What do I need?

Printed copy of pages 4-6

Coloured pens or pencils

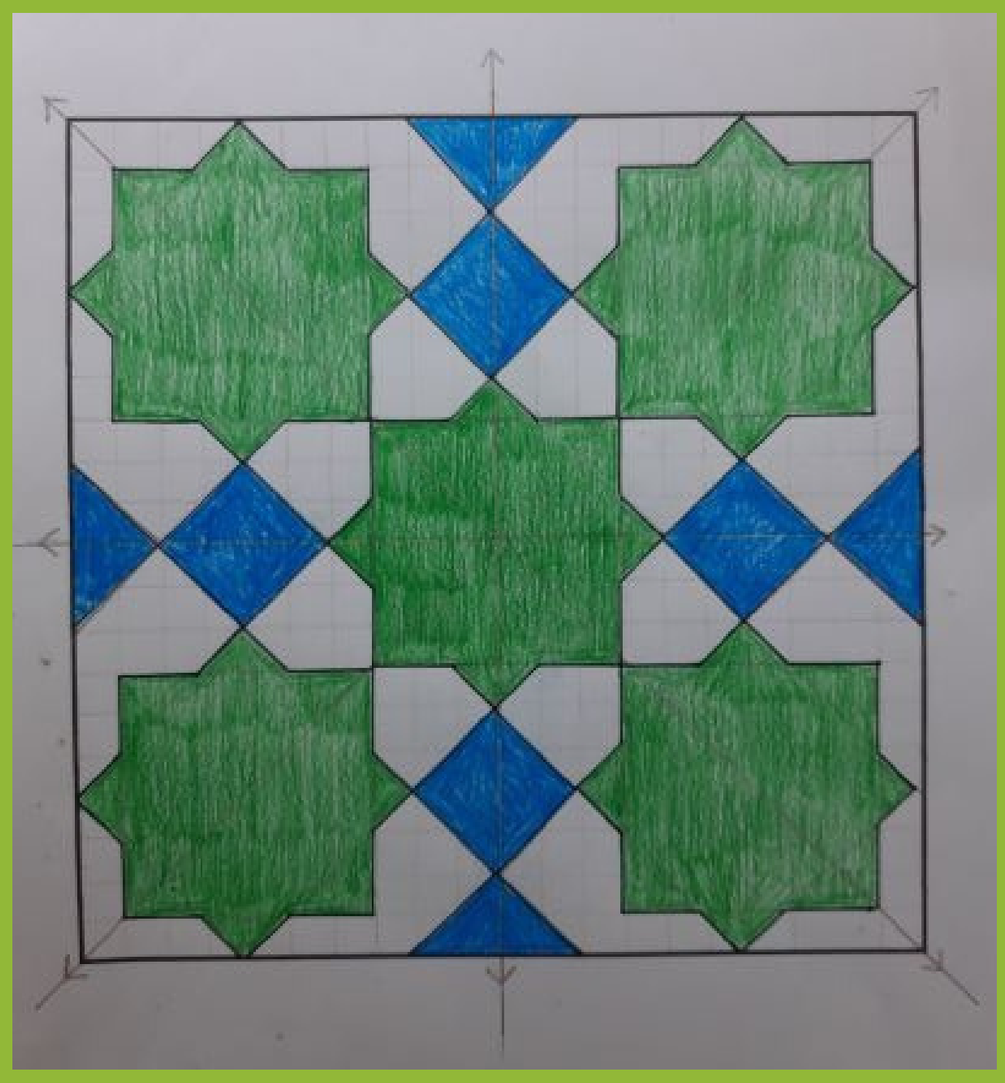
Pencil

Ruler

Mirror
(optional)

Tracing paper
(optional)

Compass
(optional)



design a Moroccan tile

What do I do?

Look at the information about symmetry in Islamic design on pages 2-3. Why is the number 4 important in Islamic design? Can you see how the number 4 is incorporated into Moroccan *zellige* tiles by using mirror symmetry and rotational symmetry?

Colouring symmetrical tiles

Study the tile design on page 4. It has 4-fold mirror symmetry, which means it is reflected along 4 lines. Can you work out where the mirror lines are? You can use a mirror to help you. Use your ruler and pencil to draw the symmetry lines onto the design.

