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| **Tessellated Fabric Printing** |
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| Creating a pattern that can be tessellated as a fabric print |
| **Subject(s):** Design & Technology**Approx time:** 70 - 110 minutes |  | **Key words / Topics:** * Ramadan
* fabric printing
* patterns and templates
* shapes
* tessellation
* textiles
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| **Suggested Learning Outcomes**  |  |  |
| * To understand what is meant by tessellation.
* To be able to create a pattern that can be tessellated as a fabric print.
* To understand and be able to apply fabric printing techniques.
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| **Introduction** |  |  |
| This is one of a set of resources designed to allow learners to use seasonal themes to support the delivery of key topics within design & technology, maths and science. This resource is based on the Islamic period of Ramadan, which is a holy month of fasting, reflection and prayer for Muslims. It builds on the tradition of using tessellated designs in Islamic art, in particular designs based on natural forms such as plants. |
| **Purpose of this activity**In this activity learners will use the theme of Ramadan to create a tessellated fabric print.This activity could be used as a main lesson activity to teach about the skills and techniques associated with making textile products using fabric printing and tessellation. It could also be used as part of a wider scheme of learning focussing on manufacturing processes, tools and equipment used within textiles, or to teach numeracy concepts within D&T. |
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| **Activity** |  | **Teacher notes** |
| **Introduction (10-15 minutes)**Teacher to explain that learners are going to design and make a tessellated fabric print using the theme of Ramadan as inspiration.**What is tessellation (10-15 minutes)**Using the teacher presentation teacher to introduce the concept of tessellation and discuss shapes that can be tessellated.**Designing the tessellation (10-20 minutes)**Teacher to explain to learners that they are going to create their own tessellation pattern using the shapes shown on the teacher presentation. Learners to produce their pattern design.**Producing the fabric print (35-50 minutes)**Teacher to hand out resources required for the task to learners. Teacher to demonstrate the steps shown in the presentation and listed below:* Step 1 - Draw the individual tessellation shape onto the sponge using a felt tip.
* Step 2 – Cut away the parts of the sponge that are not needed.
* Step 3 - Select the paints and print the design onto fabric, paying careful attention to the placement of the prints to ensure they tesselate.
* Step 4 - Let the prints dry overnight.

Learners to complete each step for themselves. The teacher presentation could be left on the whiteboard as a supporting guide as they do this.**Plenary (5-10 minutes)**Learners could write a set of instructions on how to do this for the next class, highlighting what works well and what could be improved.  |  | **Resources and equipment**Instead of using fabric paint, learners could use ink and rollers or any other suitable medium.Sponges, potatoes or lino can be used to make the shape.Fabric – we used 30cm x 30cm of Calico, sizes can be adjusted to resources at hand.**What is tessellation**Ask learners to identify the shapes on slide 2 of the teacher presentation. The pentagon and heptagon do not. Pre-cut card shapes could be given to groups of learners to put together, to demonstrate which tessellate and which do not.**Creating a pattern**A range of different sized triangles, squares, hexagons and polygons could be given to learners as templates to use to draw their designs.**Producing the fabric print**For step 2 The sponge can be cut using scissors.If using potatoes, a knife may be required (with appropriate supervision).If using lino: a reasonably sharp pencil can be used to score into the lino. If too much pressure is applied the pencil will cut through the block. If not enough pressure is applied then the marks made will not be deep enough and will not show when it comes to printing. It is important to establish that any positive pencil mark made will actually come out as a white negative line when the block is printed.For step 3, prints could be applied with multiple colours – however, to prevent contamination of colours this will require additional shapes to be made.If using lino, attaching it to another piece of lino or another material will assist with the printing process – easier to handle, less mess on hands.The finished prints could be used for display of printing skills, made into a wall hanging, or as part of a textiles item, for example a cushion or a pocket on a garment.Examples of some learners’ work are included on the final slide in the presentation. |
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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| * Pre-produce shapes and patterns/templates that can be used for the fabric printing.
 |  | * Design a clothing item that highlights the pattern.
* Produce prints using multiple colours with different shapes.
* Create a tessellated print inspired by the natural forms used in Islamic art, such as plants.
* Create a tessellated print by combining a variety of different basic shapes.
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * Kitchen Sponges
* Felt tip pens
* Fabric
* Paint
* Scissors
* Optional: pre-cut shapes to use as templates
 |  | icon-ppt Teacher presentation – Tessellated fabric printing |
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| **Additional websites** |  |  |
| * **BBC Bitesize – What is Ramadan:** <https://www.bbc.co.uk/bitesize/topics/zpdtsbk/articles/zjc2bdm>
* **Tesselations.org:** A site that helps the students understand the principles of tessellations, design complex tessellations and looks at how they are used in the real world. <http://www.tessellations.org/>
* **YouTube – Tessellation, maths for kids:** Video introducing the tessellation process. <https://www.youtube.com/watch?v=ZXU28FhYY_M>
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Discuss Ramadan and introduce with **BBC Bitesize** – What is Ramadan: <https://www.bbc.co.uk/bitesize/topics/zpdtsbk/articles/zjc2bdm>
* List and discuss different products that are made using fabric printing such as clothing, wall hangings, soft furnishings and bags.
* Analyse exiting products made using tessellated patterns.
 | **Extension** (Options)* Design a clothing item that highlights the pattern!
* Produce prints using multiple colours with different shapes.
* Create a tessellated print inspired by the natural forms used in Islamic art, such as plants.
* Create a tessellated print by combining a variety of different basic shapes.

**Plenary*** Learners could write a set of instructions on how to do this for the next class, highlighting what works well and what could be improved.
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| **The Engineering Context** film |
| * Tessellation and fabric printing are used to create a wide range of textile products such as clothing garments, wall hangings and soft furnishings.
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| **Curriculum links** |
| **England: National Curriculum**Design & Technology * KS3 1a, d, 2a, b

**GCSE D&T**AQA D&T* 3.1.1, 3.2.5, 3.2.8, 3.2.9. 3.3.6, 3.3.9, 3.3.10, 3.3.11

Edexcel D&T* 6.6.3c, 6.8.1g

Eduqas D&T* Textiles: 6, 7

OCR D&T* 5.1e, 7.2a
 | **Northern Ireland Curriculum**Technology & Design* KS3 Knowledge, understanding and skills: Manufacturing – selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome.
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| **Scotland: Curriculum for Excellence**Technologies* TCH 3-04b
 | **Wales: National Curriculum** Design and Technology* KS3 Skills: Designing 2, 3
* KS3 Skills: Making 1, 2, 4
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| **Assessment opportunities** |
| * Informal teacher assessment of practical skills through observation of learners.
* Formal teacher assessment of completed pattern designs.
* Formal teacher assessment of completed fabric prints.
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