

ACTIVITY 1.3 ANCIENT ASTRONOMY

From Chapter One of the Deep Space Diary discoverydiaries.org/activities/ancient-astronomy/

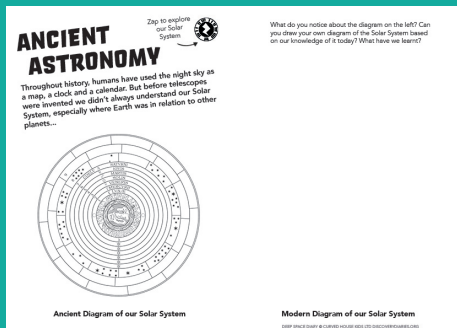
LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

View detailed curriculum links for England, Scotland, Northern Ireland and Wales in the Teacher Toolkit, plus differentiation ideas for your region and year level.

discoverydiaries.org/resources/teacher-toolkit/



Learning Objective

To understand the structure of our solar system.

Resources Required

- Smartphone/device or computer to access Zap code (optional)
- Rulers
- Compasses

Background to this Activity

Our Solar System is made up of eight planets, five dwarf planets (Ceres, Pluto, Eris, Humea and Makemake), over 200 moons, and millions of comets, asteroids and meteors. Although astronomers in ancient times – like Aristarchus of Samos who lived in Greece in the third century BCE – theorised that the planets orbited the Sun (“heliocentric” model), many people believed that the Earth was the centre of the Solar System (“geocentric” model) until the 1500s. This theory was promoted by Aristotle and later Ptolemy. The diagram included in this activity is based on Aristotelean cosmology, with the planets orbiting Earth.

In 1543, Copernicus’ book *On the Revolutions of the Heavenly Bodies* was published. It proposed a heliocentric model of our Solar System, with the Sun at the centre. In 1609, Galileo invented a spy glass or telescope that allowed him to observe the mountains on the Moon, the phases of Venus, Saturn’s rings and Jupiter’s four brightest moons. The scientific observations made by Galileo supported the theory of a heliocentric Solar System.

Key vocabulary

Helio – Sun
Geo – Earth
Centric – at the centre
Model – a three-dimensional representation of a proposed structure, often at a smaller scale

Running the Activity

This activity supports the development of visual analysis – an important skill for scientists.

Begin by asking students to examine the Aristotelean diagram of the Solar System on the left-hand page of the worksheet. Ask them to volunteer observations about the diagram. What do they notice that differs from their existing knowledge of the Solar System? What’s missing? What’s in the wrong position? What do they think the words mean?

Ask students when they think this diagram might have been drawn. Invite discussion about how our understanding of the Solar System may have developed over time.

Revisit the structure of our Solar System, then ask students to draw it on the worksheet, encouraging different levels of accuracy concerning the shape of orbital paths and distances of the planets from the Sun, based on student ability. More capable students can be introduced to Astronomical Units, which is covered in Mars Diary Activity 2.1: Going the Distance: discoverydiaries.org/activities/going-the-distance/

Solutions to the Activity

NASA diagram of planetary order with orbital distances represented (via ESA site): <https://www.cosmos.esa.int/web/cesar/the-planets>

Distance between planets in our solar system: http://www.griffithobservatory.org/exhibits/exhibitsimages/ouraddress-solar_system3.jpg

Questions for the Class

- Why couldn’t ancient astronomers see all of the planets in our Solar System?
- Do planets orbit the Sun at the same speed? How can we tell how quickly they are orbiting?

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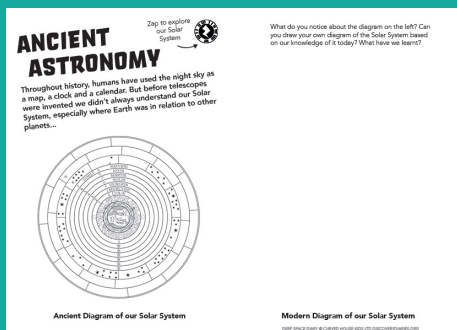
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- Why causes day and night?
- What causes our daytime length to change over the course of a year?

Additional Challenges / Extension Activities

Mnemonics are a great way to help students remember the order of the planets e.g. My very educated mother just served us noodles; Ask students to write their own mnemonic to help them remember.

As a class, create a large-scale diagram of the Solar System, including other objects in space like asteroid belts, the ISS, moons, manmade satellites, comets etc.

Looking at the words on the ancient diagram on the worksheet, ask students to research what the different words mean.

Important astronomical discoveries were made across the world in ancient times. Islamic astronomers like Al-Battani, al-Sufi, al-Biruni, and Ibn Yunus recorded the position of the Sun, Moon and stars; the Ancient Mayans built structures like staircases and wells to align with astronomical events and made many detailed records of celestial movements; during the Shang Dynasty, Chinese astronomers produced a calendar of the moon cycle; in the Southern Hemisphere, indigenous Australians had developed astronomical methodologies over 65,000 years ago. Ask students to research an ancient astronomer or culture of their choice.

Ideas for Differentiation

Support:

- Support younger students by using a primer activity like discoverydiaries.org/activities/the-solar-system/ to revise the planets in our Solar System. Work in small groups or pairs to identify the order of the planets. Provide students with cardboard circles of varying size to trace, to position the planets around the Sun.

Challenge:

- Introduce higher ability students to Astronomical Units – the unit of measurement used to measure the distance of planets from the Sun. 1 AU is equal to the distance from our Sun to the Earth. This can be done with a primer activity like: discoverydiaries.org/activities/going-the-distance/
- Challenge students to accurately represent the distance of each planet from the Sun, using a compass to draw each orbital path.

Useful Links

Animated clip of solar system: <https://www.youtube.com/watch?v=948Of8BUcTk>

Universe in a Box – free resource to help students learn about the Solar System: <http://www.unawe.org/resources/universebox/>

ZAP! Students can independently access multimedia resources using the Zappar mobile/tablet app. See Zappar instructions at the link below and note that the mobile/tablet will need to be on a WIFI connection: discoverydiaries.org/toolkit/discovery-diaries-zappar-instructions/

If you don't have access to the internet in the classroom, all Zap code content is available to download on the activity's web page (see link to the left) as a PowerPoint presentation or as bundles of images.



**GET ZAPPAR
ZAP THE CODE**



Find more great space-themed STEM resources at <https://www.stem.org.uk/esero>