

Design Technology



Holywell C of E Primary School

Flowing, Strengthening, Deepening

INTENT

At Holywell, we use our school vision, *Flowing, Strengthening, and Deepening*, to guide our design technology intent:

- **Flowing** – gaining competency in the use of basic tools and skills, knowledge of key mechanisms and an understanding of research, design and evaluation.
- **Strengthening** – developing competency over time so that use of basic skills, the complexity of key mechanisms and the ways in which research, design and evaluation are carried out become more thorough and demanding.
- **Deepening** – integrating key knowledge from other subjects, particularly science, into our projects at every stage of development.

Our own curriculum is based on the National Curriculum for DT which states that:

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

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










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




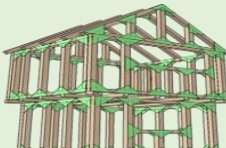

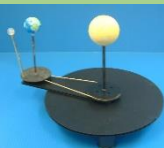



We want to provide the children with the opportunities to develop and extend skills and an opportunity to express their individual interests, thoughts and ideas. We want them to have no limits on what their ambitions are and grow up aspiring to be architects, graphic designers, chefs, or carpenters. The DT curriculum has been carefully crafted so that our children develop their design and technology capital. We want to engage, inspire and challenge pupils, equipping them with the knowledge and skills to experiment, invent and create their own designs. As pupils progress, they should be able to think critically and develop a more rigorous understanding of DT. Pupils need opportunities to learn about the designers, architects, and engineers who have shaped our world. Over time, our intention is that the children's skills in DT progress, and we feel this is evident in the increasing complexity of the projects that our children undertake in DT.

IMPLEMENTATION

1. The Long-Term Plan

Our DT curriculum is organised around three 'strands': 'Structures and Electricity', 'Food', and 'Mechanisms'. A unit of each strand is taught in each year group. The 'Structures and Electricity' strand is studied in the Autumn Term. Children learn to safely construct structures using a variety of tools and joining techniques and incorporating measurement skills from Mathematics. AS the years progress, these 'structures' units being to incorporate electrical components, reinforcing the children's science learning by providing practical application contexts. The 'Food' strand is studied in the Spring Term. In each unit, the children are reminded of the importance of eating a healthy balanced diet, and dive a bit deeper into the science of food and nutrition. The children design a balanced healthy dish. In Summer Term, DT learning moves onto 'mechanisms', designing purposeful and attractive projects incorporating different mechanisms. Our DT Long Term Plan is as follows:

	Autumn <i>Strand 1: Structures and Electricity</i>	Spring <i>Strand 2: Food</i>	Summer <i>Strand 3: Mechanisms</i>
EYFS	<ul style="list-style-type: none"> • Use a range of small tools, including scissors, paintbrushes and cutlery. • 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. 		
Y1	Freestanding Structures 	Sandwiches and Toasties 	Slides and Levers 
Y2	Freestanding Structures 	Salads 	Wheels and Axels – Fire Engines 
Y3	Shell Structures 	Cup Cakes 	Pneumatics – Moving Monsters 

	Autumn <i>Strand 1: Structures and Electricity</i>	Spring <i>Strand 2: Food</i>	Summer <i>Strand 3: Mechanisms</i>
Y4	Electrical Components 	Healthy Pizzas 	Leavers and Linkages – Catapults 
Y5	Frame Structures 	Pasta Dishes 	Pulleys and Gears – Orreries 
Y6	Electrical Components 	Baking 	CAMS – Moving Toys 

2. The Key Concepts in DT

D1: R&D

Research and design as a key concept is the foundation upon which DT is based. Before the children can make and evaluate a product, they first need to develop design criteria for the product they want to make, create a technical drawing of it, or develop a prototype. Before this happens, the children need to research and identify examples upon which their own products are based.

D2: Making

Making refers to the practical task of creating a working model of their design. It has strong links to other STEM subjects, such as Science and Maths. The need to carefully measure materials and ensure they are the right shape before joining them together provides plentiful opportunity to practice measurement and geometry skills and reinforce their mathematics learning in these areas. Additionally, DT provides many opportunities to incorporate a wide variety of science learning including forces, magnetism, electricity and light. As part of making, the children will learn how to safely use a variety of tools such as hot glue guns, saws, hammers and drills, as well as a range of techniques to join and strengthen materials.

