Building Ambition, Resilience and Respect

DT Curriculum

Subject Lead: Meg Damarell

Haveley Hey Curriculum Statement for DT

Intent

Our aim is to create a Design and Technology curriculum that introduces the world of technology, healthy eating and construction for our children, developing them into informed users and innovators. The children will be able to combine their understanding of authentic and relevant design and technology with the skills and further knowledge to design, make and evaluate their own products.

Implementation

National Curriculum	Key Concepts	Subject Specific Approach
By using the National Curriculum as a base, we develop a programme that creates a progression of skills, learning and experiences. Our curriculum creates a passion for the subject and knowledge of up-to-date technological innovations in materials, products and systems.	We aim to master the practical techniques of; **design, make, evaluate**, as well as developing the children's technical and practical knowledge, design inspiration and the design process. These concepts are repeated in each project. The program scope includes food, mechanical systems, textiles, and electrical systems.	Children combine practical skills with an understanding of aesthetic, world and environmental issues, whilst using a wide range of materials and resources. This allows for reflection on present and past Design and Technology, its uses and effectiveness and are encourages innovation and exploration.

Impact

Pupil Voice	Evidence of Knowledge and Skills
Pupils can talk about their creativity and innovation, and will be encouraged to explain how their product meets the design brief. Pupil voice is sought to gain an understanding of attitudes and learning in DT.	Children's progress in Design and Technology is monitored throughout the year and reported to parents in end of year reports. A whole school monitoring and recording system is in place for teachers to use to assess children's progress throughout the year with product outcomes and evaluations, which is assessed termly.

Resilience	Ambition	Respect
Through independence, imagination and knowledge of the subject, the children will be encouraged to think creatively to solve problems both as individuals and as members of a team to develop ideas and produce products that are innovative and original. The children will be using their growth mindset in order to create, take risks and adapt throughout each product.	Design and Technology helps all children to become innovators, creators and designers. Through a thorough knowledge of tools, equipment, materials and health, they will be using their own ideas to develop end products. The children will acquire skills, abilities and confidence that will support their ongoing development and may spark career ideas. They will acquire the ability to act as responsible designers and makers, aiding their knowledge of safety, people, materials and equipment.	In all areas of Design and Technology, the children will learn to respect and acknowledge different mindsets, cultures and skills that have led to design and technological developments. They will learn to value others' perspectives and listen to the ideas of others respectfully. Children will also learn to critically evaluate existing products, their own work and those of others positively and with focus.

	DT Long Term Plan	Our DT curriculum is planned to ensure that key DT concepts are taught again and repeated throughout school. Where possible, links are also made to other curriculum areas and opportunities are made for children to recall information from previous year groups. For example, year 5 create electrical systems in DT to consolidate Science work in year 4.

	Autumn	**Spring**	**Summer**
Subject content Key stage 1 Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment]. When designing and making, pupils should be taught to: **Design** • design purposeful, functional, appealing products for themselves and other users based on design criteria • generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology **Make** • select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] • select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics **Evaluate** • explore and evaluate a range of existing products • evaluate their ideas and products against design criteria **Technical knowledge** • build structures, exploring how they can be made stronger, stiffer and more stable • explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. **Cooking and nutrition** As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life. • use the basic principles of a healthy and varied diet to prepare dishes • understand where food comes from.		
Year 1		**My Local Area** **Structures**	**Paws, Jaws, Claws** **Mechanisms- Sliders/ Levers**
Main teaching points		Children will investigate a local play area and design, make and evaluate how to make a freestanding piece of play equipment. They will combine materials using different techniques and begin to investigate how to strengthen and stiffen structures.	Children will explore a variety of basic sliders and levers that will make things move. They will gain an understanding that different mechanisms produce different movements. They will use this learning to create a class book including a moving animal picture.
Trips and/or experiences		Sculptures around Wythenshawe.	Trip to the zoo.
Key links		Local area structures before creating their own.	Making a moving animal picture. EYFS link – making non-movable puppets.

		EYFS link – making bridges for the billy goats gruff.	
Year 2	**Explorers** **Mechanisms- Wheels & Axles**	**Explorers** **Food and nutrition**	**Beach Combers** **Textiles**
Main teaching points	Children will build on their exploratory work in EYFS to understand how wheels and axles work. They will construct their own moving vehicle and know the difference between fixed and free axles. They will also develop their finishing techniques.	Children will explore healthy diets and packed lunches and use some basic cutting techniques to create a healthy packed lunch for an exploration.	Children will use Punch and Judy as a stimulus to explore hand puppets. They will design and create their own hand puppet, using basic joining techniques such as gluing, stapling, running stitch. Children will have a basic understanding of cutting out a template and joining the materials together. They will add decorative elements to their product.
Trips and/or experiences	Trip to the airport	Be an explorer day	Trip to the beach
Key links	Links to moving vehicles EYFS links – exploring wheels and vehicles	Science - Animals including humans	Puppet show linked to subject.

Subject content Key stage 2:

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products.

Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

- understand and apply the principles of a healthy and varied diet
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Year 3	**Farm to fork**	**Ancient Greeks**	

	Food- Smoothies	**Shell Structures**	
Main teaching points	Children will investigate where food comes from and build on their learning about a healthy diet. They will think about seasonality. Children will develop further cutting techniques to design, make and evaluate a smoothie.	Children will combine their work from KS1 on mechanism and structures. They will investigate shell structures and how they could stiffen and strengthen them. They will create a shell structure on a moving vehicle to recreate their own version of a 'Trojan Horse'	
Trips and/or experiences	Trip to Asda to investigate where food comes from	DT day - Trojan horse	
Key links	Build on DT unit in year 2, Science- animals including humans	Build on Y1 free standing structures, link to maths- nets	
Year 4	**Romans** **Food & Nutrition**	**Natural Disasters (A2)** **Textiles (Christmas stocking)**	**Energy (Sp2)** **Mechanisms- levers and linkages**
Main teaching points	Children will develop their cooking techniques by deigning, making and evaluating their own Roman bread. They will think about presentation and how they want they bread to look.	Children will develop their work on textiles from year 2 by including seam allowances in their template designs and developing their joining techniques to include stitching. They will turn a 2D pattern into a 3D product.	Children will build on their knowledge of basic sliders and levers in year 1 to create moving pictures using more complex levers and linkages.
Trips and/or experiences	Trip to Chester	Celebrations link to Christmas	Visit to Southport Eco Centre
Key links	Science- animals including humans/ healthy diet	Year 2- combining materials	Year 1- sliders and levers
Year 5	**National Parks** **Mechanisms - Wheels and Axles/Pulleys & Gears**	**Volcanos** **More complex electrical systems**	
Main teaching points	Children develop their learning on wheels and axles by incorporating pulleys and gears into their designs.	Children will create an alarm system for a warning device. They will use programing devices such as crumble to support this.	
Trips and/or experiences	Visiting the peak district.	Bolton museum	
Key links	Year 2 wheels and axles	Year 4 science unit on electricity, Computing link- Crumble	
Year 6		**Mountain Ranges** **Textiles**	**Fair Trade** **Food- Celebrating different cultures**
Main teaching points		Children will further develop their work on textiles by combining different types of materials to fit a design brief. They will create an accessory belt to take on an expedition up a mountain.	Children will develop work on seasonality and where food comes from and will design a meal using only fair trade products.
Trips and/or experiences		Ghyll Head trip	
Key Links		Year 2/ Year 4- Textiles	Year 3- Farm to fork- seasonality

Progression Document Design and Technology								
	A Nursery designer can:	**A Reception designer can:**	**A Year 1 designer can:**	**A Year 2 designer can:**	**A Year 3 designer can:**	**A Year 4 designer can:**	**A Year 5 designer can:**	**A Year 6 design can:**
COOKING AND NUTRITION Where food comes from Food preparation, cooking and nutrition	Make healthy choices about food, drink, activity and tooth brushing. To understand what helps a (edible) plant to grow. To use different senses to explore different ingredients and foods. Learn what recipes are and follow these steps to create a dish (adult led).	To understand what helps a (edible) plant to grow. To be able to categorise fruits and vegetables. Learn what recipes are and follow these steps to create a dish (adult led). To be able to understand and explain healthy food choices. To begin to follow a recipe independently using pictures/photos as a guide.		Know that all food comes from plants or animals. Identify and sort food into groups. Prepare simple dishes safely and hygienically, without using a heat source. Know that everyone should have 5 portions of fruit and vegetables every day including how fruit and vegetables are part of The eatwell plate.	Understand that a healthy diet is made up from a balance of different food and drink Identify food groups & food grown in different countries. Know food is grown, reared or caught in the UK, Europe and wider world. Understanding seasonality in relation to food and why it's beneficial.	Plan the main stages of a recipe listing ingredients, utensils and equipment. Identify a range of simple cooking techniques e.g. Baking, boiling, frying, roasting. Know that recipes can be adapted to change the appearance, taste, texture and aroma.		Follow a recipe, research existing products, plan ingredients and visit supermarket to source food. Understand how organic produce is grown. Know how to use utensils and equipment including heat sources to prepare and cook food. Understand about seasonality in relation to food products and the source of different food product, including fair trades.
End Points	- *Explore the natural world around them, making observations of different plants (NW)* - *To experience using a recipe to create food with adult help e.g. gingerbread men and sandwiches.*		- *Understand where food comes from and sort into groups, prepare dishes without using a heat source and know about having 5 portions of fruit/vegetables every day.*		- *Understand what a healthy diet looks like and identify food groups, understand where food comes from across the globe, whether that be processed or grown/reared/caught, understand seasonality of food. To be able to plan a recipe and identify different simple cooking*		- *Using more advanced utensils and equipment when preparing and cooking food and evaluate meals, specifically looking at whether they contribute to a balanced diet. Follow recipes and research existing products, plan ingredients and visit supermarket to source food.*	

	- *To know and begin to talk about the different factors that support their overall health and wellbeing.*				*techniques. Understand that recipes can be adapted*		*Understand how organic produce is grown.*	
TECHNICAL KNOWLEDGE • Mechanisms • Structures • Textiles • Electrical systems	Explore how things work. Explore different materials freely, in order to develop their ideas about how to use them and what to make. Early experiences of working with paper and card to make simple flaps and hinges. Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.	Explore how things work. Explore different materials freely, in order to develop their ideas about how to use them and what to make. Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. Experience of different methods of joining card and paper.	To be able to make a simple model using a slider and lever. Know and use technical vocabulary relevant to the project (pivots) Explore and use sliders and levers. Understand that different mechanisms produce different types of movement. Understand how freestanding structures can be made stiffer and more stable. Know and use technical vocabulary relevant to the project.	Explore and use wheels, axles and axle holders. Distinguish between fixed and freely moving axles. Know and use technical vocabulary relevant to the project (chassis, cab, vehicle). Understand how simple 3-D textile products are made, using a template to create two identical shapes. Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. Explore different finishing techniques.	Know and use technical vocabulary relevant to the project. Develop and use knowledge of how to construct strong, stiff shell structures. Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.	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. Understand and use lever and linkage mechanisms. Distinguish between fixed and loose pivots.	Understand how gears and pulleys can be used to speed up or slow down. Understand how to strengthen, stiffen and reinforce 3-D frameworks. Understand and use electrical systems in their products. Apply understanding of computing to program, monitor and control their products. Know and use technical vocabulary relevant to the project. Understand that mechanical and electrical systems have an input, process and an output. Understand and use electrical systems in their products, such as series circuits	A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. Fabrics can be strengthened, stiffened and reinforced where appropriate.

