1st Quarter | 8:00pm onwards | West | 8:00pm |
| May 15th | Waxing 1st Quarter | 9:00pm onwards | West | 9:00pm |



The phases of the Moon are explained in this video clip from the Royal Museums Greenwich: <https://vimeo.com/64563198>



New Moon

Half Moon

Full Moon

Half Moon

Old Moon

Extra Activity

AN ASTRONOMICAL observatory is a location from where events in space are observed. They are usually huge telescopes in locations where the air is clear and there is very little light pollution. When you make your observations of the Moon, your location can be called an astronomical observatory.

We would like you to name your observatory and send us a drawing, or image, of it.

- enter 'astronomical observatories' into your search bar. You will discover hundreds of observatories to inspire you
- 'luna' means Moon ('lunar' is the adjective) and is a Latin word. Could you include it in your observatory's name?
- why not design your ideal observatory. What would it contain? Where would you locate it?

Once you have named your observatory, you can design a logo, or patch, to celebrate it.

- enter 'space logos' into your search bar. You will discover hundreds to inspire you
- try using just the initials of your observatory in your design
- take a look at *Checkpoint Kids* issue 10, Kerbal Space Program, Challenge 1. There you will find guidance for designing a mission patch

YOU WILL need to print off some observation sheets
TLP007WS2 or design your own. You will need to record:

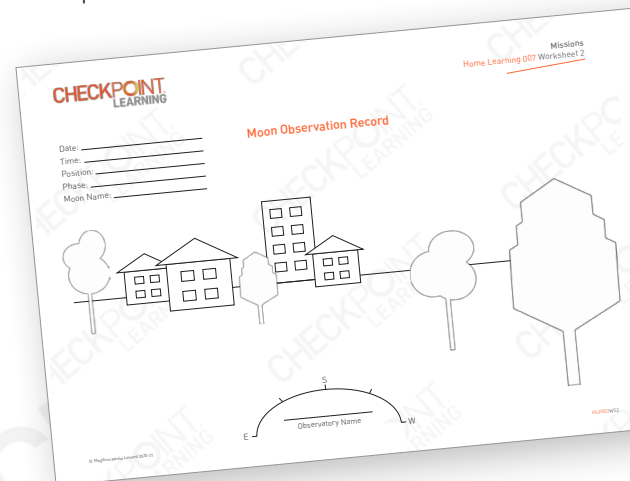
- the name of your observatory
- the position of the moon
- the phase of the Moon
- the date and time

3. Create

NOW IT is time to record your observations.

- decide when you are going to begin recording your Moon observations – this needs to be around the 15th of the month
- enter the date and time on the observation sheet
- face South and draw the Moon's position as accurately as you can
 - if you have a mobile device compass, point it at the Moon and it will give you a compass reading – record this
 - if you take a screenshot of your compass reading, you can rotate the mobile device to line this up with the Observation Sheet. You can then draw the Moon's position more accurately. HLP007WS2a shows you how to do this
- draw the Moon at roughly the right height in the sky
 - you could include buildings or trees on your observation sheet to show how high the Moon is
- shade the Moon to show the phase
- if you can, name the phase
- complete a new observation sheet for each day you observe the Moon
- always observe the Moon at the same time if you want to plot its progress across the sky
- you do not have to make observations every day. Try leaving one or two days between observations
- use the Royal Museums Greenwich list of Moon names to add the Moon name for the month you are making your observations:

<https://www.rmg.co.uk/discover/explore/names-full-moons-throughout-year>



FUN FACT:

There is no permanent 'dark side' of the Moon. Because it rotates on its axis it receives sunlight over its whole surface. This takes approximately 27 days.

4. Share

NOW ALL you need to do is complete a permission slip and email a photograph or video of your observations to the magazine! We would love to see how creative you can be and who knows, you might even be published in a future edition of *Checkpoint Kids*!

5. Challenge

THERE ARE several ways you could adapt the theme to suit your own interests:

- if you own a pair of binoculars or a telescope, you could draw a diagram of the Moon
 - don't worry if you haven't any. NASA have provided a wonderful 3d image:
<https://solarsystem.nasa.gov/resources/2366/earths-moon-3d-model/>
- you could research some folk tales that include the Moon. Try this website:
<https://www.lpi.usra.edu/education/explore/marvelMoon/tales/>
- you could write your own story about the Moon
- why not make 3d models of the Earth and Moon? You could hang them up using cotton or string. If you make models of other planets in the solar system, you could make a mobile: https://www.youtube.com/watch?v=36Na4F_K8cU

