

Design and Technology Curriculum Reception – Year 6

Overview of Design and Technology Content

NOTE - We use the Design and Technology Association 'Projects on a Page' planning as guidance.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	<p>Food: <i>Food hygiene.</i> <i>Making for a purpose.</i> <i>Pumpkin Soup and</i> <i>Autumn Cakes.</i></p> <p>(Link to Art) Explore tools and use appropriately – Parts of body, pens, pencils, brushes, markers, stampers, Scissors and crayons</p>			<p>Structures/ Construction 3 little Pigs Home & Grandma's Cottage. Designing- To represent their own designs Making: Exploring a variety of materials, tools and techniques. Evaluating: Adapting as they go along.</p> <p>Food: Healthy Fruit Kebabs Food Hygiene To be able to make healthy choices</p>	<p>Textiles <i>Making hero</i> <i>accessories (Snow</i> <i>White's cape) – using</i> <i>textiles.</i> <i>Joining and selecting</i> <i>specific materials and</i> <i>making purposefully.</i> <i>Designing using paper</i> <i>sketches</i> <i>Adapting and</i> <i>recognising changes</i> <i>that may be needed.</i></p>	

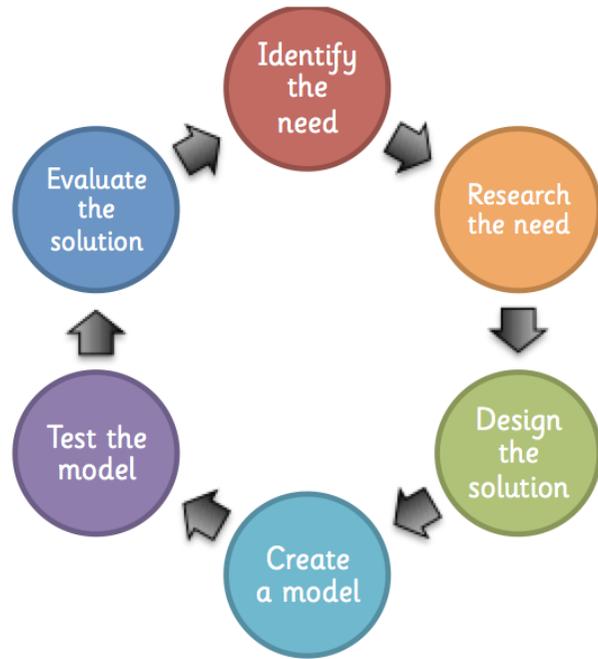
Year 1		<u>Mechanisms:</u> <u>Sliders and Levers</u> <i>Christmas Card</i>		<u>Food:</u> <u>Preparing Fruit and Vegetables</u> <i>Fruit Salad</i>	<u>Mechanisms: Wheels and axles</u>	
Year 2	<u>Structures:</u> <u>Freestanding Structures</u>				<u>Textiles:</u> <u>Templates and Joining Techniques</u>	
Year 3	<u>Textiles:</u> <u>2d shape to 3d product</u> <i>Soft Toy - fish</i>				<u>Structures:</u> <u>Shell Structures</u>	<u>Mechanical Systems:</u> <u>Levers and Linkages</u> <i>Exploring different lever styles and effects of forces.</i> <i>Product: Storyboard (2 lever system)</i>
Year 4		<u>Electrical Systems:</u> <u>Simple Circuits and Switches</u> <i>Torch</i>				<u>Food:</u> <u>Healthy and varied diet</u> <i>Making a healthy wrap</i>
Year 5	<u>Textiles:</u> <u>Combining different fabric shapes</u>		<u>Food:</u> <u>Celebrating culture and seasonality</u> <i>Savoury Scone</i>		<u>Mechanical Systems:</u> <u>Pulleys or Gears</u> <i>Exploring different styles of pulleys or gears.</i> <i>Product: Fairground Ride (with a gear or a pulley)</i>	
Year 6		<u>Structures:</u> <u>Frame Structures</u> <i>Designing a playground shelter</i>			<u>Electrical Systems:</u> <u>More complex switches and circuits</u> <i>(Maybe Bread making unit)</i>	

The Aims of the National Curriculum for Design and Technology

The national curriculum for design and technology aims to ensure that all pupils:

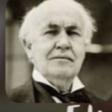
- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products 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.

Design Process at Stanley Road:



Significant Designers:

Designers and Manufacture

Year 1	 Robert Sabuda	 Henry Ford	
Year 2	 Isambard K Brunel	 Cotton Manufacture	
Year 3	 M & R Steiff	 Archimedes	
Year 4	 Thomas Edison	 David Misell	 Jamie Oliver
Year 5	 Felt Manufacture	 Mary Berry	 Ismail Al-Jazari
Year 6	 Paterson & Kerrison	 Edwin Holmes	

Year 1

Term: Y1 T2	Focus of Study: Mechanisms: Sliders and Levers
NC Objectives	Key Knowledge and Vocabulary

<p><i>Designing</i></p> <ul style="list-style-type: none"> • Generate ideas based on simple design criteria. • Explaining what they will make. • Develop, model and communicate their ideas through drawings. <p><i>Making</i></p> <ul style="list-style-type: none"> • Make mock-ups • Plan by suggesting what to do next. • Select and use tools, explaining their choices, to cut, shape and join paper and card. • Use simple finishing techniques suitable for the product they are creating. <p><i>Evaluating</i></p> <ul style="list-style-type: none"> • Explore a range of existing books and everyday products that use simple sliders and levers. • Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria. <p><i>Technical knowledge and understanding</i></p> <ul style="list-style-type: none"> • Explore and use sliders and levers. 	<p>Context for study:</p> <p>This unit follows on from learning in Reception where children will have experience of using scissors, crayons, pencils and paper.</p> <p>This unit is the precursor to work studied in Year 3 where children will develop their understanding of levers and linkages. They will look closely at forces and look at how mechanical systems work.</p> <p>Knowledge Content</p> <p>To use sliders or levers to make a story scene (for the story 'Up and Down' by Oliver Jeffers).</p> <p>Evaluation – Existing Products</p> <ul style="list-style-type: none"> • To explore a range of existing books and everyday products that use simple sliders and levers. To explore and use sliders and levers (TK). <p>To know that these books work by using levers/ sliders.</p> <ul style="list-style-type: none"> • To know about Robert Sabuda <p><i>Robert Sabuda is an artist from Michigan. whilst at school he discovered paper can be used for many things other than drawing on. He started his career as an illustrator, he then started to write children's books. In 1994, he published his first pop-up book "The Mummy's Tomb". He is known worldwide for his pop-up paper engineering. Many of his books are based on traditional stories.</i></p> <ul style="list-style-type: none"> • To look at Robert Sabuda books and discuss the techniques involved. <p>Making Mock Ups</p> <ul style="list-style-type: none"> • To know how to replicate the slider and lever teaching aids <p><i>(Following teacher demonstration of the correct use of tools and materials).</i></p>
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- Understand that different mechanisms produce different types of movement.
- Know and use technical vocabulary relevant to the project.

