

Hazelwood Schools



Design Technology Curriculum Overview

Design & Technology at Hazelwood

Intent

At Hazelwood Schools, we believe that Design & Technology (D&T) should give children the opportunity to develop technical skills, knowledge and understanding of designing and making functional products. We feel it is vital to nurture creativity and innovation through design. Through the D&T curriculum, children are inspired by engineers, designers, chefs and architects to enable them to create a range of structures, mechanisms, textiles, electrical systems and food products with a real-life purpose, reflecting the world in which we live and work.

The aims of the D&T Curriculum are:

- To provide children with opportunities to design and make functional products for a variety of purposes and users, that solve real life problems.
- To develop the skills of evaluating a product, which is an integral part of the design process, and allow children to adapt and improve their product.
- To encourage children to be creative and innovative, and to think about important issues such as sustainability and enterprise.
- To develop children's technical skills through collaborative working and problem-solving.
- To enable children to apply the knowledge and skills learned in other subjects, such as Maths, Science and Art.
- To understand why maintaining a healthy lifestyle is important and learn how to cook.



Implementation

At Hazelwood our planning is guided by the D&T Association's "Projects on a Page" scheme of work which supports the implementation of the National Curriculum for D&T in an imaginative way based on universal principles of effective teaching and learning in D&T.

Hazelwood's Approach to Teaching and Learning

At Hazelwood you will see a range of real, relevant, immersive and purposeful learning opportunities within a nurturing, enabling environment, including the following approaches to teaching and learning:

- Children **exploring and answering big questions** which allow them to think deeply about their learning
- Children **hearing and using key vocabulary** in a range of contexts
- Children **speaking in full sentences** using the key vocabulary taught
- **Cold calling** - supporting all children in engaging in their learning and believing they can achieve
- **Adaptive teaching** - responding to the needs of all children
- **Retrieval practice** – allowing children to know more, remember more and do more
- **Positive relationships and quality interactions** that nurture our responsible citizens
- **Spaced and sequential learning** over time to help children learn more quickly and remember learning better.

In a typical D&T project you will see...

- All D&T projects at Hazelwood should follow a 4-part design process: Investigate, Design, Make and Evaluate.
- Each of these 4 parts are documented through a variety of methods such as photographs, pupil voice, diagrams, annotations and drawings.
- Children will design, make and evaluate products that solve real and relevant problems. Every D&T project will include an element of real-life problem solving. The end product produced by the children should be functional, able to be tested and evaluated.
- At the investigation and exploration stage, children explore real life artefacts in order to ascertain what makes them work and what makes them good designs. Children should derive success criteria through this exploration stage.
- At the design stage children should be given a brief and a problem to solve so that they are clear on who the product is for and what the purpose of the product is. Each project will involve explicit skills building at the design stage.
- At the making stage children will select from and use a range of tools and equipment to perform their practical tasks. There may also be an opportunity for mini evaluations or written responses where possible.
- At the evaluation stage, children will evaluate their final product against their design criteria.

Real, Relevant Immersive learning opportunities in D&T are really important in ensuring our children are engaging with the world around them, explore real life and relevant problems and create products for real purposes. Our children also experience and develop a love of cooking that will enable them to creatively become independent, prepare them to look after themselves and lead a healthy lifestyle.

To further enhance our D&T curriculum, we provide all children with access to extracurricular activities and workshops i.e. the Robotics workshop at Legoland, where the children design, build and program their own robot, which they control via a computer program. We also make good quality cross-curricular links where possible, such as Science, Maths and History.

Impact

How do we assess?

We assess our children using a range of methods:

- Routine, embedded, informal formative assessment is built into every lesson.
- Questioning is a large part of our assessment. We use a range of questions to constantly check children's knowledge is secure
- Low stakes quizzes and retrieval practice to support children in remembering more and ensure learning is retained. This ongoing information tells teachers how well children have remembered and understood. This enables them to adapt and/or re-teach immediately, ensuring no pupil ever gets left behind.
- Teacher Highlight the lesson question or objective to quickly show those who have remembered and understood.