D2: Evaluating


Evaluating provides an opportunity to reflect on the product they have made. They can identify how well it matches their original design, as well as how well the product itself functions in reality and fulfils the design criteria. It also provides children the opportunity to reflect on the making process and identify things that went well, and things that they would do differently to improve the process if they were to do it again.


D4: Nutrition

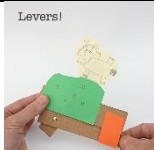
Food forms a key part of DT and the principles of healthy nutrition and a balanced diet is a key concept the children will return in each of their food units, delving a little bit deeper each time into the different food groups, the different benefits each one provides, which ones we should eat more of and those which we need less of. The children will be encouraged to reflect on their own diets and identify how well they are adhering to the principles of a balanced diet.

3. Unit Overviews

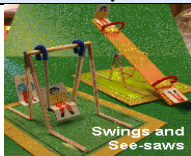
Year 1


Freestanding Structures – Autumn Term	
Final Outcome	Example
See-saws Link	
LOs and Key Concepts	
1	To gather examples of seesaws and assess them against a given design criteria (D1).
2	Design a seesaw using annotated drawings using a design criteria and list of available resources (D1).
3	To use a range of simple tools and everyday materials to make a seesaw (D2).
4	
5	To finish their product using techniques from art and design (D2).
6	To evaluate their final product, identifying what they like about their product and what they could improve, as well as what went well and what was difficult when making (D3).
Key Outcomes	
The children will gather a range of pictures of playground seesaw sets to create an image board. They will assess the pictures they find to see how the pre-existing products meet a given design criteria. They will then use this criteria, as well as a list of available resources to design their own seesaw using annotated drawings. The children will then make their produce, using simple tools and everyday materials and basic skills such as measuring, cutting and joining using glue or masking tape. They will decorate it appropriately before evaluating their product to explain what they like and what they would improve about it and what was easy/difficult about the making process.	
Vocabulary	
Structure, Research, Design, Evaluation, Diagram, Materials, Properties, Pivot, Hinge, Tools	


Food – Spring Term	
Final Outcome	Example
Sandwiches and Toasties	
LOs and Key Concepts	
1	To understand that our food is grown (vegetables, fruits), reared (cows, pigs, chickens) or caught (fish).
2	To understand how to use a knife safely and to practice chopping, cutting and spreading skills using a knife.
3	To understand how to use a knife safely and to practice chopping, cutting and spreading skills using a knife.
4	To design and write a recipe for a sandwich using a range of different ingredients and a given criteria.
5	To make a sandwich using competent knife skills such as cutting, shopping and spreading.
6	To taste and evaluate a range of different sandwiches against given criteria.
Key Outcomes	
The children will begin by looking at where our food comes from, identifying that we are omnivores and sit within a food chain like other animals, but that we grow or rear our food on farms or catch it. They will match different foods to different animals and identify key crops and vegetables that are grown in this country. The children will then learn how to use knives safely by practicing cutting, chopping and spreading skills on a range of different foods. Following this, the children will design a sandwich that has a range of ingredients using a given criteria, before making it safely and then evaluating them against the criteria.	
Vocabulary	
Grown, Reared, Caught, Farming, Crops, Vegetables, Poultry, Meat, Fish, Fishing, Knife, Chopping, Cutting, Spreading, Design, Research, Evaluation, Ingredients, Method, Equipment, Diagram	

Slides and Leavers – Summer Term	
Final Outcome	Example
Moving Pictures	
LOs and Key Concepts	
1	To explore and evaluate a range of books with moving parts and flaps.
2	To explore how to use a simple slider mechanism to make a picture move.
3	To explore how to use a simple lever mechanism to make a picture move.
4	To design a page of a picture book using a simple slider and lever mechanism to make a picture move, using a design criteria.
5	To make a page of a picture book using a simple slider and lever mechanism to make a picture move.
6	To evaluate a picture book against the design criteria to think about what worked well and what could be done differently.
Key Outcomes	
The children will begin by looking at a range of different books that have 'moving parts' and thinking about how they work include flaps, leavers and spinning wheels. They will then explore creating prototypes of these different mechanisms (sliders, simple levers with pivots and wheels) using everyday materials. Using a class book as inspiration, the children will be each be given a page from the book to recreate incorporating a slider, lever or spinning wheel. They will design the page first using a given criteria by drawing a labelled diagram, before making their own individual pages and combining them together to make a class book. They will then evaluate what worked well and what could be even better if done differently.	
Vocabulary	
Research, Design, Evaluation, Diagram, Lever, Slider, Wheel, Flap, Hinge, Pivot, Tools, Materials, Properties, Mechanism	


