

Science and Islam

Overview of Astronomy Lesson

Description

This lesson will introduce pupils to the practice of astronomy in medieval Islam and how it relates to other aspects of Muslim culture including religion and astrology.

The main activity introduces the astrolabe, a remarkable instrument that was developed to a high level of sophistication by Muslim scholars. The Museum of the History of Science has one of the largest collections of astrolabes in the world including many fine examples originating from Muslim countries. Pupils can make their own model of an astrolabe based on one in the museum's collection and find out how to use them to perform simple astronomical calculations.

This lesson may be taught in the classroom, but it is recommended that it is combined with a visit to the Museum which offers a taught session on the astrolabe including all the materials free of charge.

Curriculum Links

11-14 Science	Sc1 Ideas and evidence <ul style="list-style-type: none">• The interplay between questions, evidence and scientific explanations using historical and contemporary examples• The ways in which scientists work today and how they worked in the past, including the roles of experimentation, evidence and creative thought in the development of scientific ideas Sc4 The Earth and Beyond <ul style="list-style-type: none">• Models of the universe and relative movements of the earth, sun and stars
14-16 Science	Sc1 How Science Works Some aspects including <ul style="list-style-type: none">• How scientific ideas change over time
11-14 History	Some aspects of the NC attainment targets: <ol style="list-style-type: none">1. chronological understanding2. knowledge and understanding of events, people and changes in the past3. historical interpretations4. historical enquiry, organisation and communication

Outline Plan for Astronomy Lesson 1

It is recommended that this lesson is preceded by the Introductory lesson.

1. Setting the scene

(Allow 5-10 minutes)

A general discussion about the science of astronomy might be a useful way to orientate pupils. Possible questions to pose might include:

- Why might astronomy be the oldest of all sciences?
- In what ways was astronomy useful to historical civilisations?
- What other aspects of life might have been affected by the study of astronomy? (e.g. religion, astrology)
- What sort of things do astronomers study today and why?

2. Activity

(Allow 20-30 minutes)

Divide the pupils into small groups and allow them to research the following questions using the internet. In each case, pupils should be encouraged to find out more and to **raise a new question**.

Each group should report back in a plenary discussion:

- What is the Muslim calendar based on and how was astronomy important in determining it?
- The Muslim empire spread a lot through trade and travel. How did Muslim travellers navigate in unknown territories?
- Find out about how Muslim scholars organised study and learning. What were the main places for learning?
- What theories did Muslim scholars have about the universe? What sort of models did they make to show their ideas?

Useful websites

1. <http://muslimheritage.com/>
2. <http://www.1001inventions.com/>
3. http://www.ucalgary.ca/applied_history/tutor/islam/learning/

3. PowerPoint presentation

(Allow 10 minutes)

The discussion might be supported by the PowerPoint presentation, '**Science and Islam – Astronomy**'. This outlines some of the main reasons why the study of astronomy was important to scholars in medieval Islam.

Points to emphasise include:

- The importance of books and learning passed on to Muslim scholars from ancient Greece
- The importance of systematic study and the role of observatories and libraries
- The practical use of astronomy for navigation, religious practice (prayer times and religious festivals), and the overlap with astrology. Astrology was taken a lot more seriously than it is today and had an important role in anything from political decisions to individual medical treatment.

Outline Plan for Astronomy Lesson 2

Please note: This lesson can be delivered as a taught session at the Museum of the History of Science with all materials provided free of charge.

1. Introduction to the Astrolabe

(10 minutes)

The PowerPoint presentation, '**What is an astrolabe?**', can be used to introduce the instrument before the modelling activity.

2. Modelling the astrolabe

(20 minutes)

The resources include guidance on how to make a model astrolabe.

3. Problem-solving with the astrolabe

(30 minutes)

A practicing Muslim would need to be able to calculate the times of sunset and sunrise in order to determine the appropriate prayer times. This activity will enable the pupils to carry out this relatively simple calculation using their astrolabes.

The resources available include:

1. '**Solving problems with the astrolabe**' (PowerPoint)
2. '**A brief guide to solving problems with the astrolabe**' (Word document)
3. A pupil worksheet, '**Solving problems with the astrolabe – questions**' (Word document)
4. Two additional Word documents ('**Setting the rule**' and '**Naming the parts of an astrolabe**') that may be useful for the pupils when carrying out this activity.

Useful websites

The Museum of the History of Science has an online exhibition of astrolabes along with a more detailed guide on how to use an astrolabe at <http://www.mhs.ox.ac.uk/astrolabe/>. It also includes a searchable database of the museum's collection of astrolabes.