How do we know that children are at age-related expectation?

- Children are using the taught key vocabulary and substantive knowledge to answer big questions at the end of the unit.
- Children can explain what they made, who it was made for and what its purpose is.
- Children are able to talk confidently about what they have learnt.

How do our children feel about D&T?

- "I like D&T because it's fun!"
- "I really like D&T because it gives me a chance to experiment with new materials"
- "D&T is about exploring"
- "When we made [our product] it was challenging and we had to work together"

	Autumn	Spring	Summer
EYFS	<p align="center"><u>EXPRESSIVE ARTS AND DESIGN</u></p> <p align="center"><u>EYFS Statutory Framework (2021): Educational Programme</u></p> <p>The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.</p>		
Nursery	<p>Children have the opportunity to play and explore a wide range of media, materials and construction kits through their enabling environments and child led learning.</p>		
These are planned adult led learning opportunities	<p>Summer linked with Growing and Changing</p> <p>Technical skills: Food and nutrition</p> <p>Product: To make fruit kebabs</p> <p>User: Themselves</p> <p>Purpose: to eat at snack time</p> <p>Focused Tasks:</p> <ul style="list-style-type: none"> • Experience of common fruit and vegetables, undertaking sensory activities (appearance, taste and smell.) • Experience of threading/ piercing soft fruit and vegetables using appropriate utensil 		
Cultural Capital	<p>Book: The Very Hungry Caterpillar</p>		
Big questions	<p>What is this fruit called? Who has eaten this fruit before? What is its taste, smell and appearance?</p> <p>Which fruit do you like?</p>		
Vocabulary	<p>Names of fruit, thread, kebab, skewer, pierce</p>		

	Autumn	Spring	Summer
Reception These are planned adult led learning opportunities	Technical skill: Textiles Product: To design and make a sock puppet User: Themselves and family Purpose: to play with at home Focused Tasks: <ul style="list-style-type: none"> Explore a variety of winter-themed designs. Use a variety of techniques, i.e. sticking, stapling etc, to decorate their sock puppet. 	Technical skill: Structures Product: to design and make a rocket User: Themselves Purpose: Role-play activities Focused Tasks: <ul style="list-style-type: none"> Experience of rocket structure Design their own rocket and explain its features Use design to build rocket using junk modelling 	Technical skill: Food & Nutrition Product: to follow recipe to make no-bake spider cookies User: Family Purpose: To be tasty, crunchy and spider-like Focused Tasks: <ul style="list-style-type: none"> Experience of simple recipes through play Experience of mixing, stirring, pouring ingredients through play Learn basic food hygiene practices when handling food including the importance of following instructions to control risk
Cultural Capital	Inspiration: Puppet stories	Book: How to catch a star Famous spacecraft: Apollo 11	Book inspiration: The Giant Jam Sandwich
Big questions	What materials are used to decorate? What is it joined with? Where have you seen a puppet before? Which is your favourite puppet and why? Who might use it and why?	What are the parts of the rocket? What is it going to be used for? What are your rocket's special features? Who might use it and why? How can you stop your rocket from falling over? What are you going to use? Do you need to make the rocket longer or shorter?	What ingredients have been used? Are they healthy/unhealthy? How are they made to look like a spider?
Vocabulary	Names of materials and tools used, stick, staple, attach, pattern, finish, make	Rocket structure, cut, fold, join, fix, weak, strong, base, top, underneath, side, edge, thinner, straight, curved metal, wood, plastic, circle, triangle, square, rectangle, cuboid, cube, cylinder, design, make	Names of ingredients, equipment, utensils, techniques, texture, taste, sweet, smell, preference, healthy/varied diet