Year 2


Freestanding Structures – Autumn Term	
Final Outcome	Example
Swing Set Link	 Swings and See-saws
LOs and Key Concepts	
1	To gather examples of swing sets and assess them against a given design criteria (D1).
2	Design a seesaw using annotated drawings using a design criteria and list of available resources (D1).
3	To explore different ways of strengthening a freestanding structure (D2).
4	To use a range of simple tools and everyday materials to make a swing set. (D2).
5	To finish their product using techniques from art and design (D2).
6	To evaluate their final product, identifying what they like about their product and what they could improve, as well as what went well and what was difficult when making (D3).
Key Outcomes	
The children will gather pictures of a range of different swing sets and assess them against a given design criteria. They will use these pre-existing products to design their own swing set. They will then use everyday materials to make a prototype and practice strengthening their swing set so that it stays upright. They will then use a range of basic tools and materials to make their swing sets, and finish them to make them attractive. They will then evaluate their produce to decide what could be improved and what went well and what could be improved when they made it.	
Vocabulary	
Structure, Research, Design, Evaluation, Diagram, Materials, Properties, Pivot, Hinge, Tools	


Food – Spring Term	
Final Outcome	Example
Salads	
LOs and Key Concepts	
1	To understand how to name and sort foods into the five groups in the 'eat well' plate.
2	To understand how to use a knife safely and to practice chopping, cutting and spreading skills using a knife.
3	To understand how to use a peeler and grater safely and to practice peeling and grating skills.
4	To use the principles of the 'eat well' plate to design a healthy salad using a design criteria.
5	To make a salad using competent knife skills such as cutting, shopping and spreading and peeling and grating skills.
6	To taste and evaluate a range of different salads against a given criteria.
Key Outcomes	
The children will begin by exploring the 'eat well' plate by sorting foods into the five different categories and identifying which ones we should eat more of, and the ones that we should eat in moderation. They will then recap how to use a knife safely, before being introduced to grater and peeler, learning how to use these safely before practicing grating and peeling a range of different foods. The children will then design a healthy salad thinking about including all five food groups in proportion to how much of them we should eat, but also thinking about presentation. They will then make the food using knives, graters and peelers before tasking and evaluating them against the design criteria.	
Vocabulary	
Grown, Reared, Caught, Farming, Crops, Vegetables, Poultry, Meat, Fish, Fishing, Food Groups (Fruit and Vegetables; Potatoes, Bread, Rice, Pasta and other Starchy Carbohydrates; Dairy; Oils and Spreads; Beans, Pulses, Fish, Eggs and Meats) Knife, Peeler, Grater, Chopping, Cutting, Spreading, Peeling, Grating, Design, Research, Evaluation, Ingredients, Method, Equipment, Diagram	

Wheels and Axels – Summer Term	
Final Outcome	Example
Cars Link	 Fire Engine
LOs and Key Concepts	
1	To explore a range of toy cars and identify the wheels and axels, understanding that 'real' cars use these too.
2	To practice creating wheels and axels out of everyday materials.
3	To use annotated drawings to design a car using a given design criteria
4	To following a design criteria to make a car using wheels and axels.
5	
6	To evaluate a car against the original design criteria to identify what worked well and what could be improved.
Key Outcomes	
The children will look at a range of different toy cars and explore how the wheels work by being attached to axels and turning in unison, before identifying that 'real' cars work on a similar principle. They will then make prototype wheels and axels and using everyday materials to explore how they work more thoroughly. They children will then work from a given design criteria to design their own car by drawing a labelled diagram. They will then make the car incorporating a chassis sitting on a pair of wheels and axels, and finishing it by decorating it appropriately according to their design. They will then evaluate their car by thinking about what they like about it and what worked well, and what could be improved.	
Vocabulary	
Wheel, Axel, Chassis, Platform, Base, Research, Design, Evaluation, Tools, Materials, Properties, Diagram, Mechanism	


