ST LUKE'S CHURCH SCHOOL

Design Technology Curriculum

Year 1 to Year 6

Spring 2

Design Technology Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS (Expressive Arts)	Junk Modelling		Bookmarks		Design & Make A Rainbow Salad	
Year 1	Eat More Fruits and Vegetables		Stable Structures			Moving Mini Beasts
Year 2	Puppets		Vehicles			Perfect Pizzas
Year 3		Story books		Pencil Cases		sMini Castles
Year 4		Seasonal Stockings		Torches		Seasonal Food
Year 5	Building Bridges		Fashion and textiles (bags)		Slingshot Car	
Year 6	Programming Pioneers		Birdhouse Builders		Burgers	

Cookery Textiles Structures Electronics Mechanisms

The Aims of the National Curriculum for Design and Technology

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Intent

Through high-quality design and technology teaching, our pupils will acquire a broad range of subject knowledge, which is developed each year from Reception through to Year 6. Our pupils will be inspired to use their creativity and imagination to design, make and evaluate within a variety of contexts. Through disciplines such as mathematics, science, engineering, computing and art, our pupils will solve real and relevant problems whilst taking risks and being resourceful. Our innovative projects will ensure that our pupils become citizens capable of contributing to the creativity, culture, wealth and well-being of the nation, whilst displaying a critical understanding of design and technology through history to the present day.

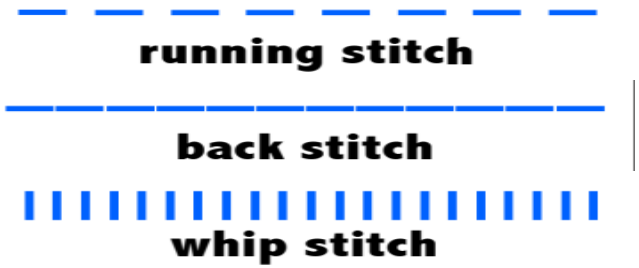
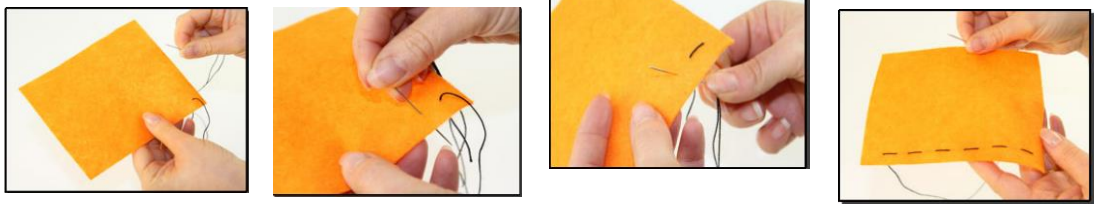
Implementation

The St.Luke's Design and Technology curriculum takes influences from planning provided by Plan Bee and Kapow as this serves to support non-specialists while providing the backbone to an ambitious curriculum. We have taken the planning to form the basis of a curriculum which has been uniquely developed for us. Each year our pupils will refine the necessary skills to become capable citizens in design and technology, carefully developing these skills each year as they progress through school. In order to develop a critical understanding of the history of the subject, our curriculum has incorporated the teaching of some of the world's most influential people, as well as including some individuals from closer to home.

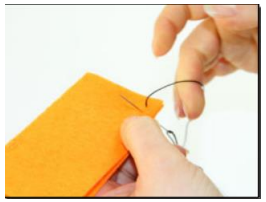
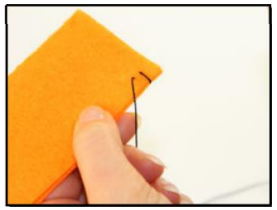
Reception

For further information about the knowledge content taught in Reception please refer to the separate EYFS curriculum document.

Spring 2 Year 3	Focus of Study: Textiles – Making a pencil case
NC Objectives	Key Knowledge and Vocabulary
Designing • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and CAD *Making* • select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities *Evaluating* • investigate and analyse a range of existing products • evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	Context for study: This is the second textiles unit of work and builds on knowledge gained in the Year 2 puppets topic where pupils learn to use a simple running stitch. In this unit pupils will learn how to complete an appliqué and a whip stitch to incorporate an open and close mechanism e.g. button element for their pencil case. This unit is the pre-cursor to the Year 4 Seasonal Stockings unit where pupils will use the applique technique to create a 3D effect. Most recently, the children will have studied measurement in maths and this is a practical application of the knowledge gained. Knowledge Content: To evaluate existing products. To design individually using a criteria. To identify appropriate joins to attach and strengthen. Technical knowledge A simple needlework stitch consisting of a line of small even stitches which run back and forth through the cloth without overlapping.