							incorporating switches, bulbs and buzzers. Apply understanding of computing to program and control their products. Understand that mechanical and electrical systems have an input, process and an output.	
End Points	- *Safely use and explore a variety of materials, tools and techniques,* - *Return to and build on their previous learning, refining ideas and developing their ability to represent them.* - *Create collaboratively sharing ideas, resources and skills.*		- *Develop skills to make and understand sliders, levers, wheels, axles and axle holder. Know and understand how freestanding structures can be made stiffer/more stable. Know and use relevant technical vocab and know how to assemble a 3D textile product.*		- Develop knowledge of how to make a structure strong and use cube and cuboid nets knowledge. Use levers and linkage mechanisms. Develop further textiles skills such how to join and make a 3D product. Understand how to use electrical circuits with a design brief.		- *Understand how a variety of mechanisms can move and/or change the speed/direction of a product. Understand how to strengthen a 3D framework. Develop textiles skills and electrical circuits with a variety of components.*	
DESIGNING Understanding contexts, user and purpose Generation of ideas Use of ICT	To be able to experience different examples of what they are going to build. For example, different bridges made out of different materials. Develop their own ideas and then decide which materials to	Assemble vehicles with moving wheels using construction kits. Explore moving vehicles through play. Gain some experience of designing, making and evaluating	To be able to create a simple design to meet a simple design criteria. Make a simple plan/draw a picture of intended design. Generate & label ideas using ICT.	Design a functional and appealing product for a chosen user and purpose based on simple design criteria. Generate, develop, model and communicate their ideas as appropriate through talking, drawing,	Analyse ideas from other people to develop ideas. Use ICT to create a labelled design/ plan with increasing detail. Generate and clarify ideas through discussion with peers and adults	Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the purpose of the product including appearance, taste, texture and aroma.	Develop ideas through the analysis of existing products Generate and develop innovative ideas and share and clarify these through discussion. Use annotated sketches, cross sectional drawings & exploded	Identify the wants, needs preferences and values of particular individuals or groups. Independently develop design criteria for a functional and appealing product that is fit for purpose, communicating

	use to express them. Which material would be the best for the goats?	products for a specified user and purpose. Develop cutting, joining and finishing skills with card.	Plan by suggesting what to do next.	templates, mock-ups and information and communication technology. Generate initial ideas and simple design criteria through talking and using own experiences.	to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. Use annotated sketches and prototypes to develop, model and communicate ideas.	Gather information about needs and wants for product and target groups. Produce annotated sketches, prototypes, final product.	diagrams to test and communicate ideas. Produce a detailed step-by-step plan. Use research to develop a design specification for a functional product that responds automatically to changes in the environment.	ideas clearly in a variety of ways. Model ideas using prototypes and pattern pieces Write a step-by-step recipe, including a list of ingredients, equipment and utensils Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.
End Points	- *Explore and use a variety of artistic effects to express their ideas and feelings.* - *Return to and build on their previous learning, refining ideas and developing their ability to represent them.* - *Create collaboratively sharing ideas, resources and skills.*		- *Create and develop ideas and plan designs with next steps. Use IT to plan/draw and label designs.*		- *Use others' designs and ideas to develop own product design focusing on the needs of the user and purpose of the product. Continue to use IT in the designing process and begin incorporating electrical circuits into the product design.*		- *Identify the wants, needs preferences and values of particular individuals or groups and independently ensure the design criteria is fit for purpose through research such as surveys and questionnaires. Model ideas using prototypes and pattern pieces.* - *Continue to incorporate circuits and electrical components into a design brief.*	
MAKE Planning (select tools) Choosing materials	Use large muscle movements to paint and make marks.	Use small motor skills to use a range of tools competently,	Select and use tools, explaining their choices, to cut, shape and	Use simple utensils and equipment to peel, cut, slice, grate and chop safely.	Select from and use appropriate tools with some accuracy to cut, score, shape	Select fabrics and fastenings according to their functional characteristics.	Select and use from appropriate tools (e.g. junior hacksaws, clamps & bench hooks) to	Select the most appropriate materials for tasks & frameworks for

	Choose the right resources to carry out their own plan. Use one handed tools and equipment, for example, making snips in paper with scissors. Make imaginative and complex 'small worlds' with blocks and construction kits.	safely and confidently. Choosing the right resources to independentl y carry out their own plan. Return to and build on their previous learning, refining ideas and developing their ability to represent them. Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function Share their creations, explaining the process they have used. Create a design with an end point in mind e.g. using	join paper and card. Practical tasks such as marking out (template), cutting, joining and finishing with glue or tape. Use simple finishing techniques suitable for the product they are creating. Cutting accurately & safely with scissors. Select and use a range of materials and begin to explain choices. Assemble, join and combine materials and components. Fold paper or card in different ways to make free standing structures, using masking tape to make joins. .	Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. Perform practical tasks such as marking out (template), cutting, joining & finishing by sewing (running stitch) and stapling. Select from and use textiles according to their characteristics and tools and explain why. Use finishing techniques, including those from art and design Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.	and join paper and card. Order the main stages of making. Use finishing techniques suitable for the product they are creating Know and use appropriate equipment and utensils to prepare and combine food Plan the main stages of a recipe, listing ingredients, utensils and equipment. Select and use appropriate utensils and equipment to prepare and combine ingredients. Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.	Joining & finishing using a variety of techniques (stitching i.e. blanket stitch, over sew, running and backward). Use of needles, thread, pins and scissors Explain their choice of materials according to functional properties and aesthetic qualities Plan and order the main stages of making. Select from and use tools and equipment to cut, shape, join and finish with some accuracy. Select and use appropriate utensils and equipment to prepare and combine ingredients. Select from a range of ingredients to make	measure, mark out, cut, shape and join construction materials to make frameworks. Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. Create and modify a computer control program to enable an electrical product to work.	different structures; explaining what makes them strong showing an understanding of their working characteristics e.g. their flexibility, waterproofing, appearance, availability Develop joining & finishing techniques-selecting equipment & developing sewing skills (sewing needles and sewing machine). Joining right sides by making seams, sewing curved edges, tacking & attaching wadding. Produce detailed lists of equipment and fabrics relevant to their tasks. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.

						appropriate food products, thinking about sensory characteristics		Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. Make, decorate and present the food product appropriately for the intended user and purpose.
End Points	- *Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function* - *Make use of props and materials when role playing characters in narratives and stories.*		- *Use simple utensils and equipment to prepare food safely. Perform practical textile l tasks such as making template, cutting, joining by sewing and stapling. Explain choice of textiles, materials and tools. Fold and join paper/card to make free standing structures. Use finishing techniques from art and design such as painting.*		- *Develop understanding of fabrics and fastenings and use this knowledge to choose materials appropriately. Continue to develop joining & finishing skills using a variety of techniques. Know and use appropriate equipment and utensils to prepare and combine food*		*Make, decorate and present the food for an intended user and purpose and formulate a plan and list of resources. Select appropriate tools, materials and frameworks for different structures and be able to explain their choices. Use wire strippers, junior hacksaws and a hand drill for making structures. Develop joining, finishing and sewing techniques such as Joining right sides by making seams, sewing curved edges, tacking & attaching wadding.*	
EVALUATE Existing products/designers Own products	Test their products and be able to explain why they did/didn't work. Return to and build on their previous learning by having the tools available for the children to try	Test their products and be able to explain why they did/didn't work. Add to this by thinking about what they could do differently. Return to and build on their	Describe how something/an existing product works. Explore a range of existing books and everyday products that use simple sliders and levers.	Explore and evaluate a range of existing textile products relevant to the project being undertaken. Evaluate their ideas throughout and their final products against original design criteria.	Evaluate their own products and ideas against criteria and user needs, as they design and make. Suggest improvements to products made and describe how to implement them, taking into	Test and evaluate their own product against design criteria and the intended user and purpose. Investigate a range of 3-D textile products relevant to the project.	Investigate famous inventors who developed ground-breaking electrical systems and components. Suggest alternative plans, outlining the positive features and draw backs. Test and evaluate the	Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. Investigate and analyse textile

	independently, refining ideas and developing their ability to represent them. Create collaboratively, sharing ideas, resource and skills.	previous learning, refining ideas and developing their ability to represent them independently. Having a wide range of resources available for the children to explore independently. Create collaboratively, sharing ideas, resource and skills.	Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria. Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. Explain what went well and how it can be improved.	Talk about their own work & others work, identifying strengths and area for development e.g. their peers, professional craftspeople. Describe similarities and differences between their own work and others work. Explore and evaluate a range of products with wheels and axles.	account others views. Carry out sensory evaluations of a variety of ingredients and products.	Identify the strengths and areas for improvement in their work. Carry out sensory evaluations and record those using tables and simple graphs. Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.	product/designs against original criteria e.g. appearance & function and adapt them as the product/design is developed. Analyse how inventions and products have changed people's lives.	products linked to their final product. Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. Understand how key chefs have influenced eating habits to promote varied and healthy diets.
End Points	- *To be able to safely use and explore a variety of materials, tools and techniques to create a product and share their creations, explaining the process they have used and why it does/doesn't work.*		- *Discuss their own and peers' work identifying strengths and areas of development and describe similarities and differences.*		- *Investigate, test, evaluate and explain how their design and existing designs are fit or unfit for purpose.* - *Suggest improvements to products and describe how to implement them.* - *Explain the similarities/differences between the work of 2 designers & craftspeople and discuss whether it is fit or unfit for use.*		- *Explain how existing products appeal to particular audiences.* - *Suggest alternative plans, outlining the positives and negatives features.* - *Test and evaluate product/designs against original criteria and adapt them the product/design is developed.* - *Analyse how inventions and products have changed people's lives and create detailed accounts of this.* - *Evaluate the final product with reference back to the design brief.*	

Haveley Hey Knowledge Map

Year	1	Subject	DT	Unit	Free Standing Structure
Links to rights:	Article 31: your right to relax and play			Trips/ Visitors	trip to local park

Children will investigate a local play area and design, make and evaluate how to make a freestanding piece of play equipment. They will combine materials using different techniques and begin to investigate how to strengthen and stiffen structures.

Prior Learning	Future Learning
EYFS Construction area	Strengthen, stiffen and reinforce more complex structures

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
•	• Understand how freestanding structures can be made stiffer and more stable • Know and use technical vocabulary relevant to the project.	• Make a simple plan/draw a picture of intended design. • Plan by suggesting what to do next.	• Practical tasks such as marking out (template), cutting, joining and finishing with glue or tape. • Select and use a range of materials and begin to explain choices. • Assemble, join and combine materials and components. • Select and use tools, explaining their choices, to cut, shape and join paper and card. • Fold paper or card in different ways to make free standing structures, using masking tape to make joins.	• Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. • Explain what went well and how it can be improved.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a perfect playground for year 1 children	Tier 2 cut, fold, join, weak, strong, base, top, underneath, side, edge, surface, thinner,	Tier 3 fix structure, tower, curved metal, wood, plastic circle, triangle,

Session 1 – Exploring existing structures

- Go on a walk and/or look at photographs of the local area to explore structures such as playground equipment, street furniture, walls, towers and bridges e.g. What are the structures called and what is their purpose? Who might use them? What materials have been used? Why have these been chosen? How have the parts been joined together? How have the structures been made strong enough? How have they been made stable?

- Ask the children to draw or photograph the structures they have been exploring and label with the correct technical vocabulary in relation to the structure, materials used and shapes e.g. wall, tower, framework, base, joint, metal, wood, plastic, brick, triangle, square, rectangle, cuboid, cube.

Session 2 – Investigating structures

- Ask the children to build and explore a variety of freestanding structures using construction kits, such as wooden blocks, interconnecting plastic bricks and those that make frameworks e.g. How can you stop your structures from falling over? How they can be made stronger and stiffer in order to carry a load? Children could make models of the structures they have seen in school and the local area.