Year 3


Shell Structures – Autumn Term	
Final Outcome	Example
Magnetic Maze Game	
LOs and Key Concepts	
1	Gather examples of magnetic maze games using a range of source, and use them to create a design criteria (D1).
2	Design a magnetic maze using annotated drawings, making measurements clear (D1).
3	Create a prototype maze using everyday materials and adjust designs to take account of findings (D1).
4	Use a range of tools, materials and skills to create a magnetic maze game (D2).
5	Use a range of materials to finish the design of the magnetic maze game (D2).
6	Evaluate the final produce making reference to the original design criteria and assess what went well and what could be improved (D3).
Key Outcomes	
The children will use a range of sources including catalogues and the internet to create a concept board of different magnetic maze games, they will use these pre-existing examples to generate a design 'success' criteria. Following on from this, they will use annotated drawings to design their maze and will make a prototype using everyday materials to 'test' their design, adjusting them as necessary. They will then use a range of tools, materials and skills to make their maze, before finishing them with a suitable design. To finish, they will evaluate the maze by referring back to the original design and design criteria as well as identifying what went well and what could be improved in the 'make' process.	
Vocabulary	
Shell Structure, Saw, Glue Gun, Health and Safety, Precaution, Research, Design, Evaluation, Magnet, Magnetic, Tools, Materials, Properties	


Food – Spring Term	
Final Outcome	Example
Cup Cakes	
LOs and Key Concepts	
1	To understand that cakes are treats and explore the consequences on the body of too much sugar intake.
2	To practice measuring skills using a range of measuring devices and ingredients.
3	To practice mixing, whisking and sieving skills using a range of kitchen tools and ingredients.
4	To develop a design criteria for a cupcake and design a cupcake accordingly.
5	To bake cupcakes using measuring, mixing, whisking and sieving skills.
6	To taste and evaluate a range of different cupcakes against the design criteria.
Key Outcomes	
The children will begin the unit by identifying sugar and fats such as butter as key ingredients in sweet foods like cakes and exploring the effects on the human body of too much sugar intake. The children will then practice measuring ingredients such as flour, sugar and butter using a range of different scales, before moving on to practice mixing, whisking and sieving ingredients using a range of simple kitchen tools. The children will then explore a range of different cupcakes, and use this to develop a success criteria for their own before designing using labelled diagrams. Following this, the children will follow a simple recipe to make their own cupcakes using the measuring, mixing, whisking and sieving skill they have practiced. They will then taste and evaluate their own cupcakes and others against their original design and design criteria.	
Vocabulary	
Research, Design, Evaluation, Recipe, Ingredients, Method, Sugar, Obesity, Decay, Disease, Sieve, Whisk, Bowl, Mix, Bake, Oven	

Pneumatics – Summer Term	
Final Outcome	Example
Moving Monsters Link	
LOs and Key Concepts	
1	To understand what pneumatics is, and identify the use of pneumatics in real world contexts.
2	To make and explore a range of simple pneumatic devices and understand how they work.
3	To explore using connected syringes to make an object open and close.
4	To create a design criteria for a pneumatic monster toy and use annotated drawings to create a design.
5	To follow instructions to make a pneumatic moving monster toy, using the design criteria to help.
6	To evaluate a moving monster toy against the design criteria to assess what went well, and what could be improved.
Key Outcomes	
The children will begin by exploring what 'pneumatics' and explore their application in a range of real life contexts ranging from a balloon pump to industrial machinery. They will then explore a range of simple pneumatic devices such as 'rocket straws' or balloon powered cars, before looking at how connected syringes can be used to make an object open and close or move. Following this the children will look at pneumatic 'moving monsters' and create a design criteria for their own monster which they will then design using a labelled or exploded diagram. They will then follow instructions carefully to make their own pneumatic moving monster before evaluating their own and others against their design criteria.	
Vocabulary	
Research, Design, Evaluation, Diagram, Product, Toy, Pneumatics, Mechanism	