- **To make mock-ups of a slider and lever mechanism with paper and card.**

To know how to make a simple working lever.

To know how to make a simple working slider.

- **To understand that different mechanisms produce different types of movement (TK).**

To know how the slider moves (Up and down, forwards, backwards)

To know how a lever moves (pivot, round)

To identify the pivot.

Vocabulary (TK):

slider - A rigid bar moving forwards or backwards

lever - A rigid bar moving on a pivot.

pivot - the point where a mechanism turns

slot - a cut something can be inserted in

join - to connect

fasten - to connect

Vocabulary describing movements (TK):

straight, forwards, backwards, round and curve

Making the Final Product

DESIGNING:

- **To know how to generate ideas based on simple design criteria.**

To know who the product is for.

To know how it will move.

To know if they are using a slider/ lever.

To know the mechanism needs to work smoothly.

- **To know how to develop and communicate their ideas through drawings.**

To draw a mock of their design.

Vocabulary (TK):

design - plan

	<p>user - the person who will use something product - something that is made for others to use.</p> <ul style="list-style-type: none"> • To plan a step-by-step guide. To know the method they will follow to make their final lever/slider product. • To know what tools are needed. • To add a finishing design to their final product To draw a rocket design To draw the character to be used To write the message to be added <p>Evaluation - Final Product</p> <ul style="list-style-type: none"> • To know how to evaluate their product <i>To know if the mechanism works smoothly.</i> <i>To know if it matches a story scene from the book “Up and Down” by Oliver Jeffers.</i> <p>Resources</p> <p>books and everyday products with levers and slider mechanisms slider and lever teaching aid images Card and card strips, rocket temple, scissors, split pins, glue, double sided sticky tape, colours,</p> <p>Outcomes</p> <p>To produce a Christmas card with a moving (sliding) Santa Claus.</p>
Term: Y1 T4	Focus of Study: FOOD
NC Objectives	Key Knowledge and Vocabulary
Pupils will be taught to : (Designing)	<p>Context for study:</p> <p>This unit follows on from learning in Reception where children will have experience of naming common fruit and vegetables. They will have undertaken sensory activities to discuss the appearance,</p>

- Design appealing products for a particular user
- Communicate these ideas through talk.

(Making)

- Use simple utensils and equipment safely.
- Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.

(Evaluating)

- Taste and evaluate a range of fruit and vegetables

(Technical knowledge and understanding)

- Understand where a range of fruit and vegetables come from.
- Understand and use basic principles of a healthy and varied diet.
- Know and use technical vocabulary

taste and smell of fruit and vegetables.

This unit is the precursor to work studied in Science in Year 2 where children will learn about human diet in more detail. In Year 4 children will develop their understanding of preparing food hygienically and use a wider range of utensils. In Year 5 children will use a heated appliance (an oven) and develop their knowledge of food groups further.

Aim/ Knowledge Content

To make a fruit salad.

TECHNICAL KNOWLEDGE

1) To know where these fruits and vegetables are grown:

Fruit/ Vegetable	Where does it grow?
orange, apple and banana	tree
blueberries	shrubs
grapes and watermelon	vines
carrots, onions and beetroot	underground
lettuce, broccoli and cabbage	above the ground
wheat, corn and rice	These are grains and come from plants

2) To know the parts of apples and which parts we eat.

3) To know that we must have a balanced diet and that fruit and vegetables are part of a food group.

4) To know as part of a healthy diet we need to eat at least 5 portions of fruit and vegetables a day.

There are five groups of food.

1. Fruit and vegetables such as apples, grapes, onions and cabbage.
2. Carbohydrates, these are foods such as bread, rice, pasta and potatoes.
3. Proteins, these are foods such as: meat, fish, egg and beans.
4. Sugars and fats, these are foods such as: crisps, chocolates and sweets.
5. Dairy these are food such as: cheese, milk and yogurt

The 'Eatwell Plate' shows us how much of what we eat needs to come from each group.

We need to have a balanced diet and eat foods from the five different food groups.

As part of a healthy diet, we need to eat a variety of fruit and vegetables, 5 times a day.

Show how much of each food group we should eat each day to have a balanced diet.

EVALUATING PRODUCTS

1) To handle, smell and taste fruit.

Describe the shape, colour, feel and taste of the following fruits through talking and drawing: blueberries, mango, kiwi, pineapple and lemon.

Teacher to offer tasters of the above fruits and complete table below using the vocabulary listed below.

<i>Fruit</i>	<i>Description</i>	<i>Taste</i>
<i>blueberries</i>		
<i>kiwi</i>		
<i>mango</i>		
<i>lemon</i>		
<i>pineapple</i>		

Vocabulary (Know and understand the meaning of these words and how to use them):

taste: bitter, sharp, tangy, sweet, tasty, sour,

description: juicy, long, bushy, tiny, leafy, smooth, rough, bumpy, hard,

DESIGNING:

1) To decide what to include in the fruit salad.

From the taste test, children to choose items to include in their fruit salad from this list: blueberries, mango, kiwi, pineapple, banana, apple, lemon and orange.

(This should be done as a verbal task before preparing the fruit salad – no drawing or written planning)

MAKING:

1) To know basic food hygiene practices when handling food.

- *hair must be tied back or out the way*
- *sleeves should be rolled up*
- *hands need to be washed before handling food*
- *do not sneeze or cough near the food*
- *cuts must be covered with a blue plaster*
- *hands must be re-washed if you touch your face or body.*

2) To know how to use simple utensils and equipment: peel and slice.

Teacher to demonstrate how to the utensils below and provide opportunities for the children to practise food-processing skills.