Term	Autumn 1	Spring 1	Summer 1
Year 1	<p>Technical skill: Mechanisms (Levers and sliders)</p> <p>Product: To design, make and evaluate a moving picture/card</p> <p>Purpose/ Functionality: To send to HCL Kitchen staff (user) to thank them for preparing food. Linked RE Harvest or Christmas</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Explore and evaluate a collection of books and everyday products that have moving parts, including those with levers and sliders <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn how simple levers and sliders work using prepared teaching aids. Used in context e.g. the slider is used to show a snail appearing from behind a stone, the lever is used to show a butterfly flying to a flower. Develop technical knowledge and skills by replicating the slider and lever teaching aids. 	<p>Technical skill: Cooking & Nutrition</p> <p>Product: To design, make and evaluate fruit salad</p> <p>Purpose/ Functionality: To be tasty, crunchy and colourful</p> <p>User: Family</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Examine a range of fruit – learn about where it is grown Handle, smell and taste fruit a range of fruit in order to describe them through talking and drawing. Evaluate fruit to determine what the children like best Investigate preferences of their intended users/suitability for intended purposes <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn basic food hygiene practices when handling food including the importance of following instructions to control risk Learn how to use simple utensils and practise food processing skills such as washing, grating, peeling, slicing, squeezing 	<p>Technical skill: Structures (Free standing structures)</p> <p>Product: To design, make and evaluate a bridge</p> <p>Purpose/ Functionality: To be strong enough to hold the weight of a “goat”.</p> <p>User: (Reception)</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Build and explore a variety of freestanding structures using construction kits, Explore folding paper or card in different ways to make freestanding structures, using masking tape where necessary to make joins. Explore how folding materials can make structure stronger, stiffer, stand up and be more stable <p>Focused Tasks:</p> <ul style="list-style-type: none"> Go on a walk and/or look at photographs of the local area to explore structures. Photograph the structures they have been exploring and label with the correct technical vocabulary in relation to the structure, materials used and shapes
Cultural Capital	Cultures: different celebrations/ cultures that give cards	Chef: Nadia Hussain British Female Chef	Bridges of the world: Golden Gate bridge, Brooklyn bridge, Sydney Harbour Bridge, Forth Bridge (Scotland) Tower bridge (London) Menai Suspension Bridge (Wales) Famous Designers: Thomas Telford (British) Menai Suspension Bridge (Wales)
Big questions	What do you think will move? How will you make it move? What part of the product moved and how did it move? How do you think the mechanism works? What else could move in the product? How well does it work?	What is this fruit called? Who has eaten this fruit before? Where is it grown? When can it be harvested? What are its taste, smell, texture and appearance? Which fruit do you prefer and why? What might we want to include in our product to meet our user’s preferences? Which fruit might be the best for our product to match the occasion/purpose?	How can you stop your structures from falling over? How can they be made stronger and stiffer in order to carry a load? What shape is the bridge going to be? What are you going to use? Do you need to make the bridge longer or shorter? Is the bridge strong enough to hold the goats?
Vocabulary	slider, lever, pivot, slot, bridge/guide card, masking tape, paper fastener, join pull, push, up, down, straight, curve, forwards, backwards, design, make, evaluate, user, purpose, ideas, design criteria, product, function	fruit and vegetable names, names of equipment and utensils sensory vocabulary: soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard, flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, ingredients, planning, investigating tasting, arranging, popular, <i>design, evaluate, criteria</i>	Freestanding structure, stability, buttress cut, fold, join, fix, structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved metal, wood, plastic, circle, triangle, square, rectangle, cuboid, cube, cylinder, design, make, evaluate, user, <i>purpose, ideas, design criteria, product, function</i>