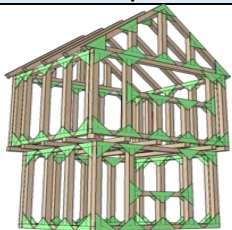
Year 4


Electrical Components – Autumn Term	
Final Outcome	Example
Steady Hand Game Link	
LOs and Key Concepts	
1	Gather examples of steady-hand buzzer games using a range of sources, and use them to create a design criteria (D1).
2	Design a steady-hand buzzer game using annotated drawings, thinking about how to make theirs unique/different from pre-existing examples (D1).
3	Re-cap simple series circuits and explain how these will be integrated into the design (D1).
4	Use a range of tools, materials and skills to create a steady hand buzzer game integrating electronic components (D2).
5	Use a range of materials to finish the design of the steady-hand buzzer game (D2).
6	Evaluate the final produce making reference to the original design criteria and assess what went well and what could be improved (D3).
Key Outcomes	
The children will use a range of sources including catalogues and the internet to create a concept board of different steady-hand buzzer games, they will use these pre-existing examples to generate a design 'success' criteria. They will then think about a unique selling point to set theirs apart from pre-existing examples. Following on from this, they will use annotated drawings to design their maze and will recap simple series circuits, explaining how this will be incorporated into the design. They will then use a range of tools, materials and skills to make their maze, before finishing them with a suitable design. To finish, they will evaluate their games by referring back to the original design and design criteria as well as identifying what went well and what could be improved in the 'make' process.	
Vocabulary	
Series Circuit, Component, Buzzer, Battery, Cell, Wires, Wire Strippers, Conductor, Insulator, Research, Design, Diagram, Evaluate	

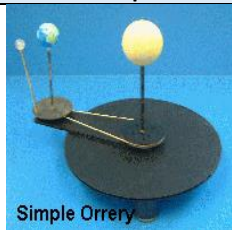
Food – Spring Term	
Final Outcome	Example
Healthy Pizzas	
LOs and Key Concepts	
1	To understand the nutrients provided by the main food groups, such as calcium, proteins and carbohydrates, and their function and importance.
2	To practice chopping, cutting and spreading skills using a knife with increasing confidence and ability.
3	To practice peeling and grating skills with increasing confidence and ability.
4	To develop a success criteria, and use the principles of the 'eat well' plate, to design a 'healthy' pizza
5	To use a range of chopping, cutting, slicing, peeling and grating skills to make a healthy pizza.
6	To taste and evaluate a range of healthy pizzas against the design criteria.
Key Outcomes	
The children will begin the unit by re-visiting the eat well plate and will identify the key nutrients and molecules (carbohydrates, proteins and vitamins etc ...) provided by each of the different food groups, before recapping the ones we need more of and the ones we need in moderation. The children will then recap the chopping, cutting, slicing, peeling and grating skills they have practiced in earlier year groups. Following this, the children will explore a range of different pizza ingredients and recipes and will develop a design criteria based off of these, before using this criteria and the eat-well plate to design a 'healthy pizza'. They will then use their skills to make one from scratch using puff pastry, before tasting both their own and other's pizzas and evaluating them against the original design criteria.	
Vocabulary	
Nutrients, Protein, Carbohydrates, Fibre, Calcium, Fats, Vitamins, Enzymes, Function, Grown, Reared, Caught, Farming, Crops, Vegetables, Poultry, Meat, Fish, Fishing, Food Groups (Fruit and Vegetables; Potatoes, Bread, Rice, Pasta and other Starchy Carbohydrates; Dairy; Oils and Spreads; Beans, Pulses, Fish, Eggs and Meats) Knife, Peeler, Grater, Chopping, Cutting, Spreading, Peeling, Grating, Design, Research, Evaluation, Ingredients, Method, Equipment, Diagram	

Levers and Linkages – Summer Term	
Final Outcome	Example
Catapults Link	
LOs and Key Concepts	
1	To explore pictures of different catapults and explain how they use scientific vocabulary.
2	Design a catapult using annotated drawings and scientific knowledge to explain how it will work.
3	To create a prototype catapult mechanism using everyday materials.
4	To practice measuring out wood and using a hand saw safely to cut it.
5	To follow instructions to make a catapult, using the design to help guide the process.
6	To evaluate a catapult against the design criteria to assess what works well, and what could be improved.
Key Outcomes	
The children will explore images of different catapults and think about how these work using their knowledge of forces and scientific vocabulary, constructing an explanation for this. They will then design their own catapult using this knowledge by drawing exploded diagrams, incorporating wheels, axels and the lever and linkage catapult mechanism. The children will then create prototype catapult mechanisms using everyday materials before practicing measuring and sawing wood safely using a hand saw, before following instructions to make a catapult based on their design. They will then evaluate the catapult based on their designs for things that worked well, and things that they feel could be improved.	
Vocabulary	
Wheels, Axels, Chassis, Lever, Force, Resistance, Release, Energy, Tools, Materials, Properties	