3) To know how to prepare a fruit salad.

Teacher to offer blueberries, mango, kiwi, pineapple, banana, apple, lemon and orange.

	<p>Children must cut/ peel the fruit into smaller pieces themselves.</p> <p>Possible resources needed: Range of fresh fruit and/or vegetables. Chopping boards, knives, peelers, spoons, jugs, plates, bowls, aprons, plastic table covers, hand washing and washing-up facilities.</p> <p>Health and safety <i>Pupils should be taught to work safely and hygienically, using tools, equipment, techniques and ingredients appropriate to the task.</i> <i>Identify whether there are children who are not permitted to taste or handle any food ingredients or products.</i></p> <p>Other Tips: <i>For children struggling to slice/ chop the fruit, use a fork to hold the fruit in place.</i></p> <p>Outcomes To know where some fruits and vegetables grow.</p>
Term: Y1 T5	Focus of Study: Mechanisms: Wheels and axles
NC Objectives	Key Knowledge and Vocabulary
	<p>To follow</p> <p>Outcomes To create a moving car.</p>

Year 2

Term: Y2 T1	Focus of Study: Free Standing Structures
Objectives	Key Knowledge and Vocabulary
<p>Designing</p> <ul style="list-style-type: none"> • Generate ideas based on simple design criteria. • Develop, model and communicate their ideas through talking and drawings. <p>Making</p> <ul style="list-style-type: none"> • Plan by suggesting what to do next. • Select and use tools, skills and techniques, explaining their choices. • Select new and reclaimed materials and construction kits to build their structures. • Use simple finishing techniques suitable for the structure they are creating. <p>Evaluating</p> <ul style="list-style-type: none"> • Explore a range of existing freestanding structures. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria. <p>Technical knowledge and understanding</p> <ul style="list-style-type: none"> • Know how to make freestanding structures stronger, stiffer and more stable. • Know and use technical vocabulary relevant to the project. 	<p>Context for study:</p> <p>This unit follows on from reception where children will experience using construction kits to build walls, towers and frameworks. They will use basic tools and materials such as scissors, hole punches, plastic and card.</p> <p>This unit is the precursor to work studied in Year 6. Children will make a 3D construction frame with wood and will look at triangulation.</p> <p>Knowledge and Skills Content:</p> <p>To design, make and evaluate a freestanding bridge (for the ‘Three little Pigs’ story characters).</p> <p>Background Knowledge of Significant Designer</p> <p>Know that Isambard Brunel designed many bridges in the Victorian period. <i>(see History curriculum for further information about Isambard Brunel)</i></p> <p><i>Brunel was a famous engineer. One of his most famous designs was the Clifton Suspension Bridge (1831). It had the longest span of any bridge at that time. Isambard was just 24 years old when he designed the bridge. Isambard described the bridge as “My first love, my darling”. The bridge goes over the 700ft Avon Gorge which was deemed impossible to cross. The bridge is still seen as one of the most important structures to be built in the Victorian era and marked a turning point in engineering. Brunel died before the bridge was completed in 1864.</i></p> <p>Evaluation Existing Products</p> <ul style="list-style-type: none"> • To label a blank bridge with the correct technical vocabulary: foundation, deck, towers: cables. • To know and discuss how to make structures strong and stable. <ul style="list-style-type: none"> - <i>Irons or steels are used to make bridges as they are strong materials</i> - <i>A simple beam bridge is not strong because the weight is not distributed evenly.</i> - <i>Using triangular shaped trusses makes the bridge stronger (but this is expensive). The</i>

triangular shape evens out the pressure and weight.

- *Using cables helps spread the weight on a bridge (suspension/ cable bridges).*

- **To evaluate existing famous bridges:**

Golden Gate Bridge, USA

Used for motor vehicles.

Pros: Made with steel. A suspension bridge- uses tension cables that pull tight. Strong, tall towers support the cables and the weight on the bridge is spread out evenly.

Sydney Harbour Bridge, Australia

Used for motor vehicles.

Pros: Made of steel and as triangular trusses that spread the weight out evenly.

The triangle shape spreads the weight (the force) and keeps its shape.

Cons: expensive

Tower Bridge, London

Used for motor vehicles

Combined suspension and beam bridge.

Pros: Made of iron, concrete and steel and has trusses on the deck and cables on the side.

Deep rooted tower foundations.

Dhola-Sadiya bridge, India.

Used for motor vehicles.

Beam bridge.

Pros: Made of steel and concrete. Has foundation blocks throughout for support.

Cons: No trusses or cables.

- **To evaluate weakness and strengths of straw bridges.**

To look at images of straw bridges and discuss their strengths and weaknesses (in relation to its

foundation, trusses, towers, suspension, cable etc):

Designing:

- **To know what structure they will be designing, making and evaluating**

A freestanding truss bridge that can hold a 100g weight.

- **To understand a given criteria**

The structure should stand up on its own,

It should be strong enough to carry the 'Three Little Pigs' / 100 gram weight.

Must only use straw, card, glue and sellotape.

- **To know how to use drawings to show their ideas –**

Model the drawing of the final bridge.

Ask the children to recreate the design using the correct scale.

Making:

- **To know how to make joints**

Teacher to model good strengthening techniques and children to practise these techniques.

To know how to make towers/ foundations- *Demonstrate measuring, marking out, cutting, shaping and joining the base of a kitchen roll holder (or rolled up paper) to a square card base. Cutting and spreading the bottom of the card strengthens the join (larger surface area contact).*

Technical knowledge:

- **To know what will make a structure weaker or stronger.**

An object topples over when the centre of gravity is outside its base.

Building a wide base distributes the weight over a wider area and helps the tower to be more stable.

(e.g. if you stand tall and straight, lean to one side, you will soon topple over. But if you sit on the floor,

you can lean further because your base is wider).

7) How to make a bridge

To plan (as a class) the method in which the structures will be made using art straws.