Term	Autumn 2	Spring 2	Summer 2
Year 2	<p>Technical skill: Textiles (assembled from two identical fabric shapes)</p> <p>Product: To design, make and evaluate glove puppet</p> <p>User/ Audience: year one</p> <p>Purpose/ Functionality: To play with the puppet</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate and evaluate existing puppets. Explore and compare fabrics, joining techniques, finishing techniques and fastenings used. Make drawings of existing products, stating the user and purpose. Identify and label the fabrics, fastenings and techniques used. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn how to use a template or simple paper pattern. Learn how to use the correct appropriate tools to mark out, tape or pin the fabric to the templates or paper patterns and cut out the relevant fabric pieces for the product Learn and practise joining techniques such as running stitch including threading own needle, stapling, lacing and glueing. 	<p>Technical skill: Mechanisms (Wheels & Axles)</p> <p>Product: To design, make and evaluate a car</p> <p>User/ Audience: Themselves</p> <p>Purpose/ Functionality To race in the year 2 Grand Prix. Which vehicle can travel the furthest?</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Explore and evaluate a range of wheeled products such as toys and everyday objects looking at the number, size, position and methods of fixing wheels and axles Walk around the school building and grounds, recording how wheels and axles are used in daily life Draw an example of a wheeled product, stating the user and purpose, and labelling the main parts <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn how wheels and axles may be assembled as either fixed axles or free axles. Learn different ways of making axle holders and the importance of making sure the axles run freely within the holders Learn how to mark out, hold, cut and join materials and components correctly <ul style="list-style-type: none"> Practice assembling some wheel, axle, axle holder combinations. 	<p>Technical skill: Cooking & Nutrition</p> <p>Product: To design make and evaluate wrap pizza that is healthy and reflects culture</p> <p>Audience: Parents</p> <p>Purpose: To eat with parents after school at a picnic</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Examine a range of vegetables and foods– learn about where it is grown/produced and when it can be harvested Investigate preferences of their intended users/suitability for intended purposes (food from my culture) <p>Focused Tasks:</p> <ul style="list-style-type: none"> Discuss healthy eating advice, including eating more fruit and vegetables; using the eatwell plate Talk about the importance of fruit and vegetables in our balanced diet Recap basic food hygiene practices when handling food Recap how to use simple utensils and food processing skills
Cultural Capital	Person: Walter Wilkinson (Puppeteer)	History: History of the wheel Product: Dinky Toys	Culture: Food from around the world – links own cultures
Big questions	How many parts is it made from? What is it joined with? How is it finished? Why do you think these joining techniques have been chosen? How is it fastened? Who might use it and why?	How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the product has this number of wheels? Why do you think the wheels are round? How can you make the car roll faster? Are bigger wheels better? What would you do differently next time? Was your design fit for purpose?	Where is it grown? When can it be harvested? What might we want to include in our product to meet our user's preferences? Which fruit/vegetables might be the best for our product to match the occasion/purpose? Why is it good to eat fruit and vegetables? How many pieces of fruit/vegetables do you eat per day? Why is it important to wash fruit/vegetables before we eat them?
Vocabulary	template, appliqué, embroider, fray, seam, sew pattern pieces, mark out, join, decorate, finish, features, suitable, quality mock-up, design brief, Names of fabrics and tools used, design criteria, make, evaluate, user, purpose, function	wheel, axle, axle holder, chassis, body, cab, dowel, friction vehicle, assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism, names of tools, equipment and materials used, design, make, evaluate, purpose, user, criteria, functional	Nutrients, health benefits, balance diet, slicing, peeling, cutting, squeezing, ingredients, planning, investigating tasting, arranging, popular, design, evaluate, criteria