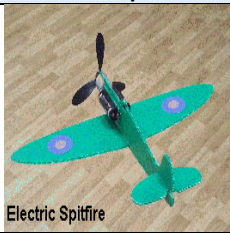
Year 5


Frame Structures – Autumn Term	
Final Outcome	Example
2-Story House	
LOs and Key Concepts	
1	Gather existing examples of houses and create a design criteria of things to include in a 'dream' house (D1).
2	Design the dream house using an exploded diagram for the shell and a separate design for the finish (D1).
3	Create a prototype shell structure using everyday materials and investigate how to strengthen the structure so it remains stable, adjust design to take account of any findings (D1).
4	Use a range of tools, everyday materials and accurate measuring and cutting skills to create a frame structure for the 2-story dream house (D2).
5	Use a range of decorative techniques from art and design to finish the 2-story dream house (D2).
6	Evaluate the finished house against original design criteria and take account of other's feedback to evaluate the project (D3).
Key Outcomes	
The children will gather examples of luxury 'dream' houses and use these to create a design criteria for their own. They will then create designs using exploded diagrams with clear measurements thinking about scaling actual measurements down, they will then take feedback on the designs and adjust them accordingly. The children will then create a model frame structure out of everyday materials and investigate how to strengthen the structure so that it is stable. They will then use tools, materials and techniques to construct and decorate the frame structure before evaluating it against the original design criteria the set.	
Vocabulary	
Frame Structure, Saw, Glue Gun, Health and Safety, Precaution, Research, Design, Evaluation, Tools, Materials, Properties	

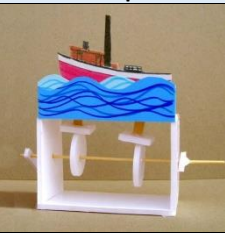
Food – Spring Term	
Final Outcome	Example
Pasta Dishes	
LOs and Key Concepts	
1	To evaluate a range of recipes using our knowledge of healthy nutrition to decide if they are 'balanced'.
2	To use a range of kitchen tools well to slice, chop, cut, peel and grate with a high level of skill.
3	To understand how a hob works and the science involved in boiling food and frying food.
4	To develop a success criteria, and use the principles of the 'eat well' plate, to design a healthy pasta dish.
5	To use a range of chopping, cutting, slicing, peeling, grating and boiling to make a healthy pasta dish.
6	To taste and evaluate a range of healthy pasta dishes against the design criteria.
Key Outcomes	
The children will begin by looking at a range of recipes and will use their knowledge of nutrition and the eat-well plate to decide if they are healthy or balanced. They will then recap how to use a range of kitchen tools safely to cut, chop, slice, peel and grate, demonstrating their ability to do this with a high level of skill. Following this, they will look at the cooking technique of boiling and think about this in the context of their knowledge of reversible and irreversible changes. They will then peruse a range of pasta dishes, generating their own success criteria and recipes based off of these, before using the developing cook skills to make it independently. Finally, they will finish the unit by tasting and evaluating both their own and other's pizzas against the success criteria.	
Vocabulary	
Nutrients, Protein, Carbohydrates, Fibre, Calcium, Fats, Vitamins, Enzymes, Function, Grown, Reared, Caught, Farming, Crops, Vegetables, Poultry, Meat, Fish, Fishing, Food Groups (Fruit and Vegetables; Potatoes, Bread, Rice, Pasta and other Starchy Carbohydrates; Dairy; Oils and Spreads; Beans, Pulses, Fish, Eggs and Meats) Knife, Peeler, Grater, Chopping, Cutting, Spreading, Peeling, Grating, Design, Research, Evaluation, Ingredients, Method, Equipment, Diagram	

Pulleys and Gears – Summer Term	
Final Outcome	Example
Orreries Link	
LOs and Key Concepts	
1	To explore Orreries and their history, and identify and explain how they work using pulleys and gears.
2	To explore how a pulley and gear system works by creating a prototype.
3	To use annotated exploded diagrams to design an orrery.
4	To follow instructions to make an orrery using the design as a guide.
5	Use a range of techniques from art and design to decorate the orrery.
6	To evaluate the finished orrery against original design criteria and take account of other's feedback to evaluate the project.
Key Outcomes	
The children will begin the unit by exploring what an orrery is, the history behind them, and how they work using pulley and gear mechanisms, they will link this to their knowledge of forces from science. Following on from this, the children will create prototype pulley and gear mechanisms using kits to explore how the mechanism works in more detail. Following this, the children will design their own orrery, perhaps for their own solar system, using exploded diagrams and written explanations. The children will then follow the instructions to make an orrery using their design to guide this process, before decorating it and evaluating it against their original design intentions, and using feedback from others, to decide what went well, and what could be improved.	
Vocabulary	
Gear, Pulley, Force, Rotate, Orrery, Earth of Orrery, Mechanism	

