Stitch In Time lesson plans

Lesson 1	**Learning objective: we are learning to discuss the role of textiles in Coventry's history.**

Preparation
You may wish to ask children to bring in embroidered items or patterned fabric from home as examples.
Print pictures for groups, open files for display on board.

Timing	**Teacher input / children's activities**	**Resources**
30-40 minutes	Hand out the first two picture sheets - photos of the Coventry Cathedral ruins and Spon Street - to groups. In groups, children should discuss the questions on the photo sheets, using their inference skills. Take feedback from the discussions and elicit or explain the answers. The information below is provided to aid the teacher. Spon Street *Fulling & preparing:* cleaning and thickening (by matting fibres together) *Weaving:* making cloth by weaving thread or yarn *Dying:* colouring *Tanning:* preparing leather (changing it from its original condition as an animal hide) *Saddling:* making & repairing saddles Cathedral ruins *Chapel:* a section of a cathedral which might be dedicated to a particular person, thing or idea. These ones were made 600-700 years ago. They were used by the mercantile guilds in the city. A guild was a group of people who did the craft. Members of a guild had to meet its standards, so being a member of a guild meant customers could trust you. In these chapels, the guilds had priests who said masses (services with prayers) for members of the guild who had died. The guilds also had meetings in the chapels! The public couldn't enter them. The guilds were stopped from using them in 1548. *Cappers:* made caps *Drapers:* sold cloth (mainly for clothing) *Girdlers:* made girdles and belts *Mercers:* traded expensive textiles, e.g. silk and velvet **From these discussions, establish that textiles has been an important industry in Coventry's history.** Briefly explain that silk ribbon weaving was Coventry's main industry from the early 1700s to the 1860s – display slides 2 and 3. There were still ribbon factories in Coventry until the 20th century. One company called Cash's now makes woven labels like the ones you can sew into your uniform. Another thing that Coventry is famous for is dying fabrics blue.	Picture sheets 1-2 PowerPoint slides 2 & 3

	Ask: what is embroidery? Elicit the answer and show or pass round samples of embroidery if you have them. Hand out the rest of the picture sheets to groups to discuss the questions on the photo sheets. **Go through some of the ideas that came out of the discussions. The information below is provided to aid the teacher.** *Samplers*: these are Victorian samplers. 'Samplers were first made in the 1400s or 1500s as a way of remembering different types of stitches or patterns. As pattern books became more widely available the function of samplers began to change from a record of stitches to an educational tool. During the 1600s borders were added to samplers, became more complicated and alphabets started to be included. Moral and religious texts were included from 1650 and samplers were worked solely in cross stitch, rather than a range of stitches. By the 1900s samplers were a mark of a young girl's knowledge and patience and were an important part of their education. The Herbert has over 60 of the second type of samplers.' (Herbert Art Gallery and Museum.) If you wish to look at additional sampler images, find them here. *Square tablecloth with embroidered names:* 'A sixth of all people called up were sent to factories rather than to the armed forces. At one stage the Government was sending 300 workers a week to Coventry to meet the demand for factory workers. People came from across the ountry but also from other parts of the world, especially British colonies. There was a small community of people form south Asia already living in Coventry, who did their bit to help the war effort. Hostels were built to house over 8000 people. Others lodged with families in their homes. The tablecloth is embroidered with the names of people who stayed at Charter Hostel in Canley during the war.' (Herbert Museum) *Flour sack*: 'One embroidered flour sack that was made into a table cloth by Mrs E Cooper during the Second World War. Flour sack was from the USA.' A woman called Mrs E Cooper turned this American flour sack into a table cloth by embroidering it. You can see the flour sack label on the fabric if you look carefully – it may be clearer on a screen than printed on paper. *Godiva Harriers*: 'This vest was worn by a member of the Godiva Harriers Athletics Club in the early 1950s. Their most successful years were in the 1960s and 1970s. Both the team and individual members, like David Moorcroft and Marlon Devenish, have achieved national and international success.' (Herbert Museum) *Coventry City Shirt*: 1994-1996. Have the children noticed any other embroidered crests or symbols? E.g. on their school uniform. *Irish dancing dress:* many people living in Coventry have Irish heritage.	Samples of embroidery Picture sheets