Technical knowledge and understanding • apply their understanding of how to strengthen, stiffen and reinforce more complex structures	A whip stitch is a simple sewing stitch that is used in crocheting, knitting and sewing, and in which the needle is passed in and out of the fabric in a series of stitches that circle an edge of the fabric.  Ensure pupils have the necessary understanding required to complete these stitches before continuing. Running stitch : 

Whip stitch:


Evaluating products:

To evaluate existing products:

Explore function of a pencil case (to store equipment). Explain that over the next few lessons, they will be exploring existing designs; designing, making and evaluating their own pencil cases. Today we will look at a variety of pencil cases to see how they have been made and who they have been designed for.


Ask pupils to consider the shape, material and how it has been put together. How does it open and close? Who might own a pencil case like this?

Explain that pencil cases can be made from lots of different materials, including fabric, wood, leather, metal and plastic. Fabric pencil cases are usually fastened with a zip or

buttons, Velcro or poppers. We are going to look closely at pencil cases that have had their pieces joined together by sewing.

Designing: Children choose designs to draw and label.

Practice and compare sewing stitches. Children practise joining two strips of felt together using running stitch and whip stitches. Provide pins so children can hold the two pieces of felt in place while they work.

Investigate ways of opening and closing pencil cases using scraps of felt. Children work to attach a button to a piece of felt and cut a button hole. Children to sew a whip stitch around their button hole to stop the hole from getting too big.

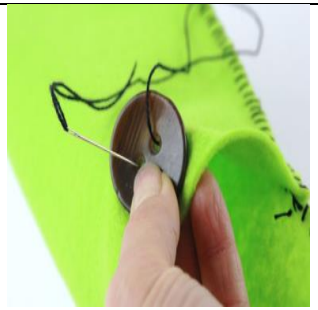
Provide children with a square of felt and other off-cuts of fabric to appliqué onto their design. Children work independently to sew appliqués onto their pencil cases. Children to make sure that their stitches are neat, even and well-secured.

Making:

Using buttons and poppers to open and close a pencil case:







Appliqué - Appliqué is when pieces of material are sewn onto a larger piece to create a picture or pattern. Use felt to cut desired shape and sew onto pencil case using appropriate stitch. Children will sew their appliqué embellishment onto their pencil case using an appropriate stitch, factoring in which way they will fold their pencil case. Children will have to make sure their opening and embellishment fit onto the fold design they have chosen.



Assembly

Children experiment with different folds for their pencil case and pay particular attention to their opening.

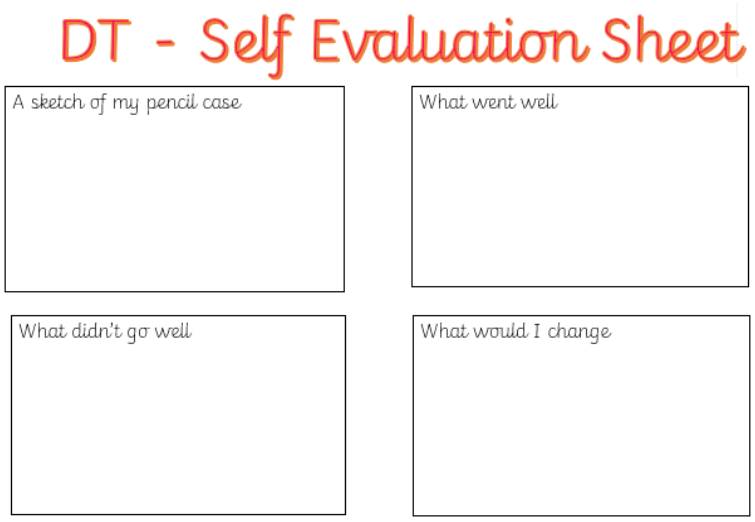


Children will use more than one button to create a secure opening using a whip stitch.

Children will sew their embellishment and sew their pencil case into their desired shape.

Evaluation

Once the sides of the pencil case have been sewed together, the embellishments added and the buttons applied using an appropriate stitch, pupils must evaluate their work.