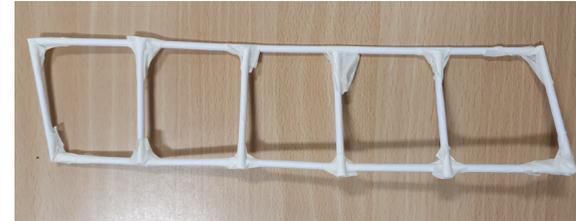
Simple method:

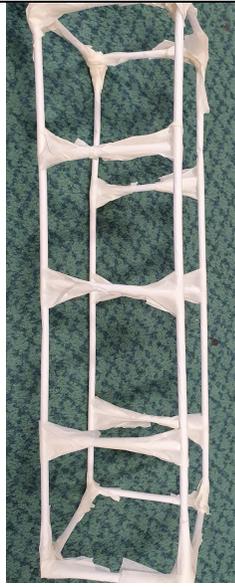
Cut straws into different lengths. Create large rectangles for the trusses. Add trusses to the rectangles. Cut rolled card and attach to square card. Attach the trusses to the towers. Add a piece of card for the deck.

To know how to build a freestanding structure:

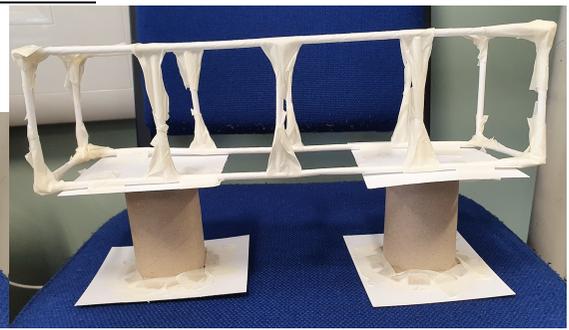


Need four longer lengths of straw (approx 30cm) and 16 smaller pieces of straw (approx. 7cm)





(Can add triangle trusses if time)



Add a narrow, rectangle piece of card as the deck.

Evaluation Part 2

•**To know how to evaluate and test the strength of their bridge.**
(Use 100gm weight to test the strength and stability of the bridge)

•**To discuss if their bridge meets the design requirements**

Did it stand?

Did it hold a 100gm weight?

What made it stable? (E.g. strong towers, strong trusses or accurate cutting of tower/ straw)

What made it weak (the straws were not cut to the same size; the joints were not attached well or towers were not the same length.)

Key Vocabulary:

freestanding structure - a structure that stands on its own.

function - purpose

design criteria - goals a product must achieve

product - something that is made for others to use.

evaluate: to assess (look at) the product's suitability.

Bridge types:

beam - a deck supported on each end.

cable/ suspension - the weight of the deck is supported by cables

truss - a beam bridge with added triangular shaped reinforcements.

weight - amount of heaviness

tension - pulling force

weak - not stable when standing (falls), joins that come away (breaks).

strong - stands and can hold weight without falling or breaking.

stability - how likely it is for the structure to fall over if pressure is applied.

know materials such as **steel, iron, concrete**

base/ foundation - the lowest part something rests on

	<p>triangular - shaped like a triangle. cylinder, arch -curved structure curve: an outline that bends round. rectangular: shaped like a rectangle</p> <p>join / fix: to connect</p> <p>Resources: Photographs of various bridge structures Kitchen roll holders, card squares, plastic/paper art straws, glue and masking tape.</p> <p>Outcomes To create a freestanding structure.</p>
Term: Y2 T5 and T6	Focus of Study: Textiles
Objectives	Key Knowledge and Vocabulary
	<p>Context of Study: This unit follows on from Reception where children had experiences of threading beads and laces. The unit is a pre-cursor of Textiles in Year 3 where children will practise cutting fabric, seam allowance and a range of stitches. Also, in Year 5 children will be creating a bag with a fastening and will learn more complex stitches.</p> <p>Knowledge and skills content: To join two pieces of material together To make a 3D puppet for Paddington</p> <p>Background history of the cotton industry: Cotton is a fibre that grows within the seeds of the cotton plant. Cotton is taken from the plant and is woven and spun into fabric. This fabric is used for many different items of clothing such as school jumpers, t-shirts, trousers and beddings. Cotton was turned into fabric using a handloom.</p> <p>During the Industrial Revolution Lancashire was a major producer of cotton goods and this was known as the Lancashire cotton industry (<i>Queen Elizabeth II is known as the Duke of Lancashire</i>).</p>

The Industrial Revolution (1760-1840) was a time when people went from living in small villages in rural areas to huge cities. It was the start of modern society as we know it today (Link to History Autumn Term 1 and Isambard Brunel).

In Lancashire cotton factories (mills) were built. These factories turned the white fluffy cotton into fabric much faster by using machines such as the “Spinning Jenny” and Power Loom”.

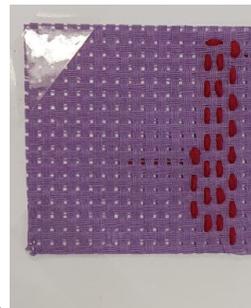
These inventions meant cotton could be mass produced and Britain was dominating the world market. Cotton was imported to Britain from countries such as America. Cotton could not be grown in Britain. Many countries depended on Britain’s exportation of cotton. However, the outbreak of World War 1 (1914) meant Britain could not easily export cotton and exportation ceased. Other countries started producing cotton cheaper and the British cotton industry started to decline.

By the 1980s the textile industry of the Northwest was over.

Making Part 1: Practise

- **To thread a metal needle and to tie a knot.**

(To be practised several times. Join both ends of the thread and knot, as this will make it easier to sew (thread will not become loose. The knot may need to be repeated several times as the binca holes are large or a know will need to be made on the binca).

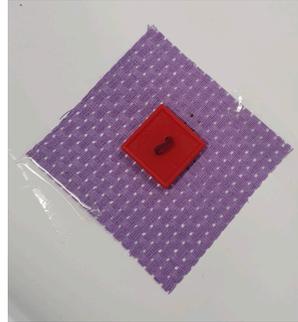


- **To complete a running stitch.**
- **To know how to finish a row of stitches with a knot** (tie off).
- **To know what buttons are used for and items of clothing that use buttons:**

Can be used to fasten two pieces of material but can be undone again.

Uses: Jackets, bags, shoes, bedding, cushions, T-shirts & trousers.

- **To fasten a button on binca** (*using a simple forward or cross stitch*).