Year 6

Electrical Components – Autumn Term	
Final Outcome	Example
Fan Powered Aeroplane Link	
LOs and Key Concepts	
1	Gather pictures of WW2 Spitfire and use these to generate a design criteria for their own model aircraft (D1).
2	Use exploded diagrams to create a design of the model spitfire including decoration, explaining it fully (D1).
3	Re-cap simple series circuits and explain how these will be integrated into the design (D1).
4	Use a range of tools, materials and skills to create the Spitfire (D2).
5	Use a range of materials to finish the design of the Spitfire (D2).
6	Evaluate the final produce making reference to the original design criteria and assess what went well and what could be improved (D3).
Key Outcomes	
The children will research the WWII Supermarine Spitfire and use research to create a design criteria for their own. They will then design their own using exploded diagrams including designing the finish. They will then recap simple series circuits and explain how this is to be incorporated into the product. They will then use a range of techniques, tools and materials to create the produce, as well as using skills from art and design to finish it to a high standard in RAF style design. They will then evaluate the product against the original design criteria.	
Vocabulary	
Series Circuit, Component, propeller, Battery, Cell, Wires, Wire Strippers, Conductor, Insulator, Research, Design, Diagram, Evaluate, Aerodynamics, Thrust, Airfoil, Lift	

Food – Spring Term	
Final Outcome	Example
Baking	
LOs and Key Concepts	
1	To understand that cakes are treats and recap the consequences on the body of too much sugar intake.
2	To understand the economics and environmental impact of the agriculture and food industry.
3	To practice measuring, mixing, whisking and sieving skills using a range of kitchen tools and ingredients with a high level of skill.
4	To develop a design criteria for a layered cake and design one accordingly.
5	To bake a layered cake using measuring, mixing, whisking and sieving skills to a high level.
6	To taste and evaluate a range of different cakes against the design criteria.
Key Outcomes	
The children will begin the unit by recapping their learning from year 3, identifying sugar and fats such as butter as key ingredients in sweet foods like cakes and exploring the effects on the human body of too much sugar intake. The children will then practice measuring ingredients such as flour, sugar and butter using a range of different scales, before moving on to practice mixing, whisking and sieving ingredients using a range of simple kitchen tools. They will demonstrate their ability to do this to a high level. The children will then explore a range of different two-story cakes, and use this to develop a success criteria for their own before designing using exploded diagrams. Following this, the children will follow a simple recipe to make their own two-story cake, using the measuring, mixing, whisking and sieving skill they have practiced. They will then taste and evaluate their own cupcakes and others against their original design and design criteria.	
Vocabulary	
Research, Design, Evaluation, Recipe, Ingredients, Method, Sugar, Obesity, Decay, Disease, Sieve, Whisk, Bowl, Mix, Bake, Oven	

CAMS – Summer Term	
Final Outcome	Example
Moving Toys Link	
LOs and Key Concepts	
1	To explore a range of different CAMS mechanisms and identify how the different shapes translate into different movements.
2	To use their knowledge of CAMS mechanisms to design a moving toy incorporating other's feedback and using annotated diagrams and written explanations.
3	To create a prototype moving toy incorporating a CAM mechanism using everyday materials, and adjust the design accordingly.
4	To follow the adjusted design criteria to make a moving CAM toy.
5	To evaluate the finished moving toy against original design criteria and take account of other's feedback to evaluate the project.
Key Outcomes	
The children will begin the unit by exploring what a Cam is and how the different shapes of the Cam affect the movement they create. They will then use their knowledge of different Cam shapes to design a toy based around the movement they generate. They will gather ideas from a range of sources to inform their design, and created exploded diagrams and written explanations to convey their designs fully. The children will then create a prototype of their design using everyday materials and adjust their designs to take into account their findings, before creating, decorating and evaluating the final product. They will evaluate against their original design criteria, and take feedback from others.	
Vocabulary	
Cam, Mechanism, Rotate, Axel, Wheel	

