# *Dark side of the moon* **Teacher background notes**

**In this investigation, students explore how our understanding of the Earth and the moon has changed through examining the validity of the common anecdotal reference to ‘the dark side of the moon’. In the process they will discover why the moon undergoes a cyclic change in appearance over the course of its movement around the Earth and how its movement influences tidal changes.**

## [Australian Curriculum: Science links](http://assist.asta.edu.au/resource/3469/dark-side-moon-cle)

## Learning intentions

Students will be able to:

* identify questions that can be investigated scientifically
* identify that the moon rotates on its axis as it moves around the Earth, and hence experiences day and night just as the Earth does
* describe the way the moon moves around the Earth and hence explain why the same side of the moon always faces the Earth as it moves around the Earth
* explain why the shape of the moon that we can observe from Earth, changes as it moves around the Earth
* analyse information from digital technologies and images to arrange the different phases of the moon in chronological order
* appreciate the importance of scientific discovery in changing people’s understanding of the world around us
* communicate their ideas using appropriate scientific language and representations.

## Suggested time for this CLE

The time needed to complete the *Dark side of the moon* CLE will depend on the depth of the prior knowledge of students, the time to perform the two investigations (‘What is the dark side of the moon?’ and ‘The moon’s changing face’) and follow up with any further extension activities. Allow 3–4 hours

## Prior conceptual knowledge

Science / Year 3 / Science Understanding / Earth and space sciences *Earth’s rotation on its axis causes regular changes, including night and day*[*(ACSSU048)*](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU048)

Science / Year 5 / Science Understanding / Earth and space sciences *The Earth is part of a system of planets orbiting around a star (the sun) (*[*ACSSU078*](http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=1#cdcode=ACSSU078&level=3)*)*

## New concepts to be introduced

Any discussion of natural phenomena related to the sun, the moon and the Earth, will naturally raise questions about the changing shape of the moon, as we observe it. The explanation requires the student to understand abstract concepts. Year 7 students are beginning to develop the cognitive tools to interpret these abstract ideas. For this reason, it is important to engage students kinaesthetically with hands on experiences to model the changing positions of the sun, Earth and moon.

Any discussion about changes in the observable shape of the moon automatically raises the idea of a dark and light side of the moon. Since the dark side of the moon is always there, but never seen, many stories of the mysterious dark side have developed over time in common folklore and fairy tales. The idea of a dark side to the moon has even been immortalised through the rock group Pink Floyd’s, *Dark Side of the Moon* album. It is for this reason that we need to establish that there is no permanent dark side of the moon and the more accurate term that should be used is the ‘far side of the moon’.

Through developing their own investigation, students should find out that there is no permanent dark side of the moon. They should also be able to understand that since the moon takes exactly the same amount of time to make a complete revolution around the Earth as it does to complete one rotation, then the same side of the moon always faces the Earth and that just as much light shines on the side of the moon facing away from the Earth, as there is on the side facing the Earth.

This concept is then applied to explain why we observe changes in shape of the moon as it moves around the Earth. **Note**: The moon does not actually change shape, the illuminated section that we can observe from Earth changes. Students should also understand that the observed changes in the shape of the moon is determined by the relative position of the moon and the sun as the moon moves around the Earth

## Possible misconceptions

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| **STUDENTS MAY THINK…** | **INSTEAD OF THINKING…** |
| The side of the moon facing away from the Earth is always in darkness. | The side of the moon facing away from the Earth receives just as much light as the side facing the Earth. |
| The moon does not rotate on its axis nor does it have ‘day and night’ like the Earth. | The moon rotates on its axis like the Earth, but it takes the moon 27 days to complete one rotation. |
| The moon goes around the Earth in one day. | The moon takes 27 days to move around the Earth. |
| Phases of the moon are caused by the Earth’s shadow on the moon. | The shadow is caused because we cannot see the whole lit face of the moon throughout its revolution around the Earth. |
| The moon emits its own light. | The illumination of the moon is due to reflected sunlight. |

## Links to further information

Strickland, Jonathan.  ‘What and where is the dark side of the moon?’ HowStuffWorks website <http://science.howstuffworks.com/dark-side-of-moon.htm>

‘Understanding The Moon Phases’, MOONCONNECTION website <http://www.moonconnection.com/moon_phases.phtml>

‘Tides and Water Levels’ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, ocean service education website <https://oceanservice.noaa.gov/education/tutorial_tides/tides01_intro.html>

Earth Sky: Understanding New Moon  
<http://earthsky.org/moon-phases/new-moon>