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Making Part 2: Actual Product

- **To thread a needle.**
- **To attach two pieces of material using a simple running stitch.**
- **To knot and tie off the thread.**



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	<p>Other:</p> <ul style="list-style-type: none"> -Use water to help wet the ends of the thread before threading the needle. -Knot both ends of the thread together. -Have thread pieces cut out prior to the lesson. -For the main product, use a thin line of glue (glue stick) just before the pre-made holes to help join the fabrics together. This will keep the holes aligned but allow the puppet to still open. <p>Key Vocabulary (TK):</p> <p>needle: fine piece of metal/ plastic, with a point on one end and a hole/ eye for thread at the other.</p> <p>thread: long strand of cotton used for sewing.</p> <p>knot: to tie/ fasten thread.</p> <p>seam: a line of stitching that joins pieces of fabric together.</p> <p>fabric: cloth or material</p> <p>Resources:</p> <p>Needles, thread, binca, buttons and pre-cut puppet fabric.</p> <p>Outcomes</p> <p>To create a hand puppet.</p>
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Year 3

Term: Y3 T1	Focus of Study: Textiles
Objectives	Key Knowledge and Vocabulary
<p>Designing</p> <ul style="list-style-type: none"> • Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Produce annotated sketches, final product sketches and pattern pieces. <p>Making</p>	<p>Context of Study:</p> <p>This unit follows on from Year 2 where children will have experience of completing a simple running stitch on binca and felt with pre-made holes. The children will have attempted to tie knots and thread large eye needles. They will have created a simple, flat 3d product without needing to think about seam allowance. This unit is the precursor of the textiles unit in Year 5. Children will move onto more complex stitches and create a product with fastenings.</p> <p>Knowledge and skills content:</p>

- Plan the main stages of making.
- Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing.

Evaluating

- Investigate a range of existing products.
- Test their product against the original design criteria and with the intended user.

Technical knowledge and understanding

- Know how to strengthen, stiffen and reinforce existing fabrics.
- Understand how to securely join two pieces of fabric together.
- Understand the need for patterns and seam allowances.
- Know and use technical vocabulary relevant to the project.

To securely join two pieces of fabric together.

Evaluation: Background knowledge about significant designers

Margarete and Richard Steiff (*pronounced st-ie-f*) were German designers who helped to design the teddy bear soft toy. Richard often visited a local zoo and drew bears in their enclosure. He used this knowledge of bears to help him design the first teddy bear toy in 1902. Richard's aunt, Margarete, and himself set up the Steiff company to make teddy bears. They became a huge success because of the high quality of their toys and now their original bears are worth a lot of money. Margarete was a seamstress who made clothes and so she had the knowledge to make the bears that Richard designed.

Evaluation Part 1: Existing Products

- **To evaluate existing products, e.g. appearance, design, colour, sturdiness, sewing practicality.**

Making Part 1: This is based on practising skills prior to design and making their product.

- **To thread a metal needle and to tie a knot (Year 2 recap).**

(To be practised several times. Join both ends of the thread and knot, as this will make it easier to sew (thread will not become loose. The knot may need to be repeated several times as the binca holes are large or a knot will need to be made on the binca).

- **To practise a range of stitches on binca: running (recap Y2) and over stitch.**
- **To discuss which stitch will be the strongest (after completing stitches on binca).**
- **To know how to finish a row of stitches with a knot (tie off, recap Year 2).**

Designing:

To know the intended user and purpose.

To know how to create a simple design brief

User: Small child.

purpose: Soft toy

Criteria: aquatic animal, easy to cut out on felt, easy to stitch and must be appealing in colour.

**Note: Remind children they will be stitching the item so a simple design that can be sewn continuously will be practical. The felt patterns will be cut on felt and glued on, therefore, designs that are too intricate will be difficult to cut and stick.*

- **To sketch and annotate possible ideas, choosing one as a final choice and explaining why.**

Ask children to feel the felt, explain it is tricky to cut and sew on as it's not stiff. Therefore, the design must be simple. The design is to be guided and achievable.

To add labels to their chosen design:

seam allowance, front, back and the pattern symbols:

- **To plan the main stages of making (flowchart)**

e.g.

Draw design on tracing paper.

Cut out the outline.

Place the template onto the felt.

Draw round the template.

Cut the felt carefully.

Repeat for the back panel.

Making part 2 (including technical knowledge)

- **To produce a template of their final design (TK)** using tracing paper/ dressmakers' paper.
(To evaluate and adjust the design, is it large enough? Will it be easy to cut/ sew?)

- **To use this template to cut around the felt.**

(Use this template to draw around on felt, ask children to think about any adjustments that may be needed- is it big enough? Will it be easy to cut/ sew?)

- **To understand seam allowance (TK)-**

The design will need to be slightly larger. The stitch needs to be lower than the edge to avoid

fraying.

- **To glue any decorative patterns onto the front panel, allowing for the seam** (*to not glue patterns too close to the edge as it will disrupt the stitch/ fray*)
- **To know how join two 2D pieces of felt with an overhand or simple stitch (TK)**
Using glue around the edge to join the two flat pieces will make it easier to sew.

To strengthen and reinforce fabric (using padding TK). (*Before children reach the end of their continuous stitch, ask them to stop leaving a gap of 3 to 4 cm. They do not need to tie off the stitch but leave the needle and thread hanging, then ask them to gently insert the padding and to use their fingers to guide the padding inside, and then to continue their stitch finish off with a knot.*)

- **To attach a ring using ribbon** (use a simple stitch or fabric glue) see below:

Evaluation Part 2: Evaluating the product

To evaluate the product against user, purpose and design criteria.

User: Small child.

purpose: Soft toy

Criteria: aquatic animal, easy to cut out on felt, easy to stitch and must be appealing in colour.

To evaluate the joining of the fabric.

(Evenness of the stitch, knots & seam allowance).

To evaluate the product:

What effect does your decorative techniques have?

How did you stiffen your design? (Padding).

To discuss possible improvements.

More colourful, less/more padding, the design was too complex etc)

Key Vocabulary (TK):

pattern/ template: a shape drawn to the exact shape and size the material will be cut in.