Session 3 – Introducing skills for making structures

- Demonstrate measuring, marking out, cutting, shaping, joining and finishing techniques with a range of tools and new and reclaimed materials that children are likely to use to make their structures. Discuss the suitability of materials for their products according to their characteristics.

- Encourage them to think about how folding materials can make them stronger, stiffer, stand up and be more stable e.g. Can they support an object on top of their structures without it falling over or breaking?

- Ask children to fold paper or card in different ways to make freestanding structures, using masking tape where necessary to make joins.

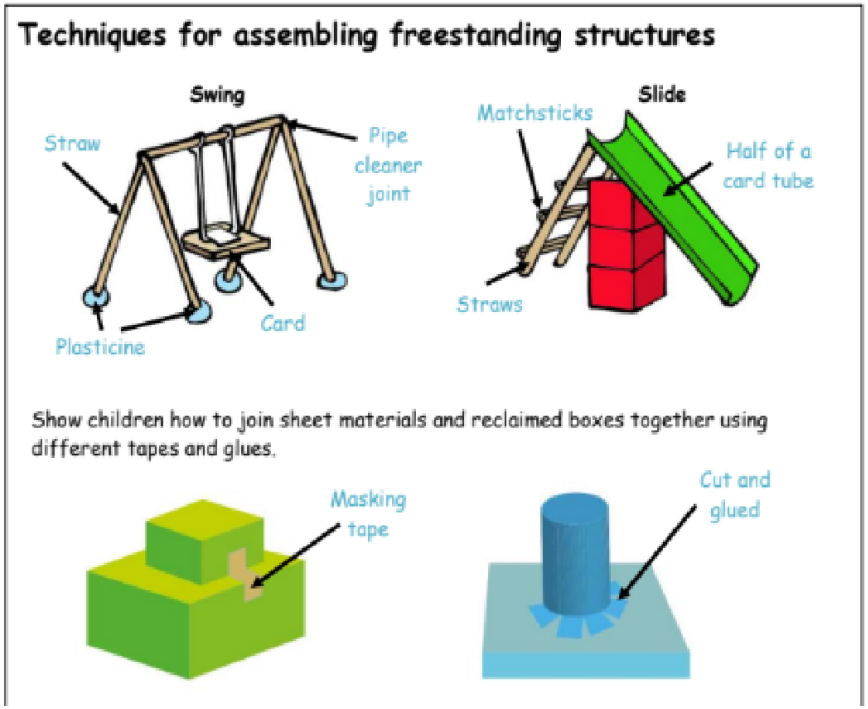
Session 4 – Designing the product

- Show children a range of resources available. Create simple labelled drawing showing how they will create their model

thicker, corner, point, straight, design, make, evaluate, user, purpose, ideas, design criteria, product, function	square, rectangle, cuboid, cube, cylinder, framework

Tips for teachers

- Create a PowerPoint or range of pictures showing a variety of freestanding structures relevant to the product the children are designing and making.
- Exploring structures in the local area provides a good opportunity to develop children's observational drawing.
- Create and display a word bank of relevant technical vocabulary in the classroom.
- Ensure that work with construction kits and materials builds on children's prior experience in the Early Years Foundation Stage (EYFS).
- Ensure that different types of construction kits are available for children to explore through focused tasks.
- Prior to producing their designs, have a range of materials available for children to access and create models.



Session 5 – Making their products • Using the skills and techniques they have explored and tested, the children make a freestanding structure of their design. **Session 6 – Evaluation** • The children evaluate their and their peers' structures. Did they work? How did they know? What did they use? What might have worked better?	

Haveley Hey Knowledge Map

Year	1	Subject	DT	Unit	Sliders and levers
Links to rights:		Trips/ Visitors			

Children will explore a variety of basic sliders and levers that will make things move. They will gain an understanding that different mechanisms produce different movements. They will use this learning to create a class book including a moving animal picture.

Prior Learning	Future Learning
• Early experiences of working with paper and card to make simple flaps and hinges. • Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.	Year 4- Levers and linkages- working with fixed and loose pivots

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• Explore and use sliders and levers. • To be able to make a simple model using a slider and lever. • Understand that different mechanisms produce different types of movement. • Know and use technical vocabulary relevant to the project.(Pivot)	• Create a simple design to meet a simple design criteria. • Generate and label ideas using ICT	• 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. • Cutting accurately & safely with scissors.	• Explore a range of existing books and everyday products that use simple sliders and levers. • Describe how something/an existing product works. • Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.

What pupil's need to know:

Key Learning	Vocab	
	Tier 2	Tier 3
Design Brief: Create a moving picture for a class book about animals		

Session 1- Exploring existing products

- Children explore and evaluate a collection of books and everyday products that have moving parts, including those with levers and sliders. e.g. What is it? Who is it for? What is it for?
- Use questions to develop children's understanding e.g. 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?

Session 2 – Exploring levers and sliders

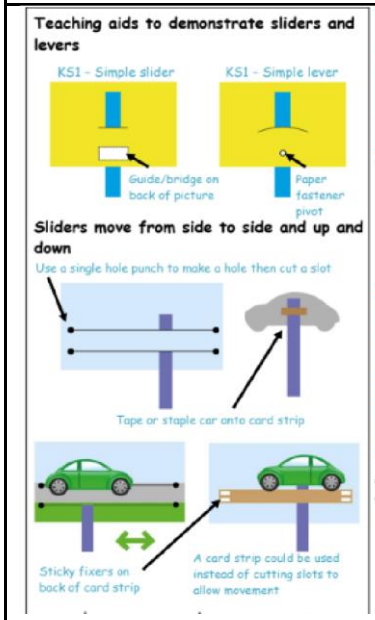
- Introduce and develop vocabulary e.g. lever, pivot, slider, left, right, push, pull, up, down, forwards, backwards, in, out.
- Demonstrate simple levers and sliders to the children using prepared teaching aids. It is helpful if these are also used in context e.g. the slider is used to show a snail appearing from behind a stone, the lever is used to show a butterfly flying to a flower.
- Use questions to develop children's understanding e.g. How does the slider move? How does the lever move? Which part of the mechanism is the pivot? What does the movement of the slider and lever remind you of?
- Following teacher demonstration of the correct use of tools and materials, children should develop their knowledge and skills by replicating the slider and lever teaching aids. Encourage children to add pictures to their mechanisms.

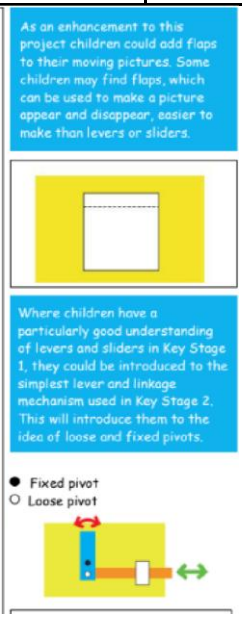
Session 3 – Product ideas/ Design

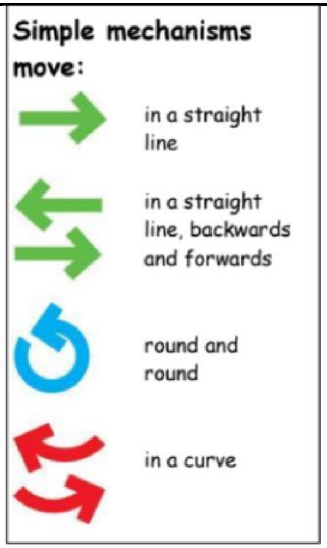
- Discuss with the children what they will be designing, making and evaluating e.g. Who will your product be for? What will be its purpose? How do you want it to move? Will you use a lever or a slider?
- Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with paper and card.
- Generate simple design criteria with the children e.g. the mechanism should work smoothly, it should make the right type of movement.
- Discuss the finishing techniques the children might use e.g. using digital text and graphics, paint, felt tipped pens or collage.

card, masking tape, design, make, evaluate, user, purpose, ideas, design criteria, product, function

slider, lever, pivot, slot, bridge/guide paper fastener, join, pull, push, up, down, straight, curve, forwards, backwards, Mechanism







Tips for teachers

- Using books and prepared examples of simple mechanisms, ask children to explain how the sliders and levers work.
- Guides/bridges can be made using strips of card fixed with masking tape.
- Display technical vocabulary and encourage the children to use it when discussing mechanisms and when designing and making.
- Mechanisms are operated directly by the children e.g. the slider is pushed and a snail appears from behind a stone.

• As a whole class, talk about the order in which the mechanisms will be made. **Session 4 – Making the product** • Using their ideas and the techniques they have learnt and developed, the children create their designs. **Session 6 –Evaluating the product** • Ask children to evaluate their developing ideas and final products against the original design criteria.	

Haveley Hey Knowledge Map

Year	2	Subject	DT	Unit	Wheels and Axles

Links to rights:		Trips/ Visitors	

Children will build on their exploratory work in EYFS to understand how wheels and axles work. They will construct their own moving vehicle and know the difference between fixed and free axles. They will also develop their finishing techniques.

Prior Learning	Future Learning
Explore how things work.	Understanding pulleys and gears

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
•	• Explore and use wheels, axles and axle holders. • Distinguish between fixed and freely moving axles • Know and use technical vocabulary relevant to the project (chassis, cab, vehicle)	• Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology. • Generate initial ideas and simple design criteria through talking and using own experiences.	• Use finishing techniques, including those from art and design • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.	• Talk about their own work & others work, identifying strengths and area for development e.g. their peers, professional craftspeople. • Describe similarities and differences between their own work and others work. • Explore and evaluate a range of products with wheels and axles.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create an exploration vehicle that moves	Tier 2 cutting, joining, shaping, finishing, , names of tools, equipment and materials used design, make,	Tier 3 vehicle, wheel, axle, axle holder, chassis, body, cab assembling, fixed, free, moving, mechanism

Session 1 – Investigating existing products

- Explore and evaluate a range of wheeled products such as toys and everyday objects. Through questioning, direct children's observations e.g. the number, size, position and methods of fixing wheels and axles. How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the wheels are round?

Session 2 – Exploring mechanisms/ Testing materials and designs

- Draw an example of a wheeled product, stating the user and purpose, and labelling the main parts e.g. body, chassis, wheels, axles and axle holders.
- Using construction kits with wheels and axles, ask children to make a product that moves.
- Demonstrate to children how wheels and axles may be assembled as either fixed axles or free axles.
- Show different ways of making axle holders and stress the importance of making sure the axles run freely within the holders.
- Ensure that children are taught how to mark out, hold, cut and join materials and components correctly.
- Using samples of materials and components they will use when designing and making, ask the children to assemble some examples of wheel, axle, axle holder combinations.

Session 3 – Designing the product

- Discuss with the children what they will be designing, making and evaluating within an authentic context. With the children, identify a user and purpose for the product and generate simple criteria.
- Ask children to generate, develop and communicate their ideas as appropriate e.g. through talk and drawing. Talk about, evaluate and share ideas with other children/adults.
- Discuss how the children might add finishing techniques to their product with reference to their design ideas and criteria. Direct the children to information and communication technology opportunities such as clip art, word processing, paint or simple drawing programs.