The tile design on page 5 has 4-fold rotational symmetry, which means it can be rotated 4 times and still look the same. Can you work out where the rotation lines are? You can copy the design onto tracing paper and rotate it over the design if you need to. Draw the symmetry lines onto the design.

Colour in both designs, making sure your coloured sections are symmetrical too. For a real Moroccan flavour, use the zellige colours on page 3 as inspiration.

Designing symmetrical tiles

Now it's time to really test your symmetry skills by designing your own Moroccan tile using the template on page 6!

Decide what type of symmetry you are going to include in your design and on how many lines. Use your pencil to sketch out your design. Use your ruler for straight lines and a compass for curved lines and circles.

Colour in your design, paying close attention to symmetry. Keep your design somewhere safe ready for the next ETG activity.

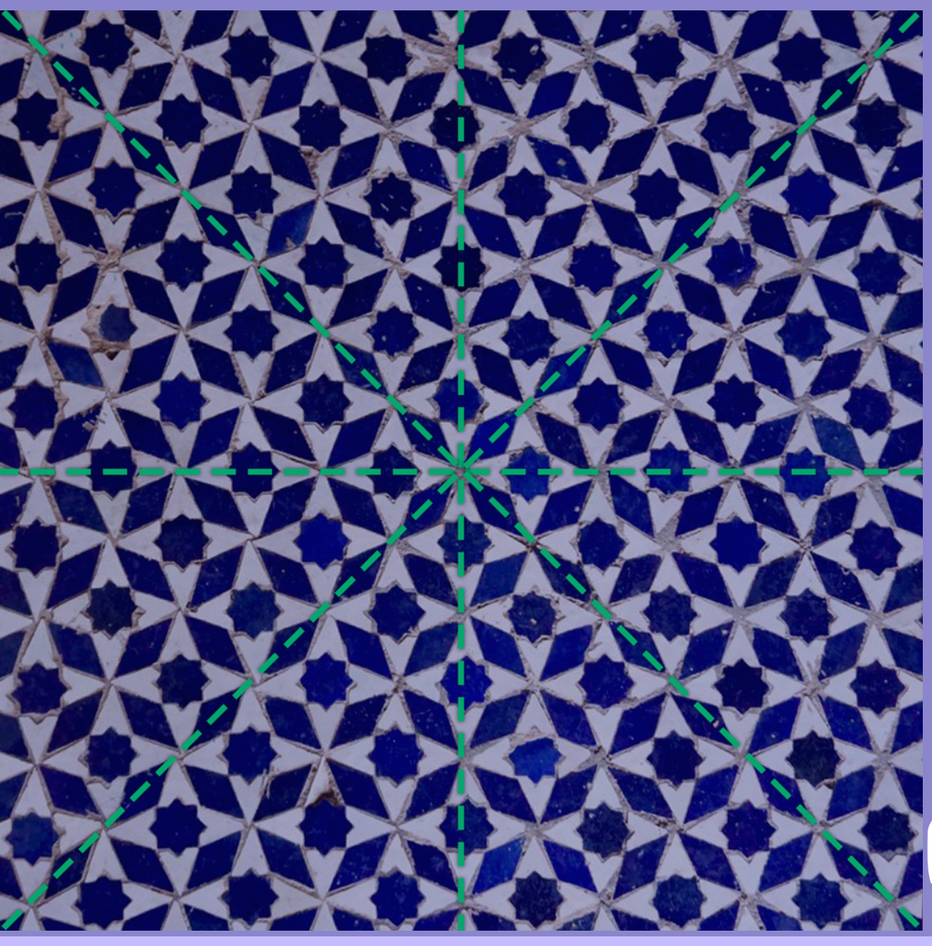
symmetry in Islamic garden design

Symmetry and geometry are historically important in Islam and are the basis of Islamic design. The order and perfection seen in symmetrical geometric patterns reflects the profound and universal order of the Divine. In Islamic garden design symmetry is found in multiples of 4 as this number is important in Islam. Islamic gardens, such as those in Morocco, use a *char bagh* four-square layout to represent the four gardens of paradise as described in the Qur'an. Symmetry is also an essential part of Moroccan *zellige* tile designs which are often based on the principle of 4. *Zellige* tiles decorate almost every type of surface in Morocco, especially in courtyard gardens where they can be seen on floors, fountains, pools, benches and walls.