	<p>needle: fine piece of metal/ plastic, with a point on one end and a hole/ eye for thread at the other. thread: long strand of cotton used for sewing. knot: to tie/ fasten thread. stiffen: to make rigid. seam: a line of stitching that joins pieces of fabric together. seam allowance: extra fabric allowed in case of fraying fabric: cloth or material</p> <p>Resources: Needles, thread, paper, felt, scissors, fabric glue, ribbon, key rings, binca</p> <p>Other: Use water to wet the tip of the thread (not saliva). It is easier to leave small pots of water near the children whilst threading. Only use needle threaders once the child has numerous opportunities to practise threading a needle . Have long pieces of thread cut out ready prior to the lesson. Cut square pieces of binca into quarters when practising stitches to save waste.</p> <p>Outcomes To create a soft toy key ring.</p>
Term: Y3 T5	Focus of Study: Structures
Objectives	Key Knowledge and Vocabulary
	<p>To follow</p> <p>Outcomes To create a 3d package.</p>
Term: Y3 T6	Focus of Study: Mechanical Systems- Levers and Linkages
Objectives	Key Knowledge and Vocabulary
	<p>To follow</p>

	<p>Outcomes</p> <p>To create a “pop-up” story scene.</p>
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Year 4

Term: Y4 T2	Focus of Study: Electrical Systems
Objectives	Key Knowledge and Vocabulary
<p><i>Designing</i></p> <ul style="list-style-type: none"> • Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. • Generate and develop an annotated sketch, cross-sectional and exploded diagrams. <p><i>Making</i></p> <ul style="list-style-type: none"> • Order the main stages of making. • Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities. 	<p>Context of Study:</p> <p>This unit is the start of using electrical systems as part of the DT curriculum. Children will look at ‘Electricity’ as part of their Science Unit alongside this unit.</p> <p>This unit is the precursor of the electrical systems unit in Year 6. Children will move onto using their knowledge to create a circuit with a buzzer that has a circuit breaker.</p> <p>Knowledge and skills content:</p> <p>To make a torch to help see at night</p> <p>Background knowledge of designers</p> <p>Know that Thomas Edison invented the first light bulb in 1879 (see Y4 T2 Science curriculum for further information)</p> <p>The British inventor David Missell (<i>Mee-sell</i>) (who lived and worked in the USA) invented the first torch or flashlight in 1899. The invention of dry cell batteries that could be mass produced in 1896 meant that a portable torch was now possible.</p> <p>Inventions build on previous ideas in this case the torch could not be made without the invention of the battery first.</p> <p>A number of these torches were given to New York City police department who found them very useful when patrolling at night. This helped to make them a success.</p> <p><u>Evaluation Part 1</u></p> <p>(Evaluating existing products)</p>

Evaluating

- Investigate and analyse a range of existing battery-powered products.
- Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.

Technical knowledge and understanding

- Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.
- Apply their understanding of computing to program and control their products.
- Know and use technical vocabulary relevant to the project.

- Disassemble a torch.

To discuss - *where and why they are used? (Used to see when it is dark, usually where mains electricity is not available).*

How does the product work? (Series circuit)

What type of switch is used and how does the switch work? (Push switch, when pushed down, completes the circuit).

Is the product manually controlled or controlled by a computer? (Manual)

What materials have been used and why? (Metal- to prevent overheating and sturdy).

- Use photos of products to investigate different examples of switches, e.g. push-to-make, push-to-break, toggle switch in.
-
- Remind children about the dangers of mains electricity.

Designing

- **To know how to create a simple design criteria.** (*Discuss with children the purpose of the torch and whom it will be for. Agree on design criteria - must light up, include off/on button, lightweight & have a working circuit).*

- **To know how to use annotated sketches and exploded diagrams.**

Exploded diagrams: show how products can be assembled and fit together.

It shows components that would be hidden once assembled.

Include Cross sectional view (side view)

- **To use a diagram drawing Key**

Making

Technical knowledge and understanding

- To know how to use electrical systems in a product. This includes a 'series' circuit with switches and bulbs.

(Teach children how to avoid making short circuits too).

Video explaining circuits

<https://www.youtube.com/watch?v=HOFp8bHTN30>

- To consider the main stages in making and testing before assembling. To write down the process. *(Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches and bulbs. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs).*
- To know how to correct simple faults *(demonstrate how to find a fault in a simple circuit and correct it, giving pupils opportunities to practise)*
- **(Science link)** To try switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. *(Ask the children to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Ask the children to test their switches in a simple series circuit).*

Technical knowledge and understanding TK

- To apply the electrical circuit knowledge to control a product *(make a torch)*

Torch Making Aid: Image not available

Evaluation Part 2

Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Did it light up? Can it be used in the dark?

Did the circuit work? Why not?

Which potential risks are there?

Key vocabulary

Technical knowledge and understanding

- To know and use technical vocabulary relevant to the project.

circuit: a path which electricity passes through
 conductor: a material that allows electricity to pass through it.
 Insulator: A material which does not easily allow electric current to pass through it.
 push to break switch- a switch that breaks a circuit when it is pressed (turns circuit off)
 Push to make switch- a switch that completes the circuit when it is pressed (turns circuits off).
 output devices - parts of the circuit that produce the outcome, e.g., light, buzzer, motor.
 input devices - components that control the circuit e.g., switches.
 circuit components - battery holder, bulb, battery, crocodile clip, wire, bulb holder
 series circuit- a circuit with the components arranged in a continuous line.

Resources kit to include:

kitchen roll holders, Card wheels, MES bulb holders, MES bulbs, Crocodile lead, Battery holders and Push switches

May need:

Aluminium foil, paper fasteners, paper clips, card, corrugated plastic, finishing materials.
 wire strippers, scissors, PVA glue, hot glue gun and plastic bottle.

Tips for teachers

- This project is undertaken at the same time as the Electricity Unit in Science.
- Use a selection of images of existing battery-powered products to add to the actual products that children investigate and evaluate.
- Stress the need for making secure connections.
- Model fault-finding process: check all the connections, ensure that bulbs are screwed in tightly and ensure that components are correctly connected.
- Some components (e.g. bulbs) need to be connected the right way round in a circuit, ensuring positive and negative match the poles of the battery.

Outcomes

To create a torch with a working circuit.

Term: Y4 T5	Focus of Study: Food
Objectives	Key Knowledge and Vocabulary

To follow

Outcomes

To understand food groups.