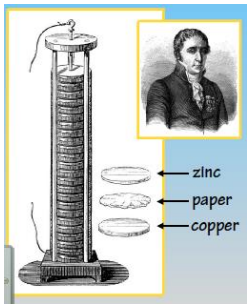


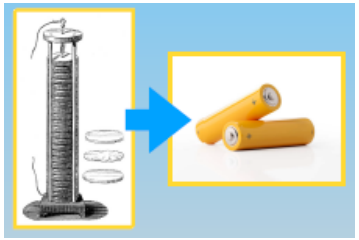
Health and Safety:

	Take care when handling sewing needles and threads. Always remain seating when sewing and do not look away while sewing. Resources needed: Felt fabric, practice felt. Sewing needle, thread. Outcome: A pencil case with an opening and closing mechanism.

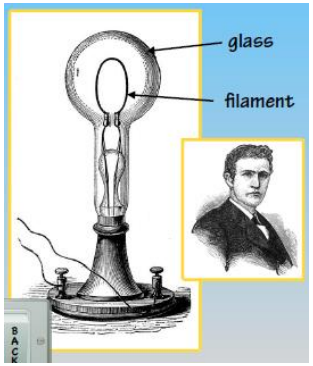
Spring 2 Year 4	Focus of Study: Electronics - Torches
NC Objectives	Key Knowledge and Vocabulary
Designing • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and CAD *Making* • select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately	Context for study: This is the first electronics unit of work and builds upon the learning children will have done in Science with circuits. The children will already have practised and applied their knowledge of circuits and the required components to build a working circuit. In this unit the children will apply their knowledge for a real life purpose. For more information on how to construct the circuit and the casing, see videos by clicking here. Knowledge Content:

• select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities *Evaluating* • investigate and analyse a range of existing products • evaluate their ideas and products against their own design criteria and consider the views of others to improve their work *Technical knowledge and understanding* • apply their understanding of how to strengthen, stiffen and reinforce more complex structures	To evaluate existing products. To design individually using a criteria. To identify appropriate materials and form. Technical knowledge   A torch is a portable, handheld electric lamp which is usually powered by batteries. The casing will need to be robust and sturdy given the nature of its function. The battery-powered torch needs an electrical circuit to work.



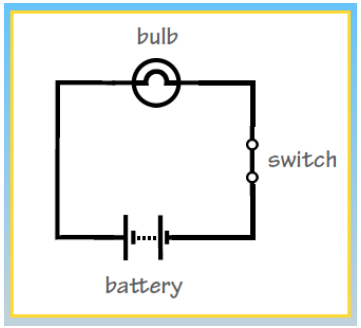


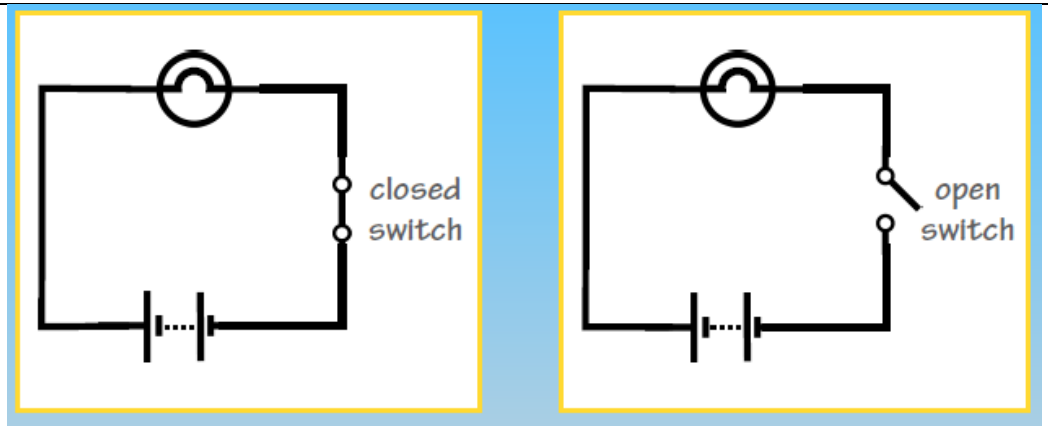
The battery was invented first, in 1800, by an Italian called Alessandro Volta. It was made by stacking discs of zinc and copper in a pile, separated by paper soaked in a saltwater solution. Volta tested the battery by giving himself small electric shocks! Remind children of the dangers of misusing batteries and brief pupils in safe and proper use.



Thomas Edison invented the first practical, long-lasting lightbulb in 1879. He used an airtight glass case with a piece of looped wire (the filament) inside. When connected to a power source, the filament heated up and glowed white hot.