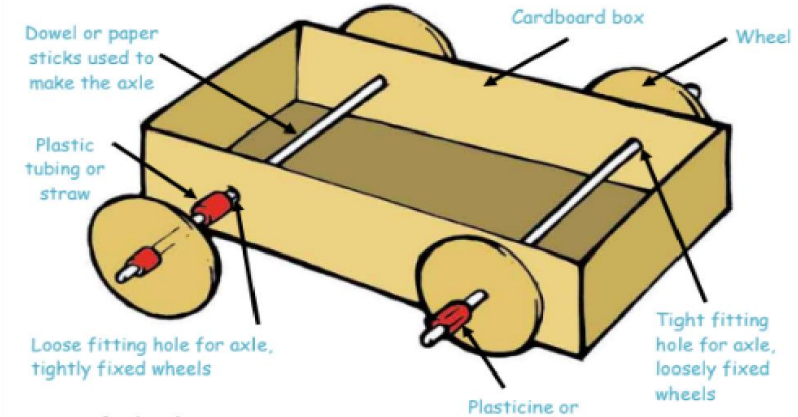
Session 4 – Creating the product

- Make their wheel and axle product using their design ideas and criteria as an ongoing guide.

Session 5 – Evaluation

evaluate, purpose, user, criteria, functional

Example of two different ways to fix wheels



Types of wheels

Tips for teachers

- Ensure a variety of different shaped boxes are available so children can select the one most appropriate for their design.
- Provide wheels with a range of diameters and thicknesses for children to explore and select the most suitable.
- A card disc glued onto a wooden/MDF wheel is easy to draw on to add details using felt tip pens.
- To add a trailer, use flat magnets glued onto the ends of boxes or short pieces of pipe cleaner bent to form a 'hook and eye'.

Ask children to evaluate their finished product, communicating how it works and how it matches their design criteria, including any changes they made.	

Haveley Hey Knowledge Map

Year	2	Subject	DT	Unit	Cooking and Nutrition
Links to rights:	Article 24: right to good food and water			Trips/ Visitors	Visit to DT room

Children will explore healthy diets and packed lunches and use some basic cutting techniques to create a healthy packed lunch for an exploration.

Prior Learning	Future Learning
Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. Experience of cutting soft fruit and vegetables using appropriate utensils.	Further cooking techniques - Y4 Roman bread, Y6- Celebrating culture Year 3- where food comes from

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
• Know that all food comes from plants or animals. • Identify and sort food into groups. • Prepare simple dishes safely and hygienically, without using a heat source. • Know that everyone should have 5 portions of fruit and vegetables every day including how fruit and vegetables are part of the eatwell plate. •	• Know and use technical and sensory vocabulary relevant to the project.	• Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. • Generate initial ideas and design criteria through investigating a variety of fruit and vegetables.	• Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. • Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.	• Evaluate ideas and finished products against design criteria,

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a healthy packed lunch to stop a sailor getting scurvy *Criteria: eg… Must have 3 portions of fruit and veg, Must be appealing to a pirate* **<u>Session 1 – Investigating products</u>** • Children examine a range of fruit/vegetables. Use questions to develop children's understanding e.g. What is this called? Who has eaten this fruit/vegetable before? Where is it	Tier 2 names of equipment and utensils, planning, popular, design, evaluate, criteria, choosing,	Tier 3 fruit and vegetable names, sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard, flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet,

grown? What are its taste, smell, texture and appearance? What will it look like if we peel it or cut it in half? What are the different parts called?

- Provide opportunities for children to handle, smell and taste fruit and vegetables in order to describe them through talking and drawing. E.g. What words can we use to describe the shape, colour, feel, taste?

- Evaluate existing products to determine what the children like best; provide opportunities for the children to investigate preferences of their intended users/suitability for intended purposes e.g. What do you prefer and why? What might we want to include in our product to meet our user's preferences? Which fruit/vegetables might be the best to match the occasion/purpose?

Session 2 - Investigating utensils and safety

- Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. What should we do before we work with food? Why is following instructions important?

- Demonstrate how to use simple utensils and provide opportunities for the children to practise food-processing skills such as washing, grating, peeling, slicing, squeezing e.g. Do we eat the whole fruit? Why or why not? Which parts do we eat? What might we have to do before eating this? Why do we cut, grate, peel and slice in this way? Discuss different effect different processes.

Session 3 - Evaluating food choices

- Discuss healthy eating advice, including eating more fruit and vegetables; using The eatwell plate model talk about the importance of fruit and vegetables in our balanced diet e.g. 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? Set a context for designing and making which is authentic and meaningful.

Session 4 - Designing the product

- Discuss with the children the possible products that they might want to design, make and evaluate and who the products will be for. Agree on design criteria that can be used to guide the development and evaluation of children's products

ingredients, investigating tasting, arranging,

Food processing equipment			
Utensil	food	effect	mouth feel
juicer 	orange	makes juice	liquid
peeler 	apple	unpeeled apple	crunchy
knife 	carrot	thin rings	crispy hard

Hygiene – some key pointers

- Jewellery is removed
- Hair is tied back
- Sleeves are rolled up
- Aprons are on
- Hands are washed
- Cuts are covered with blue waterproof dressing

Tips for teachers

- Display fruit, including photographs and associated technical vocabulary, to encourage the children to use it when discussing, designing and making a food product.
- Ask the children to sort a selection of fruit and vegetables – which is which? Photo cards could be used for this game.
- Include fruit that is less likely to be known to the children.
- Carrots can provide a relatively cheap food for examining the effects of using different equipment such as grating, slicing into thin rings, slicing into sticks.
- Serrated knives with rounded ends are the best.
- As homework, ask children to keep a weekly fruit and vegetable diary and ask them to record their results in a chart/table. If more appropriate, focus on fruit and vegetables served in school.

- Use talk and drawings when planning for a product; ask the children to develop, model and communicate their ideas e.g. What will you need? What fruit/vegetable will you need? How much will you need? How will you present the product?

Session 5 – Making the product

- Talk to the children about the main stages in making, considering appropriate utensils and food processes they learnt about.
- Create the designs.

Session 6 – Evaluation

Evaluate as the children work through the project and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Haveley Hey Knowledge Map

Year	2	Subject	DT	Unit	Textiles
Links to rights:		Trips/ Visitors	Trip to St Anne's beach		

Children will use Punch and Judy as a stimulus to explore hand puppets. They will design and create their own hand puppet, using basic joining techniques such as gluing, stapling, running stitch. Children will have a basic understanding of cutting out a template and joining the materials together. They will add decorative elements to their product.

Prior Learning	Future Learning
• Explored and used different fabrics. • Cut and joined fabrics with simple techniques. • Thought about the user and purpose of products.	Patterns/ seam allowances/ joining different materials

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• Understand how simple 3-D textile products are made, using a template to create two identical shapes. • Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. • Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons. • Know and use technical vocabulary relevant to the project.	• Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.	• Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Perform practical tasks such as marking out (template), cutting, joining & finishing by sewing (running stitch) and stapling. • Select from and use textiles according to their characteristics.	• Explore and evaluate a range of existing textile products relevant to the project being undertaken. • Evaluate their ideas throughout and their final products against original design criteria.

What pupil's need to know:

Key Learning	Vocab

Design Brief: Letter from The Entertainer to ask children to help them create a new puppet toy for children.

Criteria- eg- must fit on a hand etc..

Session 1 – investigating the product

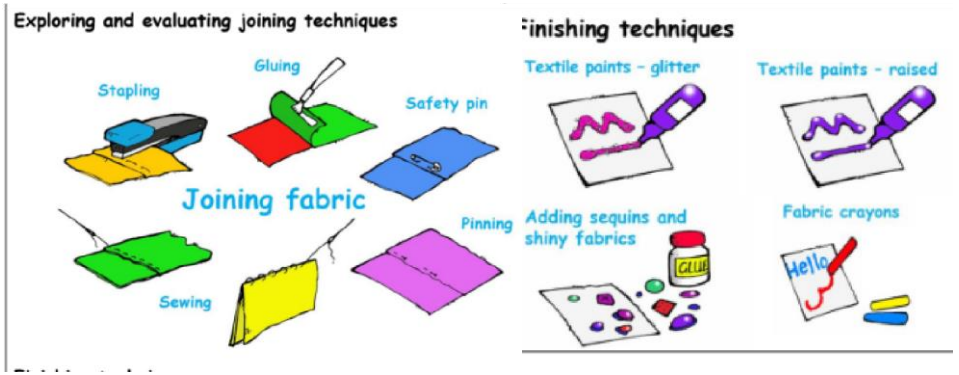
- Children investigate and evaluate existing products linked to the chosen project. Explore and compare e.g. fabrics, joining techniques, finishing techniques and fastenings used.
- Use questions to develop children's understanding e.g. How many parts is it made from? What is it joined with? How is it finished? How is it fastened? Who might use it and why? Would you buy it?
- Make drawings of existing products, stating the user and purpose. Identify and label, if appropriate, the fabrics, fastenings and techniques used. Investigate fabrics to determine which is best for the purpose of the product they are creating.
- Watch clips from puppet shows to emphasise that puppets can tell a story and talk about how they are brought to life.

Session 2/ 3 – experimenting with patterns and techniques

- Using prepared teaching aids, demonstrate the use of a template or simple paper pattern. Demonstrate how to make their own templates or paper patterns. If necessary, they can use ones provided by the teacher.
- Using prepared teaching aids, demonstrate the correct use of 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.
- Using prepared teaching aids, demonstrate appropriate examples of joining techniques for children to practise in guided groups e.g. running stitch including threading own needle, stapling, lacing and gluing.
- Talk about the advantages and disadvantages of each technique.
- Using prepared teaching aids, demonstrate examples of finishing techniques for children to practise in guided groups e.g. sewing buttons, 3-D fabric paint, gluing sequins, printing.

Session 4 – designing the product

Tier 2	**Tier 3**
features, suitable, quality, mock-up, design brief, design criteria, make, evaluate, user, purpose, function	names of existing products, joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish



Tips for teachers

- Give children the opportunity to join fabrics in a variety of ways through focused tasks and compare the outcomes.
- Children's stitching skills may be in their infancy and fabrics need to be chosen with this in mind. Start with felt as it doesn't fray and progress to other fabrics..
- Children could be reminded of sustainability issues, and of the need to reduce, reuse and recycle.
- Demonstrate sewing techniques, joining two pieces of fabric e.g. running stitch.
- Demonstrate other ways of joining, not sewing, to the class e.g. sticking, stapling, lacing.
- Encourage the children to make a mock-up from dipryl(disposable cloth fabric).
- Put technical vocabulary onto flashcards.

• Discuss with children the purpose and user of the products they will be designing, making and evaluating. Design criteria developed with the teacher should be used to guide the development and evaluation of the children's products. • Ask the children to generate a range of ideas e.g. What parts will the product need to have and what will it be made from? What size will it be? How will it be joined and finished? • Through talk, drawings and mock-ups, ask the children to develop and communicate their ideas. Information and communication technology could be used for symmetry and pattern ideas. Choose one idea to follow through. • Encourage children to make a proto-type with paper **Session 5 – making the product** • Talk with the children about the stages in making before assembling quality products, applying the knowledge, understanding and skills learnt throughout. • Create Puppet **Session 6 - evaluation** • Evaluate ongoing work and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.	

Haveley Hey Knowledge Map

Year	Y3	Subject	DT	Unit	Healthy & varied diet
Links to rights:	Article 24: your right to good food and water		Trips/ Visitors	Geodome/ Farm/ ASDA	

Children will investigate where food comes from and build on their learning about a healthy diet. They will think about seasonality. Children will develop further cutting techniques to design, make and evaluate a smoothie.