	Kneelers: the kneelers – cushions for people to kneel on while praying – are found in Coventry Cathedral. There are six designs for the small kneelers, each containing Christian imagery. Packs were sent out around the country and the world for people to hand stitch the designs and send back to the Cathedral. The long kneelers were worked on by the Cathedral Needleworkers, a group of volunteers who meet once a week to carry out repairs on vestments/textiles in the Cathedral. You can spot the year in the design. **Introducing embroidery machine and products** Explain: embroidery is the process of making patterns on fabric by stitching thread into it. As well as doing this by hand, we can use machines. Moreover, we can write instructions for an embroidery machine to follow so it does the stitching all by itself. Show slides 4-5. Play video of multi-needle machine.	Slides 4-5
15 minutes	Explain: Embroidery machines aren't the only things that can be control by computer programs – programming is used to control machinery in many fields. **Go through the images and videos on slides 6-9. Try to draw out from the children how they think these relate to programming. Introduce some of this information:** <u>Assembly lines</u> Almost every product we have in our house, bags, etc., has gone down an assembly line. Manufacturing processes. (This is in WMG Machine Hall.) The machinery is all programmed. There are (not visible) grey cabinets down the side. They have a type of computer in them (PLC: Programmable Logic Controllers). On the right are sensing devices that count as things go past; these can trigger things to happen; then the software instructs another bit of hardware to do something, e.g. grab a box so it doesn't fall off the end, or stop the assembly line. PLC could control conveyor belt, robot arm, painting robot. They use if…then instructions, e.g. 'if there is a box, then pick it up' <u>Rollercoaster</u> PLCs again (the grey boxes in cabinets). What distinguishes a PLC from a computer? They are highly specialised. They work 99.999% of the time and are very expensive: thousands…at least ten times the cost of a normal home computer because you are paying for the reliability. Ask children: why is reliability important? (e.g. safety and cost to business of disruption.)	Slides 6-9

	The grey PLCs control the hardware. The yellow PLCs monitor/supervise the process. They are safety systems. A yellow PLC only enables certain things to happen if it knows it is safe to do so. Sometimes people have to override the grey PLCs, but they must not change the yellow PLCs, because these are programed to keep people safe. PLCs are also in use at rock concerts, e.g. for lighting. <u>Kinetic rain</u> Art installation in a Singapore airport. Pulley operation – the motors at the tops of the wires are controlled by a program.	

Lesson 2	**Learning objective: we are learning to calculate missing angles on a straight line.**

Preparation

Before the lesson, familiarise yourself with Turtlestitch using these video tutorials:
Getting started (7 minutes) Saving your file (3 minutes) Displaying your design (3 minutes)

Create a Turtlestitch account for your class.

Familiarise yourself with the maths sheets: questions and answers. The children can access these online.
For a printable version, click here and set your printer to print landscape on both sides and flip on short edge.
Select pages 1 and 2 for printing.

Timing	Teaching & learning	Resources
5 minutes	**Introduction** Play this video explaining where software and control is used.	Introduction video
10 minutes	**Basic use of Turtlestitch** With the children working in pairs, show them how to log in to the account you have created and save their work with an anonymised file name (i.e. not their names). Show the children how to use the basic functions of Turtlestitch, which you have learnt from the 'getting started' video (see **preparation** above). Give them time to experiment with Turtlestitch.	www.turtlestitch.org
5 minutes	**Maths re-cap** Introduce or re-cap the fact that angles on a straight line add up to 180°. Practise subtracting from 180 to calculate the value of a missing angle.	Whiteboard
15 minutes	**Making shapes with Turtlestitch** Using the question sheet, children work through the questions to create different shapes on Turtlestitch. Tell them to leave the code for each shape on the screen, to use later.	Questions Answers
10 minutes	**Making your own Turtlestitch block** Play this video on making your own block, or watch it beforehand and teach the method yourself. The children make blocks for all of the shapes they made earlier.	Making a block video
10 minutes	**Making patterns** Play this video from 1:25 onwards. Practise dividing 360 by other numbers. The children make patterns using their shape blocks. Can they work out how to fit different shapes into the pattern?	Pattern video Whiteboard
5 minutes	**Showcase** The children show each other their patterns.	

Lesson 3	**Learning objective: we are learning to apply our knowledge of the properties of shapes.**

Preparation

This lesson is designed to be taught after the missing angles lesson. In the plans for that lesson, you will find some introductory videos for teachers.

Familiarise yourself with the maths sheets: questions and answers. The children can access these online.
For a printable version, click here and set your printer to print landscape on both sides and flip on short edge.
Select pages 5 and 6 for printing.

Timing	Teaching & learning	Resources
10-15 minutes	**Maths re-cap** Introduce or re-cap knowledge of properties of shapes, vocabulary and symbols. For example, regular, symmetrical, parallel, isosceles and equilateral.	Whiteboard
15-20 minutes	**Making shapes with Turtlestitch** Using the question sheet, children work through the questions to create different shapes on Turtlestitch. Tell them to leave the code for each shape on the screen, to use later.	Questions Answers
15 minutes	**Changing the size of your shape** Re-cap how to make a block (as learnt in the missing angles lesson). Play this video on changing the size of the shape, or watch it beforehand and teach the method yourself. The children apply this to their shape blocks and experiment with creating patterns.	Making your own block video Changing the size of your shape video
5 minutes	**Showcase** The children show each other their patterns.	

Lesson 4 - optional	**Learning objective: we are learning to find the highest common factor of two numbers.**

Preparation

This is an optional **year 6** lesson using the highest common factor of two numbers. It is designed to follow the missing angles and properties of shapes lessons (see lesson plans 1 and 2). In the plans for the missing angles lesson, you will find some introductory videos for teachers.