4. Progression

	KS1	LKS2	UKS2
Research	Collect examples of existing products using a range of sources such as the internet or catalogues, and identify how they meet a given design criteria.	Collect examples of existing products using a range of sources such as the internet or catalogues, or physical examples , and use these to self-generate a design criteria.	Collect examples of existing products using a range of sources such as the internet or catalogues, or physical examples, and use these to self-generate a design criteria. Additionally, use questionnaires and other sources to identify 'client requirements', and use these to generate a design criteria.
Design	Use annotated drawings and verbal explanations to communicate design ideas that include: how their products work, who their product is for, and how the product meets the user's requirements. Include the tools and materials that they will need to create their product. Create templates and models using everyday resources to test designs.	Use annotated drawings and cross sectional diagrams and verbal explanations to communicate design ideas that include: how their products work, who their product is for, and how the product meets the user's requirements. Include the tools and materials that they will need to create their product. Create templates and models using everyday resources to test designs. Explain how designs will be adapted to take account of findings. Explain how their design ideas link to aspects of science, by explaining, for example, how a designed meal is nutritionally balanced or how a series circuit is integrated into a product design.	Use exploded diagrams and computer aided design and verbal explanations to communicate design ideas that include: how their products work, who their product is for, and how the product meets the user's requirements. Incorporate simple ideas of cost, profitability and enterprise as well as sustainability of materials. Create templates and models using everyday resources to test designs. Explain how designs will be adapted to take account of findings. Explain how their design ideas link to aspects of science, by explaining, for example, how a designed meal is nutritionally balanced or how a series circuit is integrated into a product design.
Make	Follow procedures for safety and hygiene. Use a range of everyday materials, tools and components. Measure, mark out, cut and shape materials and components with some accuracy. Assemble, join and combine materials and components to make a finished product. Begin to use finishing techniques, including those from art and design.	follow procedures for safety and hygiene Use a wider range of materials, tools and components than KS1, including construction materials and kits , textiles, food ingredients, mechanical components and electrical components and circuits. Measure, mark out, cut and shape materials and components with more accuracy Assemble, join and combine materials and components with more accuracy to create a finished product.	follow procedures for safety and hygiene Use a wider range of tools, materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components such as CAMS, gears, leavers and pulleys , as well as more complex electrical components and circuits. Accurately measure, mark out, cut and shape materials and components, making adjustments and improvements were needed.

	<p>Begin to explore how materials can be joined and structures strengthened.</p>	<p>Join and strengthen structures using a range of techniques.</p> <p>Apply a range of finishing techniques, including those from art and design, with some accuracy</p>	<p>Accurately assemble, join and combine materials and components to create a finished product, making adjustments and improvements were needed.</p> <p>Join and strengthen structures using a range of techniques.</p> <p>Accurately apply a range of finishing techniques, including those from art and design.</p> <p>Demonstrate resourcefulness when tackling practical problems.</p>
Evaluate	<p>Identify the things they like about their products and the things they think could be improved.</p> <p>Identify areas of the 'make' process that went well, and things that were more difficult or that could be improved.</p>	<p>Identify the things they like about their products and the things they think could be improved.</p> <p>Identify areas of the 'make' process that went well, and things that were more difficult or that could be improved.</p> <p>Refer to design criteria when evaluating and identify how well they feel that their product meets their original design intentions.</p>	<p>Identify the things they like about their products and the things they think could be improved.</p> <p>Identify areas of the 'make' process that went well, and things that were more difficult or that could be improved.</p> <p>Refer to design criteria when evaluating and identify how well they feel that their product meets their original design intentions. Take feedback from other users and individuals regarding how well they feel the product meets the design criteria.</p>
Nutrition & Cooking	<p>Know that food is grown, reared or caught and comes from plants, trees, other vegetation or animals.</p> <p>Identify and categorise food as belonging to one of the five food groups. Identify which groups we need more of, and which ones we need in moderation.</p> <p>Being to develop skills in cutting, chopping, slicing, peeling and grating and how to do this safely using a knife, peeler or grater.</p>	<p>As per KS1, plus:</p> <p>Identify the nutrients and molecules we get from each of the food groups and what these provide us and enable our body to do.</p> <p>Understand the effects on the human body of too much sugar consumption.</p> <p>Develop competency in cutting, chopping, slicing, peeling and grating and how to do this safely using a knife, peeler or grater. Begin to develop skills in measuring, whisking, sieving, mixing and baking.</p>	<p>As per KS1 and LKS2, plus:</p> <p>Analyse both individual recipes and our own diets to decide if they are 'healthy' or 'balanced' based on our understanding of nutrition and suggest adaptations to make them healthier.</p> <p>Cut, chop, slice, peel and grate, measure, whisk, sieve, mix and baking, boil and fry.</p>

Bold type represents progression from previous stage.