Term	Autumn 1	Spring 2	Summer 1
Year 3	<p>Technical skill: Food and Nutrition - Healthy and Varied Diet</p> <p>Product: To design, make and evaluate a healthy sandwich (baking own bread)</p> <p>User/ Audience: Themselves</p> <p>Purpose/ Functionality: Healthy diet</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate a range of food products. Link to the principles of a varied and healthy diet Carry out sensory evaluations on the contents of the food from a variety of bought food products. Record results using a table Gather information about existing products available Learn about how a variety of ingredients used in products are grown and harvested, reared, caught and processed <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking. Practise techniques by following a simple recipe Discuss basic food hygiene practices when handling food 	<p>Technical skill: Structures -Shell structures with computer aided design</p> <p>Product: To design, make and evaluate packing to protect cakes</p> <p>User/ Audience: For HPSA for summer fair cake boxes</p> <p>Purpose/ Functionality: Protection/ Sustainable</p> <p>Investigative and Evaluative Activities</p> <ul style="list-style-type: none"> Investigate a collection of different shell structures including packaging. Take a small package apart identifying and discussing parts of a net including the tabs Evaluate existing products to determine which designs are the most effective. Judge the suitability of the shell structures for their intended users and purposes. Discuss graphics including colours/impact of style/logo/size of font <p>Focused Tasks:</p> <ul style="list-style-type: none"> Use simple drawing software (2design and make a Cookie box on Purple mash) CAD for designing net (Purple Mash) Explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares, ellipses, trapezoids and triangles. Use the software to open existing drawings including nets and to draw nets of their own, using grid lines and pre-shaped tools. Explore and be guided to try out different fill and font tools to become familiar with the graphic design aspects of the available software to achieve the desired appearance of their products. Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling pre-drawn nets in numerous ways using scoring, cutting and assembling techniques. Construct a simple box and know how a window can be cut out and acetate sheet added 	<p>Technical skill: Mechanical Systems - Pneumatic systems</p> <p>End product: To design, make and evaluate A moving monster</p> <p>Purpose/ Functionality: enjoyment and play</p> <p>Purpose/ Audience: For year 2 children</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate, analyse and evaluate familiar objects that use air to make them work Construct a simple pneumatic system by joining a balloon to 5mm tubing and then to a washing-up liquid bottle. Demonstrate lifting an object and ask the children to think about ways in which this might be used in a product. Demonstrate a range of pneumatic mechanisms using prepared teaching aids including two syringes joined by plastic tubing; three syringes connected using a T-connector and using different sized syringes <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn how to assemble the systems using syringes, tubing, balloons and plastic bottles. Know ways in which pneumatic systems can be used to operate levers. Learn correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques. Draw the three systems they have been shown <ul style="list-style-type: none"> Balloon connected to a washing-up liquid bottle. Two syringes of the same size connected together. Two syringes of different sizes connected together.

Cultural Capital	Experience: Following a simple bread recipe	Experience: Computer aided design	Products that use Pneumatics: Jackhammer
Big questions	What ingredients have been used? Which food groups do they belong to? What substances are used in the products e.g. nutrients, water and fibre?	What is the purpose of the shell structure – protecting, containing, presenting? What material is it made from? How has it been constructed? Are the materials recyclable or reusable? How has it been stiffened i.e. folded, corrugated, ribbed, laminated? What size/shape/colour is it? What information does it show and why? How attractive is the design? How are different faces of the package arranged? How are the tabs used to join the ‘free’ edges of the net? What do you prefer and why? What style of graphics and lettering might we want to include in our product to meet users’ preferences and its intended purpose? Which packaging might be the best for	What does the air do? How has it been used in the design of these products? How can air be used to move heavy objects? What happens to the air when you squeeze the bottle? What happens when you let go? Can you lift a soft toy or a notepad using a balloon? Who might it be for? What is its purpose? What part moved and how did it move? What materials have been used? How effective do you think it is and why? What else could move? What happens when the plunger of one syringe is pressed in? Why do the syringes move at different speeds
Vocabulary	name of products, names of equipment, utensils, techniques and ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet, planning, design criteria, purpose, user, annotated sketch, sensory evaluations	shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision, evaluating, design brief design criteria, innovative, prototype	components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener, pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight linear, rotary, oscillating, reciprocating user, purpose, function, prototype, design criteria, innovative, appealing, design brief, research, evaluate, ideas, constraints, investigate

