A Stargazer’s Guide To The Cosmos – How To See The Earth Turn

**ABC ME screening details: Monday** 4 May, 2020 at 1:10pm

This episode can also be viewed on [ABC iView](https://iview.abc.net.au/show/stargazers-guide-to-the-cosmos) after the scheduled screening time.

**Key learning areas:** science

**Level:** secondary

**About:** "Space Gandalf" Greg Quicke shares the stargazing discovery that inspired him to become an astronomer: How to observe the rotation of the Earth in space, by watching a handful of easily observable stars in the night sky.

## Before the episode

1. Discuss with justification your ideas about whether the Earth is stationary or in motion.
2. Complete the following tasks in five minutes:

* Draw an astronomer
* Describe what an astronomer does
* What is a star?
* List any constellations you know of

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## During the episode

1. Write down the evidence for Earth’s rotation, as described by Greg Quicke. This can be done as a series of bullet points, concept maps or sketches. Focus on Greg Quicke’s descriptions.
2. List words and concepts that are not clear.

## After the episode

1. Synthesise the information presented in the video by answering the following:

* Describe how the movement of stars and constellations in the night sky explain the rotation of the Earth.
* How has the information provided in this video changed or extended your understanding of Earth’s rotation in space?
* List one to three questions you have about Earth’s rotation in space.

1. **Smartphone astronomy** - students should conduct their own investigations about evidence for the rotation of the Earth. This can done in a number of ways:

* Native camera apps on smartphones can be used to photograph the night sky. Many apps allow the user to adjust aperture and shutter settings, so that photographs of the night sky may be obtained. Experiment with these settings to obtain pictures of stars, planets and other objects in the night sky. The best times for night sky photography are late evenings, particularly in the days before the new moon.
* Take images of the same region of the night at regular intervals, for example, at one hour intervals. Images that include terrestrial reference points such as buildings, trees or other natural formations will assist students with charting the night sky. After obtaining a few images, chart the movement of stars and constellations, but avoid planets and meteors. You may choose to print the images of the night sky and then measure the distances travelled by the stars/constellations. A clear transparency with a grid may be useful. If available, photo stitching software can be used to align the images and identify objects that have been repositioned during the investigation.

**Follow up activity:** Obtain long-exposure images of the night sky. To do this, the smartphone should be mounted on a tripod or rested on a stable platform. Depending on the part of the night sky that was photographed, you should see linear or circular trails.

## NSW teacher notes

This is an optional standalone resource that could supplement student learning. The activities align with syllabus outcomes across stages and can be modified to meet the needs of your students. Students can complete the activities while learning at home and in the classroom. All activities can be completed without access to the internet or a device. Teachers could collect student work to offer feedback and as evidence of learning.

### Learning intentions

* To explain that the fixed stars in the night sky move in predictable patterns, rising in the East and setting in the West.
* To understand how the observed motion of stars provides evidence for the Earth’s rotation.
* To collect data that demonstrates the motion of the stars in the night sky.
* To describe the motion of the Earth and stars using a variety of scientific formats.

### NSW Science 7-10 Syllabus outcomes

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| Outcome | Stage 4 |
| Working Scientifically | **SC4-4WS**  identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge |
| Knowledge and understanding | **SC4-12ES2**  Scientific knowledge changes as new evidence becomes available. Some technological developments and scientific discoveries have significantly changed people's understanding of the solar system.  a. explain that predictable phenomena on the Earth, including day and night, seasons and eclipses are caused by the relative positions of the sun, the Earth and the moon (ACSSU115)  **Additional**  investigate examples of how scientific knowledge has developed through collaboration of experts from across the disciplines of Science, eg space exploration and resource management |
| Values and attitudes | **SC4-1VA**  appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them |

[NSW Science 7-10 Syllabus](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/science/science-7-10-2018) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales 2018.