Year 5

Term: Y5 T1	Focus of Study: Textiles
Objectives	Key Knowledge and Vocabulary
<p>Designing</p> <ul style="list-style-type: none"> • Generate innovative ideas by carrying out research of existing products. • Develop, model and communicate ideas through drawings, templates and mock-ups/ prototypes. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. <p>Making</p> <ul style="list-style-type: none"> • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plan. • make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost. <p>Evaluating</p> <ul style="list-style-type: none"> • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. <p>Technical knowledge and understanding</p> <ul style="list-style-type: none"> • A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes 	<p><u>Context of Study:</u> This unit follows on from Year 2 and 3 where children will have experienced completing some basic stitching techniques. They would have threaded a needle, secured thread with a knot and fastened a row of stitches with a knot. They would have cut fabric, used templates and joined two pieces of fabric together using thread. Children in Year 2 have looked at how cotton is produced.</p> <p><u>Knowledge and skills content:</u> To design a wallet case that can be constructed by hand and by using simple materials.</p> <p><u>Background information -</u></p> <p><u>Felt Manufacture:</u> Most fabrics are woven, which means they are made on a loom with fabric that is interlocked. Felt is not woven, instead it is made from fibres that have been matted and compressed. The fibres are pressed together using heat, moisture and pressure. Felt was largely made from wool (from Sheep) but now includes synthetic fabrics (made by man) too to make it stronger. Felt has many advantages. It is very dense and can be used to line the inside of clothes. It does not fray like other fabrics as it is matted and not woven. Felt can easily be dyed and therefore is available in a range of colours.</p> <p><u>History:</u> Felt may be the oldest known fabric to man. As it does not need a loom, ancient men could create it easily. Ancient tribes used felt for saddles, tents and clothing because it is resistant to wet and snowy weather.</p>

and different fabrics.

Comparison of felt and cotton:

	Felt	Cotton
First Produced	6500 - 6200 BC (Earliest known textile)	5000 - 3000 BC
Made from	Made from natural and synthetic fibres	Made from natural fibres
Manufacture process	Compressed using moisture and heat.	Spun and then woven.
Properties	Water resistant Durable Can cause allergies	Not water resistant Durable Comfortable/ hypoallergenic
Uses	Rugs, coat linings, shoe linings, hats	Jumpers, t -shirts, trousers.

Evaluation Part 1: Existing Products

- To evaluate existing products:
- To evaluate the pictures below and actual felt products.
- Is the product functional or decorative?
- Who would use this product?
- What is its purpose?
- What components have been used to enhance the appearance?
- Would this product be easy to sew by hand?
- How has the fabric been joined?
- How has the product been strengthened and stiffened (e.g. double stitch/ chain stitch)?
- What fastenings have been used?

Making Part 1: This is based on practising skills prior to design and making their product.

- To thread a metal needle and to tie a knot (Year 2 recap).

(To be practised several times. Join both ends of the thread and knot, as this will make it easier to sew

(thread will not become loose. The knot may need to be repeated several times as the binca holes are large or a knot will need to be made on the binca).

- **To know a range of stitches including the overhand stitch (Year 5)**

These stitches were practised in Year 2 and 3: running and overhand.

- **To know how to finish a row of stitches with a knot** (tie off, recap Year 2/Year 3).
- **To practise sewing a press stud button on felt**

Designing: Actual Product

To know the intended user and purpose.

To know how to create a simple design brief

e.g. User: Self

Purpose: to create a storage pouch, e.g. wallet to keep smaller items safe.

Criteria: Must include two pieces of fabric sewn together and a secure fastening. The wallet can include an aesthetic design. It must be easy to sew by hand and be made out of the given materials. (felt, scissors, glue, press on buttons and thread)

**Note: Remind children they will be stitching the item so a simple design that can be sewn continuously will be practical. The felt patterns for the aesthetic design will be cut on felt and glued on, therefore, designs that are too intricate will be difficult to cut and stick.*

To sketch and annotate possible ideas, choosing one as a final choice and explaining why.

Show children the video demonstrations so they understand the method prior to designing. Ask children to feel the felt, explain it is tricky to cut and sew on as it's not stiff. Therefore, the design must be simple. The design is to be guided and achievable.

To add labels to their chosen design.

*seam allowance,
front,
back
pattern symbols*

**pattern adjustments show where the fabric can be lengthened or shortened to suit a body shape. This may not be needed in their design unless they are including handles.*

To create a flowchart to say how the product will be completed (simple) and to include materials that will be used. (This should be guided).

Making Part 2 Actual Product

- **To mark out the measurements on tracing paper (TK)**
(To evaluate and adjust the design, is it large enough? Will it be easy to cut/ sew?)
- **To use this template to cut around the felt.**
(Use this template to draw around on felt, ask children to think about any adjustments that may be needed- is it big enough? Will it be easy to cut/ sew?)
- **To understand seam allowance (TK)-**
The design will need to be slightly larger. The stitch needs to be lower than the edge to avoid fraying.
- **To glue any decorative patterns onto the front panel, allowing for the seam (to not glue patterns too close to the edge as it will disrupt the stitch/ fray)**
- **To know how sew two 2D pieces of fabric (TK)**
If needed, using a little glue around the edge to join the two flat pieces will make it easier to sew.

To strengthen and reinforce fabric (using a secure stitch TK).

- **To attach a fastening (TK)**

Evaluation Part 2: Evaluating the product

To evaluate the product against user, purpose and design criteria.

User: Self

Purpose: to create a storage pouch, e.g., wallet to keep smaller items safe.

Criteria: Must include two pieces of fabric sewn together and a secure fastening. The wallet can include an aesthetic design. It must be easy to sew by hand and be made out of the given materials. (Felt, scissors, glue, press on buttons and thread)

To evaluate the joining of the fabric.

(Evenness of the stitch, knots & seam allowance).

To evaluate the product:

What effect does your decorative techniques have?

What has been used to make the product attractive?

To discuss possible improvements.

More colourful, less/more padding, the design was too complex etc)

Vocabulary (TK):

Design criteria -

function -

pattern/ template: a shape drawn to the exact shape and size the material will be cut in.

needle: fine piece of metal/ plastic, with a point on one end and a hole/ eye for thread at the other.

Popular Phrase: "Eye of the needle" = used to emphasise the impossibility of a project.