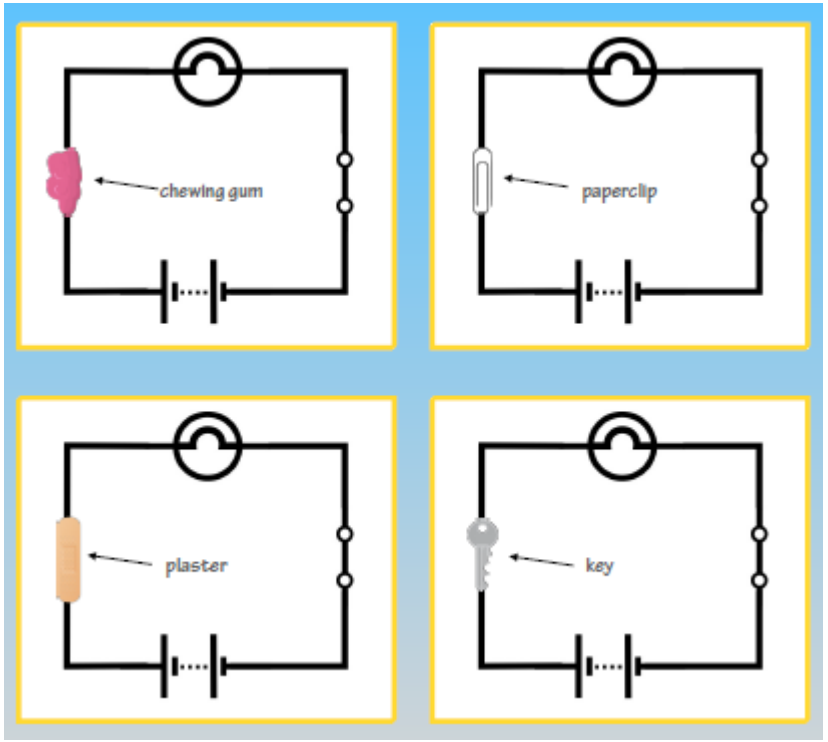
Evaluating existing products – become 'enlightened':

	Provide children will different torches to look at. Facilitate a discussion around the materials used. What would this type of torch be used for? Who might use this type of torch? Why? Allow pupils to remove the batteries (where possible) and explore the components for an electrical circuit that would be in a torch. Can you identify and name the different components? Investigate electrical circuits using different materials to make a **switch**. 



Check pupils can assemble a circuit with a switch, light bulb and battery.

Provide pupils with a range of conductive components (paperclips [not plastic-coated] split pins, drawing pins, staples, aluminium foil to build a prototype circuit) and allow them to explore a simple closed circuit with a switch. Explain that it's not only wire that can conduct electricity around a circuit. Most objects that are made out of metal are conductors (allows electricity to pass through them). Show an incomplete circuit. Can they identify why the bulb does not light?

	Share a variety of different materials. Which do they think will light up?  Explain that the wires are used to join the bulb, batteries and switch together in a type of loop known as a circuit. Explain that this allows the stored power from the batteries to flow through the wires and light up the bulb. Materials that allow electricity to pass through are called conductors. Which materials are not conductors? The battery and bulb are both essential components in a circuit for a torch. Without the battery, there would be no power and without the bulb, there would be no light.

	Explore a simple electric circuit using the correct symbols for each component. Look at switches and how, when closed, the circuit is complete and the bulb will light up. Pupils make their own switch using what they have learn about circuits and materials that will conduct electricity. **Design Casings** for a torch: Gather kitchen roll tubes, plastic bottles, joining materials e.g. sticky tape, masking tape. Explore which part of the torch is the 'casing'. The casing holds all the different parts of the device, including the circuit and the head. Explore what properties the casing may need to have and why (strong, hard, waterproof, does not conduct electricity) Explore a variety of possible casings and whether they could use each one as a torch casing. Why? Pupils should learn that single-use plastic water bottles are not rigid enough and thicker bottles e.g. 7up, pepsi, coca cola bottles are better.





After, ask pupils if they were going to make a casing for a torch, which material they would use and why. Encourage pupils to explain their choice.