Term	Autumn 2	Spring 2	Summer 2
Year 4	<p>Technical skill: Textiles (2-D shape to 3-D product) Product: To design, make and evaluate a winter decoration User/ Audience: To sell to others Purpose/ Functionality: to hang decoratively</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate a range of textile products that have a selection of stitches, joins, fabrics, finishing techniques, fastenings and purposes, linked to the product they will design, make and evaluate. Think about products from the past and what changes have been made in textile production and products such as the invention of zips and Velcro. Disassemble appropriate textiles products to gain an understanding of 3-D shape, patterns and seam allowances. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn a range of stitching techniques and practise sewing two small pieces of fabric together, Learn about the use of, and need for, seam allowances. Use a textile product they have taken apart to create a paper pattern using 2-D shapes. Consider fabrics suitability for the chosen purpose and user. Test out a range of decorative finishing techniques e.g. appliqué, embroidery, fabric pens/paints, printing. 	<p>Technical skill: Electrical systems (Focus Simple circuits and switches) Product: To design, make and evaluate a light up robot User/ Audience: Purpose/ Functionality: light up feature</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Discuss, investigate and, where practical, disassemble different examples of relevant battery-powered products. Investigate examples of switches, including those which are commercially available, which work in different ways e.g. push-to-make, push-to-break, toggle switch. Remind children about the dangers of mains electricity. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Recap how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs and buzzers. Learn how to find a fault in a simple circuit and correct it and practise fault finding Use a simple computer control program with an interface box or standalone control box to physically control output devices e.g. bulbs and buzzers. Make switches that operate in different ways Test switches in a simple series circuit. Learn how to avoid making short circuits. 	<p>Technical skill: Mechanical systems (Leavers and Linkages) Product: To design, make and evaluate a children's book User/ Audience: Children Purpose/ Functionality: to move and entertain</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn about the range of lever and linkage mechanisms by using prepared teaching aids. Learn the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.
Cultural Capital	Culture: Hanging decorations from around the world.	Inspiration: Artist Nam June Paik	Inspiration: Moving children's books – traditional tales
Big questions	What is its purpose? Which one is most suited to its purpose? What properties/characteristics does the fabric have? Why has this fabric been chosen? How has the fabric been joined together? How effective are its fastenings? How has it been decorated? Does its decoration have a purpose? What would the 2-D pattern piece look like? What are its measurements? How might you change the	Where and why are they used? How does the product work? What are its key features and components? How does the switch work? Is the product manually controlled or controlled by a computer? What materials have been used and why? How is it suited to its intended user and purpose? How might different types of switches be useful in different	Who might it be for? What is its purpose? What do you think will move? How will you make it move? What part moved and how did it move? How do you think the mechanism works? What materials have been used? How effective do you think it is and why? What else could move? Which card strip is the lever? Which card strip is acting as the linkage? Which part of the

	product?	types of products?	system is the input and which part the output? What does the type of movement reminds you of? Which are the fixed pivots and which are the loose pivots?
Vocabulary	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics, function, pattern pieces	series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip control, program, system, input device, output device user, purpose, function, prototype, design criteria, innovative, appealing, design brief	mechanism, lever, linkage, pivot, slot, bridge, guide system, input, process, output, linear, rotary, oscillating, reciprocating user, purpose, function, prototype, design criteria, innovative, appealing, design brief