Prior Learning	Future Learning
Year 2 DT/ Year 1/ 2 Science – Where food comes from, basic hygiene, 5 portions of fruit and veg	Y4- cooking techniques

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
• A healthy diet is made up from a balance of different food and drink • Identify food groups & food grown in different countries. • Know food is grown, reared or caught in the UK, Europe and wider world. • Know about a range of fresh and processed ingredients for the product and whether it is grown, reared or caught. • Understanding seasonality in relation to food and why it's beneficial.	• Know and use relevant technical and sensory vocabulary appropriately	• Analyse ideas from other people to develop ideas • Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose.	• Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.	• Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. • Suggest improvements to products made and describe how to implement them, taking into account others views.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a new smoothie product *Possible criteria- must use a product from the school garden, all ingredients must be grown in the UK*	Tier 2	Tier 3
	Healthy, prepare, diet,	Appearance, Texture, Sensory evaluation, Preference test,

Session 1 - investigating a range of food:

- Children investigate a range of smoothie products. Link to the principles of a varied and healthy diet using The eatwell plate e.g. 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?
- Carry out sensory evaluations on the smoothies. Record results, for example using a table. Use appropriate words to describe the taste/smell/texture/appearance. Which is most popular? etc

Session 2 - investigating ingredients:

- Gather information about fruits and vegetables. Visit a local supermarket and/or use the internet to see where they come from.
- Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed?

Session 3 - investigating utensils:

- 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.
- Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. What should we do before we work with food? Why is following instructions important?

Session 4 - designing the product:

- Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.
- Develop and agree on design criteria with the children within a context that is authentic and meaningful. This can include criteria relating to healthy eating and a varied diet
- Using discussion, annotated sketches and information and communication technology if appropriate, ask the children to develop and communicate their ideas.
- Ask children to consider the main stages in making the food product, before preparing/cooking the product including the ingredients and utensils they will need.

Session 5 - making the product:

- Make the product

Session 6 - evaluating:

- Evaluate as the assignment proceeds and the final product against the intended purpose and user, reflecting on the design criteria previously agreed. Consider what others think of the product when considering how the work might be improved.

	Processed food, bridge cut, slice, grate, hygiene, claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking.

Tips for teachers

- When choosing bought products to evaluate, choose some with simple fillings (such as cheese) and others with more variety (such as bacon, lettuce and tomato). Include some with fillings from a variety of cultures.
- Children may need help to develop design criteria for their product. You can model this by discussing what the design criteria may have been for an existing product that the children have previously evaluated before encouraging them to create their own.
- Use a range of fresh and processed ingredients.
- Hygiene: tie long hair back, wear aprons, cover cuts with blue plasters and wash hands thoroughly with soap and dry with a paper towel. More details on www.foodafactoflife.org.uk.
- Homework idea 1: Ask children to collect pictures of related food products from magazines etc. Research which similar products are used around the world.
- Homework idea 2: Ask members of the children's family which is their favourite lunch snack and why.

Investigating and Evaluating Activities

Children can analyse existing products related to their project using sensory evaluations and record their results in a table. Explain that tasting is not the same as eating. Provide kitchen towel so children can spit out food they do not like. Provide water to cleanse palette between tasting products.

Analysing existing products

Filling	Appearance	Smell	Flavour/Taste	Texture	Dislike	Neither	Like
1							
2							
3							
4							
Word bank	Colourful Dark/pale Greasy Moist	Fruity Meaty Smoky Oniony Garlicky Fishy	Salty Herby Spicy Fishy Smoky	Crispy Crunchy Soft Chewy Sticky Smooth Hard			

Haveley Hey Knowledge Map

Year	3	Subject	DT	Unit	Shell Structures
Links to rights:			Trips/ Visitors		

Children will combine their work from KS1 on mechanism and structures. They will investigate shell structures with nets and how they could stiffen and strengthen them. They will create a shell structure on a moving vehicle to recreate their own version of a 'Trojan Horse'

Prior Learning	Future Learning
• Experience of using different joining, cutting and finishing techniques with paper and card. • A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science. • Wheels and axles	

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
•	• Develop and use knowledge of how to construct strong, stiff shell structures • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.	• Use ideas from other people when designing • Use annotated sketches to communicate ideas • Use ICT to create a labelled design/ plan with increasing detail	• Select from and use appropriate tools with some accuracy to cut, score, shape and join. • Use finishing techniques suitable for the product they are creating	• Suggest improvements to products made and describe how to implement them, taking into account others views. • Evaluate their own products and ideas against criteria and user needs, as they design and make.

What pupil's need to know:

Key Learning	Vocab	
	Tier 2	Tier 3
Design Brief: Create a "Trojan horse" style **Session 1 - looking at different shell structures:** • https://www.dltk-kids.com/world/greece/m-trojan.htm • Children investigate a collection of different shell structures including packaging. Use questions to develop children's understanding e.g. 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?	length, width, breadth, material, stiff, strong, reduce, reuse, recycle, laminating font, lettering, text,	shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, capacity marking out, scoring, shaping, tabs, adhesives,

- Children take a small package apart identifying and discussing parts of a net including the tabs e.g. How are different faces of the package arranged? How are the tabs used to join the 'free' edges of the net?
- Evaluate existing products to determine which designs children think are the most effective. Provide opportunities for the children to judge the suitability of the shell structures for their intended users and purposes.

Session 2 - constructing nets:

- Children use kit parts with flat faces to construct nets. Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling in nets in numerous ways.
- Demonstrate skills and techniques of scoring, cutting out and assembling using pre-drawn nets. Then allow children to practise by constructing a simple box. Show how a window could be cut out and acetate sheet added.
- Demonstrate how to use different ways of stiffening and strengthening their shell structures e.g. folding and shaping, corrugating, ribbing, laminating. Provide opportunities for the children to practise these and to carry out tests to find out where their structures might need to be strengthened or stiffened.

Session 3 - designing the product:

- Discuss with the children the uses and purposes of their shell structures e.g. What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions? Agree on design criteria that can be used to guide the development and evaluation of children's products .
- Use an ICT programme to design their model. Ask the children to use annotated sketches and prototypes to develop, model and communicate their ideas for the product e.g. What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance?
- Recap work from year 2 on wheels and axles. How will their Trojan horse move?

Session 4 - designing the outside of the product:

- Children discuss and explore the graphics techniques and media that could be used to achieve the desired appearance of their products.
- Practise using computer-aided design (CAD) software to design the net, text and graphics for their products according to purposes.

Session 5 - creating the design:

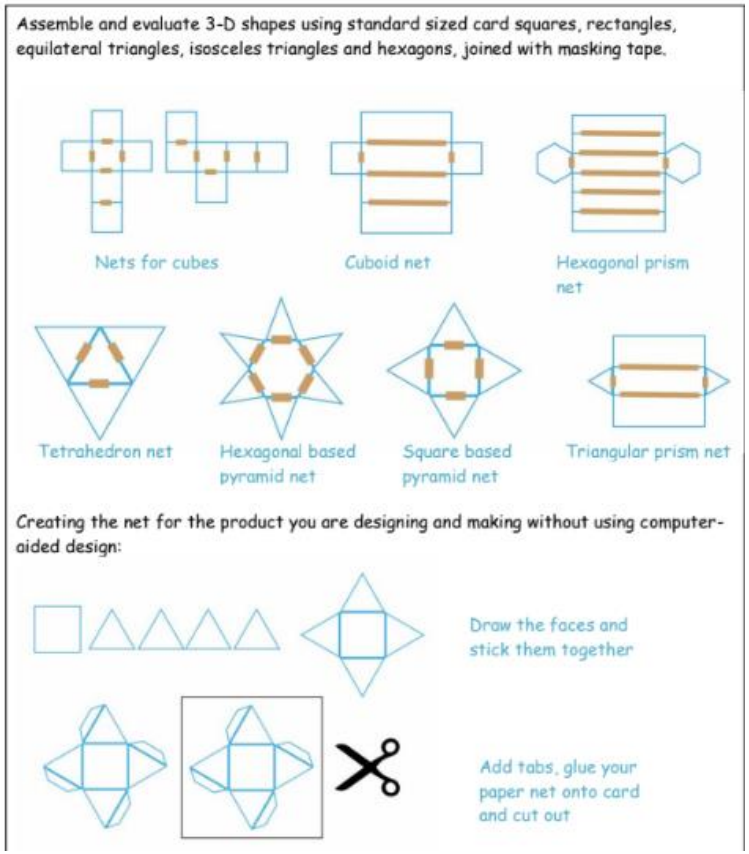
- Ask children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. Encourage the children to work with accuracy, using computer-aided design (CAD) where appropriate.

Session 6 - evaluation:

graphics, decision, evaluating, design brief design criteria, innovative, prototype

joining, assemble, accuracy,corrugating,

ribbing,



Tips for teachers

- Discuss environmental issues relating to the wastage of materials when packaging items including the three R's - reducing, recycling and reusing.
- The use of standard shapes as templates will help children design their own nets.
- Divide your class into teams and assign children to specific jobs within their teams e.g. Resources Manager, Sustainability Officer,

• Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.	Design Director, Tools Manager, Process Controller, Graphics Director. • The use of computer-aided design to draw nets and graphics form the children's products could be practised in computing lessons. • Ensure that the children have a good understanding of 2-D and 3-D shapes in maths before carrying out this project.

Haveley Hey Knowledge Map

Year	Y4	Subject	DT	Unit	Healthy & varied diet
Links to rights:	Article 24: your right to good food and water		Trips/ Visitors		
To create a product reflecting a healthy and varied diet. Making Roman Bread					

Prior Learning	Future Learning
Year 3 – Making Smoothies Know some ways to prepare ingredients safely and hygienically. Have some basic knowledge and understanding about healthy eating and The eat well plate. Have used some equipment and utensils and prepared and combined ingredients to make a product.	Y6- Fair Trade – celebrating food from other cultures

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
• Plan the main stages of a recipe listing ingredients, utensils and equipment. • Identify a range of simple cooking techniques e.g. Baking, boiling, frying, roasting. • Know that recipes can be adapted to change the appearance, taste, texture and aroma.	• Know and use relevant technical and sensory vocabulary appropriately	• Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the purpose of the product including appearance, taste, texture and aroma. • Gather information about needs and wants for product and target groups.	• Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.	• Carry out sensory evaluations and record those using tables and simple graphs. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a new bread to feed a Roman soldier. *Possible design criteria- add at least 1 ingredient, be an appealing shape, appeal to a Roman Soldier, have a good colour on the outside.*	Tier 2	Tier 3
	Healthy, prepare, diet,	Appearance, Texture, Sensory evaluation, Preference test, processed food, bridge cut, slice, grate, hygiene, claw technique, grating, peeling,

Session 1 - investigating a range of food:

- Children investigate a range of bread products e.g. different types of bread available. Link to the principles of a varied and healthy diet using The eatwell plate e.g. What ingredients have been used? Which food groups does it belong to? What substances are used in the products e.g. nutrients, water and fibre?
- Carry out sensory evaluations on the breads Record results, for example using a table. Use appropriate words to describe the taste/smell/texture/appearance

Session 2 - investigating ingredients:

- Gather information about existing products available relating to your product. Visit a local supermarket and/or use the internet.
- Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed?
- Comparing the differences between bread types.

Session 3 - investigating utensils:

- Learn the basic method for baking a simple bread roll. What cooking techniques do you use- baking, kneading, rolling etc… Use DT room to bake own bread.
- Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. What should we do before we work with food? Why is following instructions important?

Session 4 - designing the product:

- Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for. Links to Roman history topic.
- Develop and agree on design criteria with the children within a context that is authentic and meaningful. This can include criteria relating to healthy eating and a varied diet.
- Using discussion, annotated sketches and information and communication technology if appropriate, ask the children to develop and communicate their ideas.
- Ask children to consider the main stages in making the food product, before preparing/cooking the product including the ingredients and utensils they will need.

Session 5 - making the product:

- Make the product, linking it to their topic by making their own bread.