Explain design brief to the children:

	I am going camping this weekend with school. I need a torch to help me find my way to the toilet block during the night! It needs to be strong, comfortable to hold and small enough so that it won't take up much room in my bag and it should be easy to switch on too. • You must create a safe, robust and waterproof casing • You must include a switch • You must ensure that there is a working circuit within the casing • You must ensure that the torch is comfortable to hold and aesthetically pleasing e.g. the wires are neat and there are no holes within the casing. • First, use the components you have been given to make an electrical circuit. Now you are going to test out a range of different casings. Ask yourself the following questions: • How will you attach the circuit to the casing? • Will the casing be strong and secure? • Does the circuit fit well inside the casing? • Where will you put the switch so that it is easy to turn on and off? • Would it be easy and comfortable to hold? • Is there an opening to access the bulb and battery for replacement parts? Elicit the design criteria from the brief: strong, small, easy to switch on and comfortable to hold. Pupils will draw and label four casing ideas, highlighting the advantages and disadvantages of each. By the end of this session, pupils must have an idea of the type of casing they feel will work best for the torch. Pupils will need to bring in plastic bottles, tubes etc. from home to act as their casing. Vertical bottles with straight lines will work best e.g. 7up or pepsi. Avoid bottles with ridges

and curves as this will make things much harder. If using cardboard packaging, pierce a hole first then use scissors to carefully cut the required shape.

Using recycled rigid plastic bottles as the casing as seen in the video above


Adding the switch (split pins and a non-coated paper clip and using filler to stop ratting)



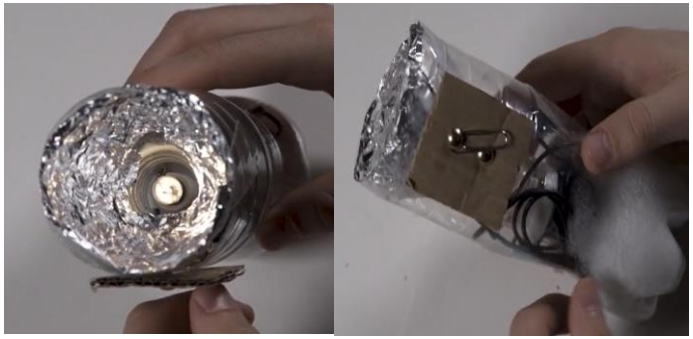

Adding the bulb


Inserting circuit – this may look slightly different depending on the type of materials used at the time. Ensure circuit works prior to insertion and any connections are securely attached.

Adding torch head

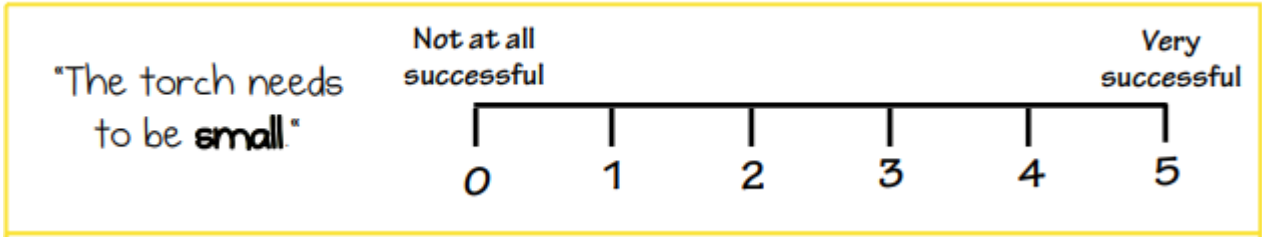



Completed product may look something like this:



Evaluating the product:

Using a sliding scale, explore the design criteria and brief from the previous lesson: is the torch small? Is it comfortable to hold? Is it strong? Is it easy to switch off and on? Is the circuit securely attached? Are the wires and battery hidden? Encourage pupils to explain their choices to a partner.



- Which part of your finished torch are you the happiest with, and why?
- Which part of your finished torch would you like to change, and why?

Revisit the questions from previous sessions: does it meet the design criteria? Have appropriate materials for the casing been chosen?

Focusing on the design criteria, pupils evaluate how well their finished product meets each design criteria.

	Design Criteria	Success score (out of 5)	Reason for score
1			
2			
3			

Health and Safety:

When working with circuits, it is incredibly important to ensure pupils do not use batteries with a voltage higher than required for the bulb to light. This can pose a fire risk. At the end of each lesson, all components must be disassembled from the battery to prevent overheating from a current.

Other tips:

Consider how the light bulb will be secured into place.

Resources needed:

- A range of different torches
- Components for switches: paper clips (not plastic-coated) split pins, drawing pins, staples, bulldog clips, aluminium foil
- Masking tape, scissors,
- Rigid plastic bottles (not single-use as these are too flimsy)
- Circuit components: bulbs, batteries, wires.

Outcome:

A functioning torch for a camper.