Term	Autumn 1	Spring 1	Summer 1
Year 5	<p>Technical skill: Structures- Frame structures Product: To design, make and evaluate a tent/ shelter for Camping User/ Audience: Outdoor adventurers Purpose/ Functionality: shelter people from all weathers</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas. Use photographs and web-based research to extend the Range research key events and individuals related to their study of frame structures e.g. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. Compare the strength of square frameworks with triangular frameworks. Reinforce square frameworks using diagonals to help develop an understanding of using triangulation to add strength to a structure. Learn how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of e.g. dowel. Use these tubes and masking tape or paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. Demonstrate the accurate use of tools and equipment. 	<p>Technical skill: Mechanical systems Product: To design, make and evaluate a fairground ride with gears or pulleys e.g. carousel, Ferris wheel User/ Audience: Target group Purpose/ Functionality: to spin or move using knowledge of forces</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Investigate, analyse and evaluate existing everyday products and existing or pre-made toys that incorporate gear or pulley systems. Use videos and photographs of products that cannot be explored through first-hand experience. Research and, if possible, visit engineering and manufacturing companies that are relevant to the product they are designing and making e.g. Jaguar Land Rover, JCB, local companies <p>Focused Tasks:</p> <ul style="list-style-type: none"> Use a construction kit, to investigate combinations of two different sized pulleys Learn about direction and speed of rotation and explore combinations of two different size gears meshed together. Investigate the direction and speed of rotation focusing on how the size of the driver gear affects the speed of the follower gear. use the number of teeth on each gear to decide upon the gear ratios e.g. 10 tooth driver gear meshed with a 20-tooth follower gear produces a ratio of 2:1 Build a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch. Use tools accurately including cutting and stripping wire, and making secure electrical connections. Remind children about the dangers of mains electricity. Draw a pictorial representation of the circuit or draw a circuit diagram using correct symbols. Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench 	<p>Technical skill: Food and Nutrition - Celebrating culture and seasonality Product: To design, make and evaluate own bread recipe User/ Audience: Themselves/ family Purpose/ Functionality: Representing culture with added ingredients</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. Visit to a local bakery, farm, farm shop or supermarket e Carry out sensory evaluations of a variety of existing food products and ingredients relating to the project. The ingredients could include those that could be added to a basic recipe such as herbs, spices, vegetables or cheese. These could be locally sourced, seasonal, Fair Trade or organic. Present results in e.g. tables/graphs/charts and by using evaluative writing. Research key chefs and how they have promoted seasonality, local produce and healthy eating. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Learn how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. Learn how to use appropriate utensils and equipment that the children may use safely and hygienically. Practice techniques following a basic recipe to prepare and cook a savoury food product. Investigate which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell. When using a basic dough recipe, explore making different shapes to change the appearance of the food product

	<ul style="list-style-type: none"> Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. Learn skills and techniques for accurately joining framework materials together e.g. paper straws, square sectioned wood. Practise these, mounting their joints onto card for future reference 	hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate	
Cultural Capital	Designers: Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge.	History: History of fairground rides (hand-turned, steam powered etc)	Experience: Sharing own recipe with friends/family
Big questions	How well does the frame structure meet users' needs and purposes? Why were materials chosen? What methods of construction have been used? How has the framework been strengthened, reinforced and stiffened? How does the shape of the framework affect its strength? How innovative is the design? When was it made? Who made it? Where was it made? How could each of the frameworks be reinforced and strengthened?	How innovative is the product? What design decisions have been made? What type of movement can be seen? What types of mechanical components are used and where are they positioned? What are the input, process and output of the system? How well does the product work? Why have the materials and components been chosen? How well has it been designed? How well has it been made? How many times does the smaller pulley turn each time the larger pulley turns once? Do the pulleys move in the same direction? How can you reverse the direction of rotation	What ingredients are sourced locally/in the UK/from overseas? What are the key ingredients needed to make a particular product? How have ingredients been processed? What is the nutritional value of a product? What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product? Which shape is most appealing and why
Vocabulary	frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent, design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional	pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output, design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs, fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality, utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble, design specification, innovative, research, evaluate, design brief