MIRROR SYMMETRY

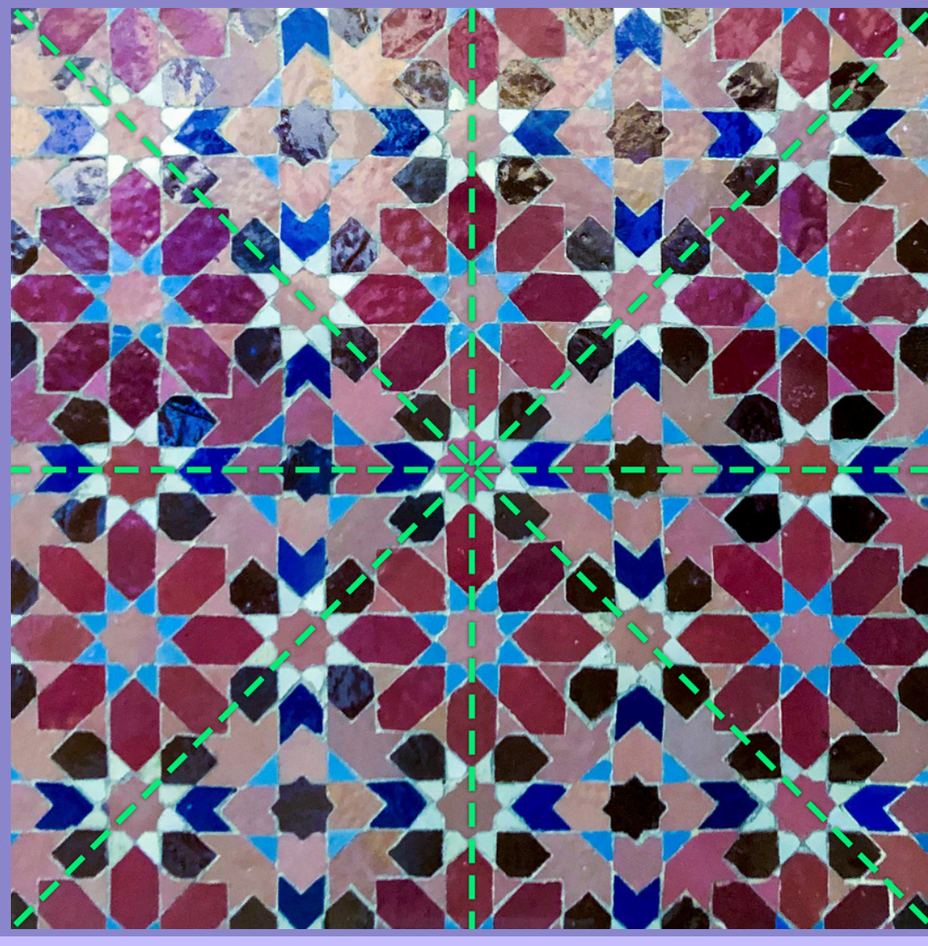
Mirror symmetry is when a pattern is reflected along a central line with both sides identical to each other. This means that when you place a mirror along the line the design would look complete. 2-fold mirror symmetry is when the design can be reflected on 2 lines - horizontal and vertical. 4-fold mirror symmetry is when the design can be reflected on 4 lines - horizontal, vertical and 2 diagonals.

TYPES OF SYMMETRY



ROTATIONAL SYMMETRY

Rotational symmetry is when a pattern can be rotated around its centre and still look the same. 2-fold rotational symmetry is when the design can be turned twice and look the same. 4-fold rotational symmetry is when the design can be turned 4 times and look the same. Very complicated tile designs can have more than 16-fold rotational symmetry! Rotational symmetry is mostly seen in designs which include shapes with 4, 8, 12 or 16 sides. The most common shape is a star.



examples of Moroccam zellige