Session 6 - evaluating:

- Evaluate as the assignment proceeds and the final product against the intended purpose and user, reflecting on the design criteria previously agreed. Consider what others think of the product when considering how the work might be improved.

chopping, slicing, mixing, spreading, kneading and baking.

Tips for teachers

- When choosing bought products to evaluate, choose some with simple fillings (such as cheese) and others with more variety (such as bacon, lettuce and tomato). Include some with fillings from a variety of cultures.
- Children may need help to develop design criteria for their product. You can model this by discussing what the design criteria may have been for an existing product that the children have previously evaluated before encouraging them to create their own.
- Use a range of fresh and processed ingredients.
- Hygiene: tie long hair back, wear aprons, cover cuts with blue plasters and wash hands thoroughly with soap and dry with a paper towel. More details on www.foodafactoflife.org.uk.
- Homework idea 1: Ask children to collect pictures of related food products from magazines etc. Research which similar products are used around the world.
- Homework idea 2: Ask members of the children's family which is their favourite lunch snack and why.

Investigating and Evaluating Activities

Children can analyse existing products related to their project using sensory evaluations and record their results in a table. Explain that tasting is not the same as eating. Provide kitchen towel so children can spit out food they do not like. Provide water to cleanse palette between tasting products.

Analysing existing products

Filling	Appearance	Smell	Flavour/Taste	Texture	Dislike	Neither	Like
1							
2							
3							
4							
Word bank	Colourful Dark/pale Greasy Moist	Fruity Meaty Smoky Oniony Garlicky Fishy	Salty Herby Spicy Fishy Smoky	Crispy Crunchy Soft Chewy Sticky Smooth Hard			

Haveley Hey Knowledge Map

Year	4	Subject	DT	Unit	Christmas Stockings
Links to rights:			Trips/ Visitors		

Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Prior Learning	Future Learning
Year 2- Created hand puppet KS1- A 3D product can be made by using two identical shapes and basic joining methods	KS2 - 3D textile products can be made by joining accurate patterns

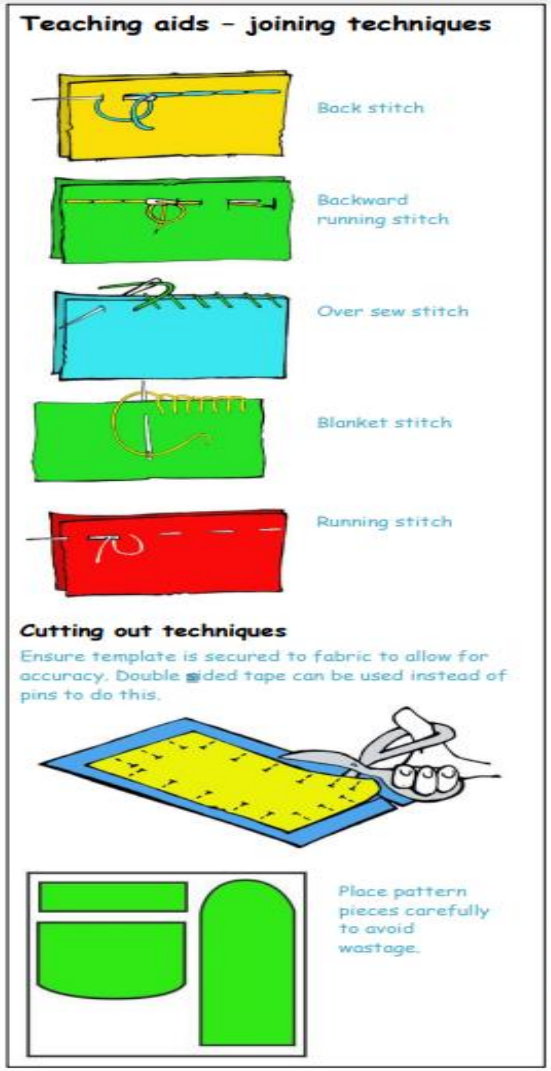
Threshold Concepts (disciplinary knowledge)

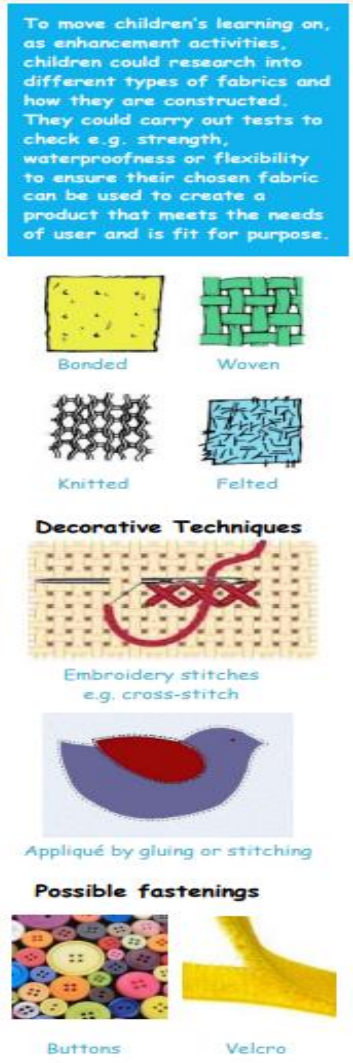
Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• Understand how to securely join two pieces of fabric together. • Understand the need for patterns and seam allowances. • Know and use technical vocabulary relevant to the project. • Know how to strengthen, stiffen and reinforce existing fabrics.	• Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the purpose of the product • Produce annotated sketches, prototypes, final product.	• Select fabrics and fastenings according to their functional characteristics. • Joining & finishing using a variety of techniques (stitching ie blanket stitch, over sew, running and backward). • Use of needles, thread, pins and scissors • Explain their choice of materials according to functional properties and aesthetic qualities	• Test and evaluate their own product against design criteria and the intended user and purpose. • Investigate a range of 3-D textile products relevant to the project. • Identify the strengths and areas for improvement in their work.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a Christmas stocking	Tier 2	Tier 3

Possible design criteria: Must be able to fit an orange inside, Must have a child's name on the outside, **Session 1 - Investigating different products** ● 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. **Session 2 - discussing and exploring different fabrics** ● Give children the opportunity to disassemble appropriate textiles products to gain an understanding of 3-D shape, patterns and seam allowances. ● Use questioning to develop understanding e.g. What is its purpose? 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? **Session 3 - discussing and exploring sewing techniques** ● Demonstrate a range of stitching techniques and allow children to practise sewing two small pieces of fabric together, demonstrating the use of, and need for, seam allowances. ● Allow children to use a textile product they have taken apart to create a paper pattern using 2-D shapes. ● Provide a range of fabrics – which are suitable for the chosen purpose and user. ● Use questioning to develop understanding e.g. Which joining technique makes the strongest seam? Why? Which stitch is appropriate for the purpose? What is the purpose of the fastenings? Which one is most suited to the purpose and user? What decorative techniques have been used? What effect do they have? **Session 4 - designing the product** ● Discuss the intended user, purpose and appeal of their product. Create a set of design criteria. ● Ask children to sketch and annotate a range of possible ideas, constantly encouraging creative thinking. Produce mock-ups and prototypes of their chosen product. ● Plan the main stages of making e.g. using a flowchart or storyboard.	compartment, structure, finishing technique, templates, user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, function,	fabric, names of fabrics, fastening, zip, button, stitch, seam, seam allowance, aesthetics, pattern pieces





Session 5 - making their product: ● Children make product. Encourage children to think about the aesthetics and quality finish of their product. **Session 6 - evaluation:** ● Evaluate as the process is undertaken and the final product in relation to the design brief and criteria.	cards, stamps etc **Tips for teachers** ✓ Have simple patterns available for children who may find it difficult to create their own. ✓ Demonstrate stitching techniques and have help sheets showing stitch instructions for the children to practise independently. ✓ Complete sewing practice in small groups. Use adult helpers to provide additional support. Possibly set up a rotation of activities. ✓ Demonstrate finishing techniques; let the children practise on small pieces of fabric. ✓ Have a limited range of fasteners. ✓ Use recycled fabrics e.g. old clothing, ensuring they are easy to work with. ✓ Use dipryl or J-cloth type fabric for prototypes. ✓ Have a range of products and pictures for children to investigate. Try to use at least one product that can be disassembled so children can see all the parts. ✓ Games could be made with technical vocabulary cards e.g. pairs.

Haveley Hey Knowledge Map

Year	4	Subject	DT	Unit	Levers and Linkages
Links to rights:		Trips/ Visitors			

Children will build on their knowledge of basic sliders and levers in year 1 to create moving pictures using more complex levers and linkages.

Prior Learning	Future Learning
Simple sliders and levers. Simple pivots	Pulleys and gears

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
•	• Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots.	• Produce annotated sketches, prototypes, final product.	• Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Plan and order the main stages of making.	• Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.

What pupil's need to know:

Key Learning

Design Brief: Create a moving picture for a book including linkages

Design criteria- Must have at least 2 pivots, must use fixed and loose pivots, etc…

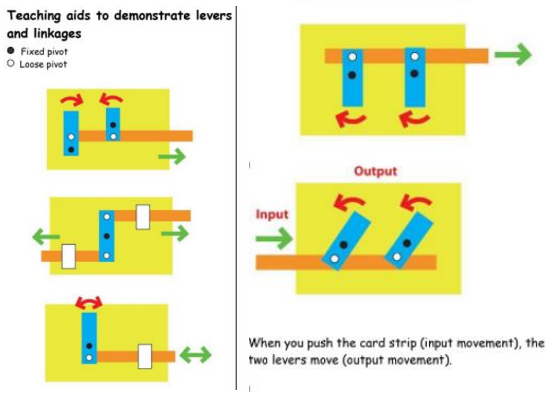
Session 1 - Investigating different products

- Children investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms.
- Use questions to develop children's understanding e.g. 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?

Session 2 - Exploring different levers and linkages

- Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids.

Vocab



- Use questions to develop children's understanding e.g. Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots?
- Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.
- Children should develop their knowledge and skills by replicating one or more of the teaching aids.

Session 3 - designing the product

- Develop a design brief with the children within a context which is authentic and meaningful.
- Discuss with children the purpose of the products they will be designing and making and who the products will be for. Ask the children to generate a range of ideas, encouraging creative responses.
- Agree on design criteria that can be used to guide the development and evaluation of the children's products.
- Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas.
- Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.

Session 5 - making their product:

- Children to create their product

Session 6 - evaluation:

Evaluate as the process is undertaken and the final product in relation to the design brief and criteria.

-

Tips for teachers

- ✓ Give children the opportunity to make examples of lever and linkage mechanisms though focused tasks.
- ✓ Preparing a plentiful supply of card strips can be useful to speed up the process.
- ✓ Card from recycled packaging is a cost-efficient way of providing enough material for children to experiment with different arrangements and to make mock-ups and prototypes.
- ✓ When working with thin card, a hole can be made for the paper fastener pivot by pressing a pencil through the card on to a piece of Plasticine or Blu Tack.
- ✓ A picture can be drawn on and cut out from another piece of card and glued on to the output levers.
- ✓ Windows can be cut out of the backing sheet or extra pieces added so that the picture on the output lever is hidden and then revealed.
- ✓ The backing sheet can be shaped to suit the picture.
- ✓ Guides/bridges can be made using strips of card fixed with masking tape e.g. white card on diagrams.
- ✓ Display technical vocabulary and encourage the children to use it when discussing mechanisms and when designing and making.
- ✓ Make sure the existing books children investigate include moving pictures that are similar to the teaching aids.

Useful resources at www.data.org.uk:

- Levers and Linkages 'Let's Get Practical!' Support Pack
- D&T Primary 17 issue on mechanisms including levers and linkages
- CPD Resources Primary Inset Guides

D&T Association publications:

- Primary Helpsheets – Unit 4B Storybooks
- Primary Lesson Plans – Unit 4B Storybooks

Please note that these publications are based on previous National Curricula.