Term	Autumn 2	Spring 2	Summer 2
Year 6	<p>Technical skill: Electrical systems (Monitoring and control) - Connecting up a Crumble</p> <p>Product: To design, make and evaluate a winter themed electrical game</p> <p>User/ Audience: Christmas Fete</p> <p>Purpose/ Functionality: Light up/ produce sound</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> Research and discuss a range of relevant products that respond to changes in the environment using a computer control program such as automatic nightlights, alarm systems, security lighting. Investigate electrical sensors such as light dependent resistors (LDRs) and a range of switches such as push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches. Gain an understanding of how they are operated by the user and how they work use each component to control a bulb in a simple circuit. Recap children about the dangers of mains electricity. Research famous inventors related to the project e.g. Thomas Edison – light bulb. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Recap measuring, marking out, cutting and joining skills with construction materials needed to create electrical products. Practice methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks. Drawing on science and computing understanding, explore a range of electrical systems that could be used to control their products, including a simple series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where 	<p>Technical skill: Textiles (Using computer aided design (CAD) in textiles</p> <p>Product: To design, make and evaluate an upcycled piece of clothing</p> <p>User/ Audience: representing a culture</p> <p>Purpose/ Functionality: sustainability and upcycling clothes</p> <p>Investigative and Evaluative Activities:</p> <ul style="list-style-type: none"> investigate, analyse and evaluate a range of existing products which have been produced by combining fabric shapes. Investigate work by designers and their impact on fabrics and products. Investigate and analyse how existing products have been constructed. Disassemble a product and evaluate what the fabric shapes look like, how the parts have been joined, how the product has been strengthened and stiffened, what fastenings have been used and why. Investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles. <p>Focused Tasks:</p> <ul style="list-style-type: none"> Develop computer-aided design (CAD) skills by using pattern making software to generate, modify, scale, save and print pattern pieces. Learn that designs can be easily modified and repeated on the computer without the need for a physical product. Investigate using art packages on the computer Develop skills of threading needles and joining textiles using a range of stitches. Improve appearance and consistency of stitches and introducing new stitches. Develop skills of sewing textiles by joining the right side together and making seams. Investigate how to sew and shape curved edges by snipping seams, how to tack or attach wadding or 	<p>Technical skill: Food and nutrition</p> <p>Product: To design make and evaluate own Menu</p> <p>User/ Audience: Themselves</p> <p>Purpose/ Functionality: Celebration</p> <p>Investigative and Evaluative Activities:</p> <p>Using all prior knowledge</p> <ul style="list-style-type: none"> use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. Investigate sources for ingredients - a local bakery, farm, farm shop or supermarket These could be locally sourced, seasonal, Fair Trade or organic. Carry out sensory evaluations of a variety of existing food products and ingredients relating to the project. Consider ingredients that could be added to a basic recipe such as herbs, spices, vegetables or cheese. Investigate preferences with the class including allergies and dietary requirements Present results in e.g. tables/graphs/charts and by using evaluative writing. Research key chefs and how they have promoted seasonality, local produce and healthy eating Budget and cost for menu <p>Apply knowledge:</p> <ul style="list-style-type: none"> Measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. Use appropriate utensils and equipment that the children may use safely and hygienically. Decide which ingredients could be changed or added in a basic recipe Consider texture, taste, appearance and smell. Write own menu for a celebration feast

	<p>appropriate, parallel circuits where two output devices are controlled independently by two separate switches.</p> <ul style="list-style-type: none"> • Drawing on related computing activities, ensure that children can write computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to interface boxes or standalone boxes. • Know how to avoid making short circuits. 	<p>stiffening and learn how to start and finish off a row of stitches.</p> <ul style="list-style-type: none"> • Develop skills of 2-D paper pattern making using CAD and create a 3-D paper or Dipryl mock-up of a chosen product • Remind how to pin a pattern on to fabric ensuring limited wastage, how to leave a seam allowance and different cutting techniques. • Develop skills of computer-aided design (CAD) by using on-line pattern making software to generate pattern pieces. • Investigate using art packages on the computer to design prints that can be applied to textiles using iron transfer paper. 	
Cultural Capital	Experience: Selling product at Christmas fete	Inspiration: Clothing from around the world	Experience: End of year lunch
Big questions	Who have the products been designed for and for what purpose? How and why is a computer control program used to operate the products? What input devices, e.g. switches, and output devices, e.g. bulbs, have been used?	Is the product functional or decorative? Who would use this product? What is its purpose? What design decisions have been made? Do the textiles used match the intended purpose? What components have been used to enhance the appearance? To what extent is the design innovative?	What ingredients are sourced locally/in the UK/from overseas? What are the key ingredients needed to make a particular product? How have ingredients been processed? What is the nutritional value of a product? What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product?
Vocabulary	series circuit, parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart, function, innovative, design specification, design brief, user, purpose	computer aided design (CAD), computer aided manufacture (CAM) font, lettering, text, graphics, menu, scale, modify, repeat, copy, flip brief, design criteria, design decisions, seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper, design criteria, annotate, design decisions, functionality, innovation, innovative, authentic, user, purpose, evaluate, mock-up, prototype	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs, fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality, utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble, design specification, innovative, research, evaluate, design brief