This phrase comes from Matthew 19.:24 "It is easier for a camel to go through the eye of a needle, than for a rich man to enter the kingdom of God".

thread: long strand of cotton used for sewing.

knot: to tie/ fasten thread.

reinforce: to make rigid.

seam: a line of stitching that joins pieces of fabric together.

seam allowance: extra fabric allowed in case of fraying

fabric: cloth or material

	<p>Resources: binca, thread, needles, glue, felt, tracing paper, scissors, rulers, poppers and existing products</p> <p><i>*May want to dismantle and use an old pillow case, cushion cover or fabric shopper bag to show how 2D pieces are sewn to create a 3d product.</i></p> <p><i>*May want to show items with fastenings such as zips, hole buttons, poppers, Velcro etc.</i></p> <p>Other: Use water to wet the tip of the thread (not saliva). It is easier to leave small pots of water near the children whilst threading. Only use needle threaders once the child has numerous opportunities to practise threading a needle. Have long pieces of thread cut out ready prior to the lesson. Cut square pieces of binca into quarters when practising stitches to save waste.</p> <p>Outcomes To create a wallet that can be used to store small items.</p>
Term: Y5 T3	Focus of Study: Food
Objectives	Key Knowledge and Vocabulary
	<p>To follow</p> <p>Outcomes To understand the importance of good nutrition.</p>
Term: Y5 T5	Focus of Study: Mechanical Systems – Pulleys or Gears
Objectives	Key Knowledge and Vocabulary
	<p>To follow</p> <p>Outcomes To create a mechanical carousel.</p>

Year 6

Term: Y6 T2	Focus of Study: Structures
Objectives	Key Knowledge and Vocabulary
<p>Designing</p> <ul style="list-style-type: none"> • Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. <p>Making</p> <ul style="list-style-type: none"> • Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. • Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. 	<p>Context of Study: This unit follows on from Year 2 and 3 where children will have experienced completing 3d structures. Year 2 would have looked at how to make a freestanding structure and how to join straws. Year 3 would have looked at 3d nets and created a 3d packaging structure.</p> <p>Knowledge and skills content: To design a frame structure in the style of an Anderson Shelter.</p> <p>Evaluation Part 1</p> <ul style="list-style-type: none"> • To investigate a range of portable and permanent frame structures. <i>Tents, bus shelters, umbrellas (use photographs).</i> <i>What methods of construction have been used?</i> <i>How has the framework been strengthened, reinforced and stiffened?</i> <i>How does the shape of the framework affect its strength?</i> <p><u>The Anderson Shelter</u> The Anderson shelter was designed in 1938 by William Paterson and Oscar Carl Kerrison in response to a request from the Home Office. It was named after Sir John Anderson, who was responsible for preparing air-raid precautions immediately before the start of World War II.</p> <p>Anderson shelters were designed to accommodate up to six people. They were either buried deep in the soil and then covered with soil above the roof or in some cases installed inside people's houses and covered with sandbags. When they were buried outside, the earth banks could be planted with vegetables and flowers.</p> <p>Anderson shelters were issued free to all householders who earned less than £5 a week. One and a half million shelters of this type were distributed between February 1939 and the outbreak of war. The Anderson shelters performed well under blast and ground shock.</p> <p>Because of the large number made and their robustness, many Anderson shelters still survive. Many were dug up after the war and converted into storage sheds for use in gardens.</p>

- Use finishing and decorative techniques suitable for the product they are designing and making.

Evaluating

- Investigate and evaluate a range of existing frame structures.
- Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.
- Research key events and individuals relevant to frame structures.

Technical knowledge and understanding

- Understand how to strengthen, stiffen and reinforce 3-D frameworks.
- Know and use technical vocabulary relevant to the project.

Making part 1

- **To understand the use of triangulation in structures.**
 - **To practise cutting wood using a bench hook. (See images below)**
 - **To join two pieces of wood at a right angle, using triangle cards.**
 - **To evaluate the mock join they have made:**

Where are the weak points? E.g. where the wood meets.

How could you reinforce them? E.g. add more glue, make sure the triangle lines up with the edges of the wood.

Designing:

- **To discuss the brief of designing and making a small-scale frame structure (similar to an Anderson shelter)**

What is the purpose of the frame structure? - To understand how to create a free-standing structure with wood.

Will it be permanent, or can it be easily dismantled? Permanent

What materials will you use? Square sectioned wood, triangle cards, glue and card.

How will it be joined? Using triangle cards to create joins.

How will it be reinforced? - Glue and triangulation.

How will it be finished? Decorated with card to replicate a shelter.

- **To know how to produce a detailed, step-by-step plan, listing tools and materials (flowchart)**

e.g., To cut 12 pieces of wood in the same length.

To put two pieces of wood together at a right angle.

Glue a triangular card onto the wood to create a join.

Repeat to create a square etc

- **To annotate sketches with notes to help develop and communicate their ideas.**

Making part 2: Actual Product

- **To demonstrate the accurate use of tools and equipment.**

- **To build with accuracy:**

Bench Hooks are held against the front edge of a bench or table to support work whilst it is being sawn - and to protect the bench or table. They usually rely on hand pressure only. For those struggling to keep pressure, they can use a G clamp to secure the bench hook to the table.

- **To develop skills and techniques using junior hacksaws, G-clamps(if needed)**

G-clamp

- **Demonstrate skills and techniques for accurately joining framework materials together. TK**

- To use finishing materials to create the style of an Anderson Shelter.

Evaluation Part 2 - End of the project:

To evaluate if the frame structure is freestanding:

Did it stand?

Is it stable?

If not, what improvements need to be made? *E.g. wood length, wood placement/ alignment.*

To evaluate the joining of the wood:

Was there enough glue?

Were the triangles aligned?

If not, what effect did this have?

To evaluate the design of the structure:

Does it replicate the style of an Anderson shelter?

If not, what was needed?

Technical knowledge and understanding

- **To know how to strengthen, stiffen and reinforce 3-D frameworks.**

- **To know and use technical vocabulary relevant to the project.**

	<p>Possible resources: Photographs of structures, square sectioned wood, masking tape (if needed), glue gun, pencils, metal rulers, scissors, bench hooks, G-clamp, junior hacksaws, sand paper, corrugated or other type of card to cover structure.</p> <p>Key vocabulary <i>TK</i> Frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent, design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional</p> <p>Tips for teachers -Collect a range of photographs of different frame structures, both portable and permanent e.g. tents, bus shelters, bird hides. - cut the wood for the project in one go before joining.</p> <p>Outcomes To create a frame structure in the style of an Anderson Shelter.</p>
Term: Y6 T5 and T6	Focus of Study: Electrical Structures
Objectives	Key Knowledge and Vocabulary
	<p>To follow</p> <p>Outcomes To create an alarm system.</p>