

Working with others : Islamic design

Description

Working in the voluntary sector requires an understanding of cultural variety. These activities bring out the mathematics to be found in Islamic art – you may want to discuss with pupils why patterns like these are important in this context. The topic provides rich opportunities for cross curricular work and can also provide the focus for off site activities.

Activity 1: Four by four

Activity 2: Hexagons and stars

Activity 3: Tiles on grids

Designing nets encourages the pupils to explore reflecting patterns on a square grid – horizontally, vertically and diagonally. Sometimes these designs are aesthetically satisfying; sometimes not. Adapting the pattern requires visualising the impact of small changes as they are reflected across the grid. Some pupils may struggle with the first diagonal reflection – mirror cards may help here. You may want to use two mirrors and link this in with the diagonal effect. Initially, the pupils will use the resource as a worksheet but have plenty of 16 x 16 square grids available to allow further exploration.

An Islamic design found on a mosque door features in the next two activities.

This design is used on a glass door at a mosque.



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Geometric Patterns from *Islamic Art and Architecture*, Tarquin Publications.

The book which this image comes from is also a rich source of rewarding extension activities.

In completing the **Hexagons and stars** worksheet, the pupils use limited information to extend the tiling pattern. The task requires careful attention to detail and

justifying how you know that the pattern will extend in a particular way. It is easy to make mistakes and pupils should be encouraged to use pencil and not to expect their first attempt to be a final 'fair copy'.

Resources

Squared paper, isometric paper, square dotted paper, tracing paper, mirror cards, rulers, colours.



Photo: Peter Smith Associates

Subsequent attempts, or a final 'fair copy', can be produced on isometric paper. The symmetries of the final pattern can be discussed – it can be created by translation or by rotation. Some pupils will struggle with the abstract nature of the problem as set. Having a few stars and hexagons cut out and available for them to use will support these learners. The same pattern is reproduced on the **Tiles on grids** worksheet. Here the pupils explore working with co-ordinates in an original way: using a non-standard format will build pupils understanding of the nature of co-ordinate systems. You can expect that some pupils will choose an acute angle and others an obtuse angle for the first quadrant: this makes an interesting discussion point and results can be compared. To support the pupils' understanding of their results, they need to use 7mm squared paper so that more of the pattern is available to view. This can be downloaded free from

<http://www.cleavebooks.co.uk/troll/index.htm>

The mathematics

Four by four focuses on reflection whilst **Hexagons and stars** requires thinking about translation or rotation. **Tiles on grids** uses co-ordinates to develop a non-standard transformation.