

Science and Islam

Art Lesson 2 – Geometric drawing in Islam.

This lesson is linked to an unusual architectural artefact featuring Keplerian type solids at The Museum of the History of Science, Oxford (see Entrance Gallery).

This lesson is aimed at KS3 Art pupils and teachers but it could also be used in a mathematics lesson on proportion and shape. There is a lot of material in this lesson and you may wish to adapt it to suit the level and ability of your group. There are suggestions of homework and ideas of how to extend this topic at the end of the lesson plan. Pre-divided circle shapes are downloadable from the source detailed in the further reading section. Using these will speed up a lesson and remove the need for having multiple compasses and protractors.

Lesson Aims and Objectives:

Students should:

- Know and understand about the sacred and philosophical interpretations of the circle and other geometric shapes in Islamic design.
- Know and understand about some of the mathematical and visual qualities of Keplerian polyhedra.
- Be able to create complex drawings involving a number of shapes.
- Apply numeracy skills to divide and measure the proportions of a circle and other shapes.
- Be able to identify and name shapes and polygons within their drawings.

Resources Required:

- A3 White paper
- Small card circle templates with holes pierced in the middle – no larger than 5cm diameter.
- Compasses (enough for one per student if possible).
- Protractors (enough for one per student if possible).
- Rulers (enough for one per student if possible).
- Sharp coloured pencils or fine coloured pens.
- **Islamic Art** *PowerPoint* if required.
- **Geometric drawing in Islam** *PowerPoint*.

(The *PowerPoints* can be shown on an interactive whiteboard or printed out as slides for students to look at in pairs or small groups).

The Lesson

You may wish to begin the lesson by looking at the **Islamic Art** *PowerPoint* from Lesson 1 and reminding students of the core concepts in Islamic Art.

Task 1

For this task students will need the circle templates. Using the **Geometric drawing in Islam** *PowerPoint* to show students each stage show students how to create a triangle, square and hexagon using the perfect circle. Remind students to mark the centre-point of each circle using their template and stress the importance of accuracy and care when drawing around the templates and connecting lines. Explain the sacred Islamic symbolism of the shapes as detailed in the *PowerPoint*.

Task 2

Look at and discuss the monument displaying Keplerian type polygons, which is shown in the *PowerPoint* and is on display in the museum if you are visiting with your group.

Task 3

Using the *PowerPoint* show students how to create an 8 pointed star shape using circles and squares. Stress the importance of careful measuring and accuracy when attempting this task.

Extension Tasks

These tasks can be used for homework or to continue work over a number of lessons:

- Students could attempt Task 3 as homework or this task could be a starting point for a further lesson when students could create a pattern using the 8-point star shape. Use a limited number of colours to define the pattern.
- Students could create 3D polygon shapes of the shapes from the Keplerian type solids by creating nets and assembling the shapes. Students should try and learn the names of as many polygons as possible.

Further reading and resources:

Islamic Patterns (an infinite design colouring book) – Bourgoin, J.
ISBN 0 486 23537 8

Islamic Patterns (an analytical and cosmological approach) – Critchlow, K.
ISBN 0 500 27071 6

Geometric Patterns from Islamic Art and Architecture – Field, R.
ISBN 1 899618 22 8

Introducing Islam – Sadar, Z. & Malik, Z.

ISBN 1 840465 824.

Download a resource on Geometric Patterns (which includes pre-divided circle outlines)
from:

www.projects.ex.ac.uk/trol/trol/trolna.pdf