Haveley Hey Knowledge Map

Year	5	Subject	DT	Unit	Mechanisms
Links to rights:			Trips/ Visitors		

understand and use mechanical systems in their products [for example, gears, pulleys, cams]

Prior Learning	Future Learning
Experience of axles, axle holders and wheels that are fixed or free moving/ Basic understanding of electrical circuits, simple switches and components/ Experience of cutting and joining techniques with a range of materials including card, plastic and wood. / An understanding of how to strengthen and stiffen structures	

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• Understand how gears and pulleys can be used to speed up or slow down. • Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Understand and use electrical systems in their products.	• Develop ideas through the analysis of existing products • Use annotated sketches, cross sectional drawings & exploded diagrams to test and communicate ideas • Produce a detailed step-by-step plan.	• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. • Select and use appropriate tools to join construction materials to make frameworks. • Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.	• Investigate famous inventors who developed ground-breaking electrical systems and components. • Suggest alternative plans, outlining the positive features and drawbacks. • Test and evaluate my product/designs against original criteria e.g. appearance & function and adapt them as I develop my product/design. • Analyse how inventions and products have changed people's lives.

What pupil's need to know:

Key Learning	Vocab

Design Brief: Create a moving vehicle, incorporating electrical systems.

Possible criteria- should move on rough terrain, has pulleys to change speed

Session 1 - Investigating existing products

- 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.
- Use observational drawings and questions to develop understanding of each product in the collection e.g. 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?

Session 2 - Researching existing products

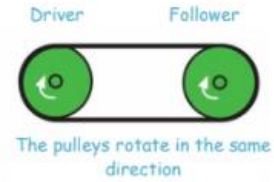
- Children could research and, if possible, visit engineering and manufacturing companies that are relevant to the product they are designing and making e.g. Jaguar Land Rover, JCB, local companies
- Children generate innovative ideas by carrying out research including surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product.
- Research development in electric cars and self-driving cars

Session 3 - Testing out different mechanisms and circuits

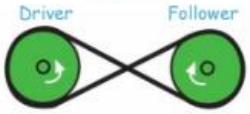
- Using a construction kit, investigate combinations of two different sized pulleys to learn about direction and speed of rotation e.g. How many times does the smaller pulley turn each time the larger pulley turns once? Do the pulleys move in the same direction? How can you reverse the direction of rotation? AND/OR
- Using a construction kit, 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. Ask the children to 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. Demonstrate the accurate use of tools and equipment including cutting and stripping wire, and making secure electrical connections. Remind children about the dangers of mains electricity. Draw a

Tier 2	Tier 3
follower, ratio, functionality, innovation, authentic, user, purpose, design specification, design brief	pulley, drive belt, gear, rotation, spindle, driver, transmit, axle, motor circuit, switch, circuit diagram annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output design decisions

Developing understanding of gears and pulleys



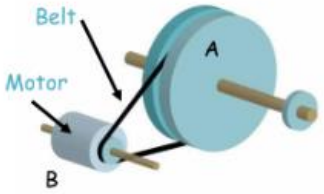
The pulleys rotate in the same direction



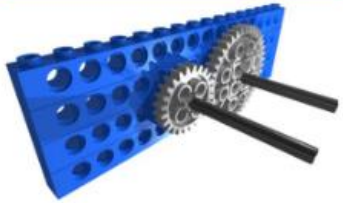
The pulleys rotate in different directions

Using construction kits, ask children to explore gear ratio using combinations of two gears e.g.

No. teeth	Ratio
8, 16	2:1
8, 40	5:1
8, 24	3:1
40, 40	1:1



The small pulley (B) rotates much more quickly than the large pulley (A)



Tips for teachers

pictorial representation of the circuit or draw a circuit diagram using correct symbols.

Session 4 - Developing a product

- Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. Demonstrate the accurate use of tools and equipment
- Develop an authentic and meaningful design brief with the children.
- Communicate ideas through detailed, annotated drawings from different views and/or exploded diagrams. The drawings should indicate the design decisions made, including the location of the mechanical and electrical components, how they work as a system with an input, process and output, and the appearance and finishing techniques for the product.
- Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.

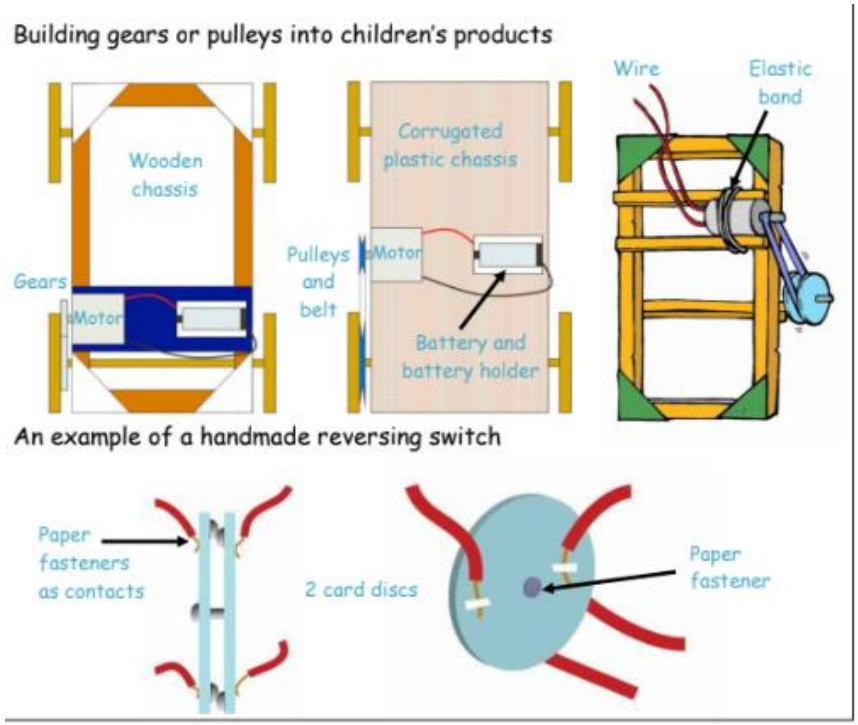
Session 5 - Creating the product

- Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Children should use a range of decorative finishing techniques to ensure a well finished final product that matches the intended user and purpose.

Session 6 - Evaluation

- Evaluate throughout and the final product in use, comparing it to the original design specification.
- Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for the intended user and purpose.

- When beginning designing and making, ensure children are focused on making the mechanical system work, rather than the decoration.
- Focused tasks should concentrate on exploring combinations gears or pulleys using construction kits.
- Gears require more accuracy than pulleys at the making stage but make it easier for children to understand the concept of ratio by counting the number of teeth on each gear.
- Don't be afraid of incorporating any failed designs into displays of final products. Include evaluations of why designs didn't work and how children would make them work.
- Do not use rechargeable batteries.



Haveley Hey Knowledge Map

Year	5	Subject	DT	Unit	Electrical Systems – More complex switches and circuits
Links to rights:	Article 36: Right to be safe		Trips/ Visitors		

To understand and use more complex electrical systems in their products.

Prior Learning	Future Learning
• Science- understanding circuits (Y4) • Computing- programming	

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• Understand and use electrical systems in their products. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project. • Understand that mechanical and electrical systems have an input, process and an output.	• Use research to develop a design specification for a functional product that responds automatically to changes in the environment. • Generate and develop innovative ideas and share and clarify these through discussion.	• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. • Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. • Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.	• Test and evaluate the product/designs against original criteria e.g. appearance & function and adapt them as the product/design is developed. • Investigate famous inventors who developed ground-breaking electrical systems and components.

What pupil's need to know:

Key Learning	Vocab	
Design Brief: Create a warning device	Tier 2	Tier 3

Possible design criteria: must be

Session 1 - Investigating existing products

- Investigate electrical sensors such as light dependent resistors (LDRs), car alarms, fire alarms etc… and a range of switches such as push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches. To gain an understanding, ask the children to use each component to control a bulb in a simple circuit. Remind children about the dangers of mains electricity.
- Ask children to think about how the alarms are set off, what features do they have? How can they be used
- Using research, 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 e.g. 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?
- Children could research famous inventors related to the project e.g. Thomas Edison – light bulb.

Session 2 – Understanding Crumble

Session 3 - Recapping and testing out circuits

- Through teacher demonstration and explanation, recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products.
- Demonstrate and enable children to practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks.
- 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.
- Teach children how to avoid making short circuits.

Session 4 - Developing a product

- Develop an authentic and meaningful design brief with the children.
- Ask the children to generate innovative ideas by drawing on research and develop a design specification for their product, carefully considering the purpose and needs of the intended user.

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

Tips for teachers

- To ensure progression from Y3/4, children need to develop an understanding of 'monitoring' as well as control and the idea of 'input' as well as 'output'.
- This project should be undertaken soon after electricity is covered in science and programming, monitoring and control are undertaken in computing.
- Create a selection of images of existing products e.g. burglar alarm and outdoor security lighting, that use monitoring and control.
- Discuss the difference between products that rely upon timed events, such as traffic lights, and those that depend upon monitoring to make something happen such as a security alarm.
- Some children will be ready to use parallel circuits in their electrical systems and this enables two or more sensors or switches to be incorporated in their products.
- Have a 'working' circuit set up so that children can test suspect components.
- Some components e.g. buzzers and light emitting diodes (LEDs) need to be connected the right way round in a circuit, ensuring positive and negative match the poles of the battery.
- Make sure electrical components and batteries match e.g. 1.5v bulb with a 1.5v battery.
- Do not use rechargeable batteries.
- Use non-mercury tilt switches.

- Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output.
- Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.

Session 5 - Creating the product

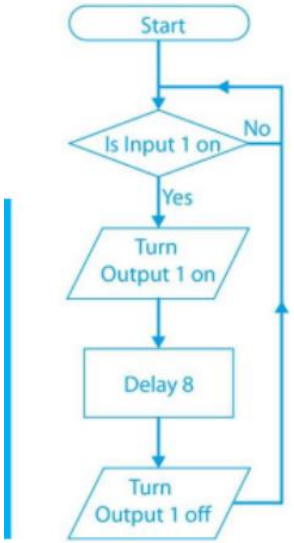
- Make high quality products, applying knowledge, understanding and skills learnt.

Session 6 - Evaluation

- Critically evaluate throughout and the final product, comparing it to the original design specification. Test the system to demonstrate its effectiveness for the intended user and purpose.

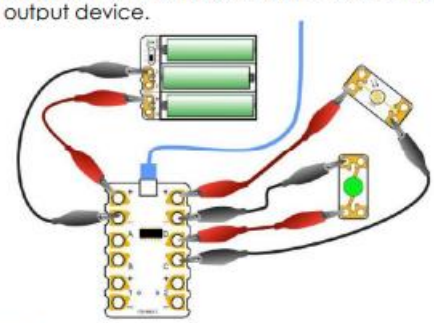
- **Micro-switch** – a switch that can operate as push-to-break switch or a push-to-make switch.
- **Push-to-break switch** – a switch turned off by pressing it.
- **Push-to-make switch** – a switch turned on by pressing it.
- **Reed switch** – a switch operated by a magnet.
- **Tilt switch** – a switch that works when tilted at an angle.
- **Toggle switch** – a switch operated when a lever is pressed.
- **Light dependent resistor (LDR)** – a sensor that operates when light is shined on it.