Familiarise yourself with the maths sheets: questions and answers. The children can access these online.
For a printable version, click here and set your printer to print landscape on both sides and flip on short edge. Select pages 11 and 12 for printing.

Timing	Teaching & learning	Resources
5-10 minutes	**Maths re-cap** Re-cap finding the highest common factor of two numbers. Using the method on the first side of the question sheet, demonstrate how highest common factors can be used to create a shape.	Whiteboard Questions
20-30 minutes	**Making shapes with Turtlestitch** Using the question sheet, children work through the questions to create different shapes on Turtlestitch. Tell them to leave the code for each shape on the screen, to use later.	Questions Answers
10-20 minutes	**Exploration** Can the children find other numbers this works well with? What makes some numbers difficult to use?	
5 minutes	**Showcase** The children show each other their patterns.	

Lesson 5	**Learning objective: we are learning to use variables in programs.**

Preparation
This lesson is designed to be taught after the missing angles and properties of shapes lessons. There is also an optional year 6 lesson using the highest common factor of two numbers. In the plans for the missing angles lesson, you will find some introductory videos for teachers.

Familiarise yourself with variables using this video. There is also a less detailed instruction card.

Timing	Teaching & learning	Resources
5-10 minutes	**Maths re-cap** Re-cap finding what the children learnt in the missing angles lesson. You could use the first side of the card to do so.	Whiteboard Missing angles card
20 minutes	**Using variables to makes spirals** Show the children how to create a spiral with a variable (as shown in the video you have watched before the lesson). 1. The children should try making spirals based on different shapes, e.g. hexagon, by changing the angle turned in the spiral. 2. Instead of starting from the inside and making the spiral bigger, can they start from the outside and make the spiral smaller?	Variable video
20-30 minutes	**Exploration** Can the children use variables in other ways to create their own patterns? 1. Instead of changing the number of steps moved, could they change the angle turned? What else can they make a variable? 2. Can they combine variables with other blocks? See this example video.	Star spiral video
5 minutes	**Showcase** The children show each other their patterns.	

Lesson 6	**Learning objective: we are learning to write an efficient program to create a design on an embroidery machine.**	
Timing	**Teaching & learning**	**Resources**
Dependent on teacher choice	Say: today you are going to use what you have learnt to design a pattern or image of your choice. This will be stitched onto felt. Guide children to draft simple designs inspired by Coventry. E.g. they could draw a shape simplified from a place in Coventry, and then when they write their program they could repeat this shape in a spiral. **Teachers are encouraged to explore their own preferred methods of teaching the children to design simple patterns inspired by Coventry.**	
5 minutes	Ask: what do you think 'efficient' means? Ask: what have we learnt so far that will help us to write efficient code? Elicit: repeat loops, making blocks, setting parameters. Say: show your initial design ideas to your partner. Discuss which is your favourite. Ask: how will you instruct the machine to stitch your design? Do you need to make any changes to your design? Draw them now (you might like to use another colour so it is clear). **Your design must be a maximum of 8cm x 8cm and no more than 5000 stitches.** *Show slide 1.* It may be useful to hand out protractors for the children to use when taking their design from the paper onto the computer program.	Slide 1
30-45 minutes	**Programming** Say: because we are stitching our designs for real today, we need to make sure our programs don't cause any errors on the embroidery machine. *Show slide 2.* Circulate while the children write their programs. Check achievability and accuracy. Use questioning to guide pupils to write efficient programs. Periodically stop to bring attention to any common issues/learning points. Remind children to write efficient code, using repeats, blocks and parameters.	Slide 2
5 minutes	**Checking** Instruct all children to check their designs a final time, checking for error messages. Remind them to make sure the turtle is actually stitching, not just drawing lines.	

	They need to make sure that they only have to click once to get the turtle to draw the whole pattern. If they are having to click more than once, they need to think about repeat loops.	
5 minutes	**Final inspiration** Show a video of the Barcelona magic fountain, which is controlled by computer programming.	Slide 3

Sending the designs to WMG – *for participating schools*

To share the finished files with WMG, please email us your login information (username and password) after you have made sure the file names are anonymised, i.e. do not identify the students. Please also email us a list of the file names which need to be stitched (in case there are other, unfinished pieces of work or the children later log in to do other things on Turtlestitch).

We will check the programs and use them to stitch the children's designs onto felt. Due to the volume of work, we are not able to give children a choice of which colour each design will be stitched in.

We may also create gifs or still images from some of the children's programs. We will upload these to our online gallery.

Once the designs have been stitched onto felt, we will send them to you by post; please provide a recipient name along with the school's address. We encourage you to find creative ways to combine the stitched pieces into one work which can be exhibited. We hope to include your final piece in an exhibition at the University of Warwick in April 2022 (details TBC).

Summary:

- wmgoutreach@warwick.ac.uk
- Email title: Stitch In Time + School Name
- Your class's Turtlestitch login information (username and password)
- A list of the finished file names which you would like to be stitched (i.e. one per pair of children)
- The school's postal address