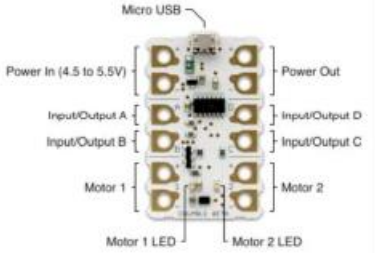
Example control program



Connecting up a Crumble

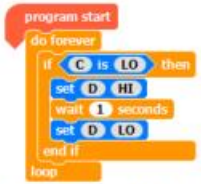
This arrangement is for an automatic nightlight, using a light dependent resistor (LDR) as the monitoring or input device and a light emitting diode (LED) as the output device.





Example programs for an automatic nightlight

The LED connected to output D switches on when it goes dark. Change the value of the LDR connected to terminal C so that the system is activated at different light levels.

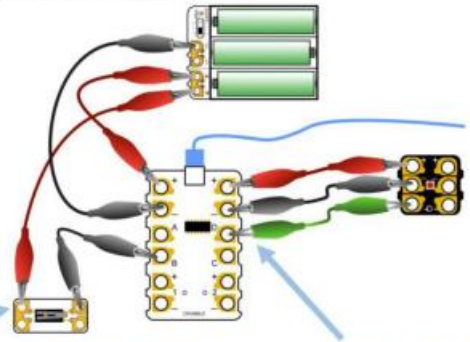


LED – connect +ve to D and -ve to Power Out

LDR – connect -ve to C and +ve to Power Out

An example program for an electronic toy moneybox

A sparkle LED is connected to the Crumble and changes from green to yellow to red every time a plastic coin is placed through the slot of the moneybox and depresses a micro switch connected to terminal B.



Connect the crocodile clips to 'common' and 'normally open' on the micro switch. Connect the +ve lead to a +ve

Use the 'D' output for sparkles.

Haveley Hey Knowledge Map

Year	6	Subject	DT	Unit	Textiles
Links to rights:		Trips/ Visitors			

Children will further develop their work on textiles by combining different types of materials to fit a design brief. They will create an accessory belt to take on an expedition up a mountain.

Prior Learning	Future Learning
• Joining 2 identical shape fabric to make a product • Different types of joins. • Patterns and seam allowances	

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
	• A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Fabrics can be strengthened, stiffened and reinforced where appropriate.	• Identify the wants, needs, preferences and values of particular individuals or groups. • Independently develop design criteria for a functional and appealing product that is fit for purpose, communicating ideas clearly in a variety of ways. • Model ideas using prototypes and pattern pieces	• Select the most appropriate materials for tasks & frameworks for different structures; explaining what makes them strong showing an understanding of their working characteristics e.g. their flexibility, waterproofing, appearance, availability • Develop joining & finishing techniques- selecting equipment & developing sewing skills (sewing needles and sewing machine). • Joining right sides by making seams, sewing curved edges, tacking & attaching wadding. Where possible use sewing equipment, work within constraints of time, resources and costs • Produce detailed lists of equipment and fabrics relevant to their tasks.	• Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. • Investigate and analyse textile products linked to their final product. •

What pupil's need to know:

Key Learning	Vocab

Design Brief: Create a bag/ belt for a mountain rescue team member.

Possible design criteria- must have a waterproof pouch, must have a space for first aid kit, must be visible in the dark

Session 1 - Investigating existing products

- Children 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. Use questions to develop children's understanding e.g. Is the product functional or decorative? Who would use this product? What is its purpose? What design decisions have been made? What components have been used to enhance the appearance? To what extent is the design innovative?
- Children investigate and analyse how existing products have been constructed. Children 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.

Session 2 - Exploring different textiles and stitches

- Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles.
- Develop skills of threading needles and joining textiles using a range of stitches. This activity must build upon children's earlier experiences of stitches e.g. improving appearance and consistency of stitches and introducing new stitches. If available, demonstrate and allow children to use sewing machines to join fabric with close adult supervision.
- Develop skills of sewing textiles by joining right side together and making seams. Children should investigate how to sew and shape curved edges by snipping seams, how to tack or attach wadding or stiffening and learn how to start and finish off a row of stitches.

Session 3 - Developing patterns

- Develop skills of 2-D paper pattern making using grid or tracing paper to create a 3-D dipryl mock-up of a chosen product. Remind/teach 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

Tier 2	Tier 3
reinforce, right side, wrong side, design criteria, annotate, design decisions, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype	seam, seam allowance, pins, wadding, hem, template, pattern pieces name of textiles and fastenings used, needles, thread, pinking shears, fastenings, iron transfer paper

Tips for teachers

- Investigate using materials other than fabrics e.g. for handles. Plastic bags can be cut into strips and plaited.
- To make the activity more manageable, limit the choice of decorating techniques.
- Make sure that you have plenty of pins and needles for children to use.
- Arrange zones in the class where children will find materials and resources.
- Ensure children have a basic understanding of stitching techniques, threading needles, starting and finishing off.
- Make mock-ups, then alter and refine and go back to initial design ideas to amend as necessary

on the computer to design prints that can be applied to textiles using iron transfer paper.

Session 4 - Designing the product

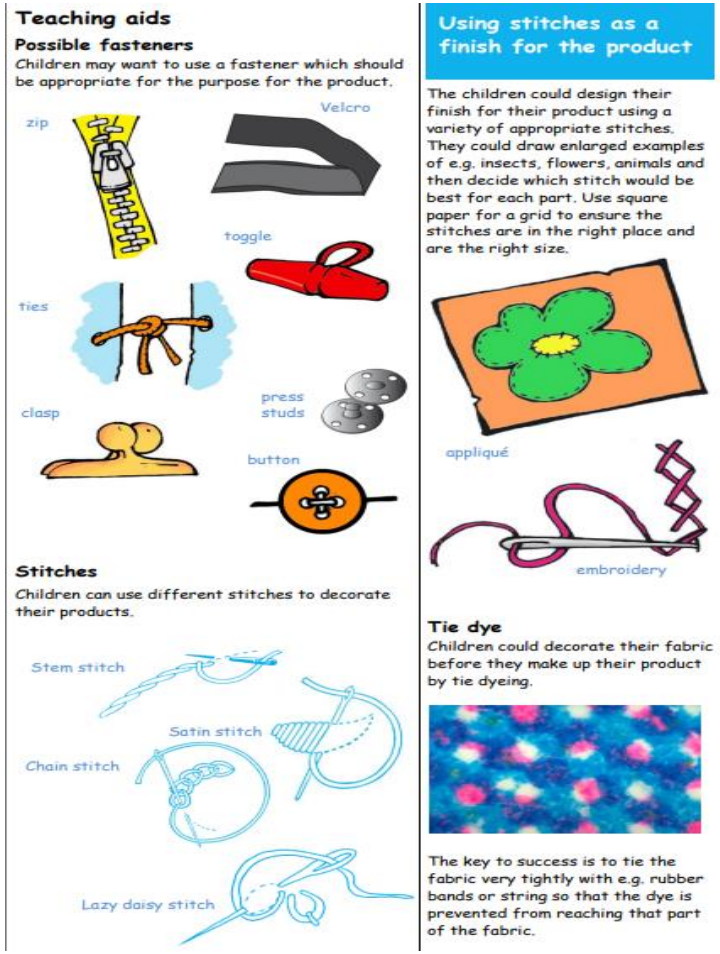
- Set an authentic and meaningful design brief. Children generate ideas by carrying out research using e.g. surveys, interviews, questionnaires and the web. Children develop a simple design specification for their product.
- Communicate ideas through detailed, annotated drawings from different perspectives and/or computer aided design. Drawings should indicate design decisions made, the methods of strengthening, the type of fabrics to be used and the types of stitching that will be incorporated.
- Produce step-by-step plans, lists of tools, equipment, fabrics and components needed. Allocate tasks within a team if appropriate.

Session 5 - Making the product

- Make high quality products applying knowledge, understanding and skills from IEAs and FTs. Incorporate simple computer-aided manufacture (CAM) if appropriate e.g. printing on fabric. Children use a range of decorating techniques to ensure a well-finished final product that matches the intended user and purpose.

Session 6 - Evaluation

- Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for intended user and purpose, considering others' opinions. Communicate the evaluation in various forms e.g. writing for a particular purpose, giving a well-structured oral evaluation, speaking clearly and fluently.



Haveley Hey Knowledge Map

Year	6	Subject	DT	Unit	Cooking and nutrition
Links to rights:			Trips/ Visitors		

Children will develop work on seasonality and where food comes from and will design a meal using only fair trade products.

Prior Learning	Future Learning
• Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. • Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.	

Threshold Concepts (disciplinary knowledge)

Cooking & Nutrition	Technical Knowledge	Designing	Making	Evaluating
• To be able to follow a recipe, research existing products, plan ingredients and visit supermarkets to source food • Understand how organic produce is grown. • Know how to use utensils and equipment including heat sources to prepare and cook food. • Understand about seasonality in relation to food products and the source of different food products, including fair trade.	• Know and use relevant technical and sensory vocabulary.	• Write a step-by-step recipe, including a list of ingredients, equipment and utensils • Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.	• Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. • Make, decorate and present the food product appropriately for the intended user and purpose.	• Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. • Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. • Understand how key chefs have influenced eating habits to promote varied and healthy diets.

What pupil's need to know:

Key Learning	Vocab	
	Tier 2	Tier 3

Design Brief: Create a healthy meal using fair trade products which takes into account the range of cultures in our class.

Session 1 - Investigating and researching existing products

- Children survey the types of cultural food that children eat. Where possible ask parents to make some traditional food for children in class to try (consent form needed for children to try)
- Children 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. e.g. 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?
- Research key chefs and how they have promoted seasonality, local produce and healthy eating

Session 2 - Evaluating existing products

- Children 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.
- Use a range of questions to support children's ability to evaluate food ingredients and products e.g. What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product?

Session 3 - Designing the product

- Develop a design brief and simple design specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating.
- Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.
- Ask children to generate a range of ideas encouraging innovative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's product.

design specification, innovative, research, evaluate, 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

Sensory evaluation

When carrying out sensory evaluations of products and/or separate ingredients, begin with a whole class activity then use group work to develop ideas.

Example of a recording table:

Type of cultural/seasonal food product	Appearance	Smell	Texture	Taste
Savoury scone	Golden/rough	Fresh/baked	Crumbly	Cheesy

- Children can also use simple ranking and rating tables as well as star diagrams.
- Use packaging and/or the internet to find out about the nutritional content of the food products and the ingredients.
- Link this to the principles of a healthy and varied diet.
- Edible plants grown in the school grounds can also be evaluated and considered as potential ingredients for products the children will later design, make and evaluate.

- Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.

Session 4 - Practising different techniques

- Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients.
- Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically.
- Techniques could be practised following a basic recipe to prepare and cook a savoury food product.
- Ask questions about 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 e.g. Which shape is most appealing and why?

Session 5 - Making the product

- Ask children to record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt.

Session 6 - Evaluation

- Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

Tips for teachers

- When rubbing in flour and fat, keep ingredients and hands cool.
- The purpose of kneading bread is to strengthen the gluten (the protein in grain such as wheat). It normally takes about 10-12 minutes by hand. When ready the dough will be smooth, elastic and hold its shape.
- When developing a product e.g. soup, that requires chopping and slicing of ingredients refer to the Y3/4 Food Project Planner.
- Limit the number of ingredients added to the basic recipe and discuss when is the best time to add the new or changed ingredient(s).
- Emphasise the importance of accurate weighing and measuring.
- Some supermarkets and bakeries will allow children to visit.
- This could be linked to an enterprise project with a class-based food company.
- Children could design packaging for their food products as part of work on structures linked to mathematics.
- Carry out a survey to find out which cultural/seasonal food products are preferred by family and friends.