Design Technology

Knowledge Building
Food Technology
Food technology is an area that focuses on the production, research, development, preservation and quality control of food products. It features a range of techniques in food preparation, as well as recognising the need for hygiene when working with food. Pupils will know where food comes from, how to prepare food safely, with and without a heat source, and finally explore different techniques used to make a wider range of dishes. There is a link with science here
Users and Purposes
In design technology, **users** are defined by the people who will use the product that is being designed. **Purpose** relates to designing solutions to improve people's lives. These two components need to work harmoniously together in order to create a design, and then, ultimately, a product that suits both. By making pupils aware of these two aspects, they can see how design technology evolves and develops until they recognise that some designs have impact beyond their intended **user and purpose**.
Product Research
Product research is the process of deciding which new products will be successful and then seeing how they could be developed. It can also involve looking at any existing similar products. Initially research is very basic in terms of like and dislike, but deeper research looks into aesthetics, functionality and the materials used. Pupils will expand their research skills to include these different areas and, ultimately, be able to link them to **users and purposes.**
Design Technology Vocabulary
The language of design technology can be broken down into different categories such as: the language of **design** e.g. draw, sketch, user, purpose; the language of **making**, for example, tools, equipment, materials and the language of **evaluation,** including discussion about the product, asking questions about its useability, reviewing and checking.

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Product Features
Product features are aspects that make a product useful, fit for purpose and, sometimes, unique. They are attributes that appeal to **users** and make that particular product distinct. When designing a product, the features need to appeal to users, need to fulfil the purpose of the product and be influenced by research into products that may do the same thing. This aspect has strong links with **users and purposes** and **product research**. Pupils will learn how to identify features, discuss how useful they are and then explore how **product features actually** benefit the product in terms of performance and usability.
Invention and Development
Design technology can be looked at as two strands: **invention and development. Invention** is the process of thinking and making new products. The people who do this are **inventors**. **Development** looks at products and ideas that already exist and finds ways of making them better. It is important that pupils recognise that adapting and innovating designs / products is key in making new things. Initially, pupils will find out about well-known inventors and how their products and designs have improved life for others. They will learn about the need for problem-solving skills during the invention process, so that a product can be as functional and usable as possible. Pupils will also find out about copyrighting, trademarks and patenting ideas and products.

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EXPLORERS

Knowledge Building					
Food Technology	**Users and Purposes**	**Product Research**	**Design Technology Vocabulary**	**Product Features**	**Invention and Development**
Know that food comes from plants or animals and that food has to be grown or caught	Know what they are designing and making and say what its purpose is	Know what they like and dislike about a product	Know the names of simple construction tools and equipment	Know the key features that define a product	Know what inventors do and why they are important

Learning Progression	
3 – 4 years	**Reception**
• Explore different materials freely, in order to develop their ideas about how to use them and what to make • Develop their own ideas and then decide which materials to use to express them • Join different materials and explore different textures	• 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 collaboratively, sharing ideas, resources and skills

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Knowledge Progression

Explorers 1 / Nursery and Explorers 2 / Reception

Tell Us A Story

- To identify which materials would be the most suitable to make a large model
- To know how to take key aspects of a story and replicate as a model
- To identify reflective and shiny materials to be used in making a mirror
- To take an active role in designing and making a large item for use in class

Key Vocabulary
design, make, reflective, shiny, mirror, giant, map, journey, compare, listening booth

Happy To Be Me
Additional Knowledge

To design a badge or medallion to show belonging

Let's Play

- To know which materials to select to make a useable puppet theatre
- To identify textures of materials to compare and contrast
- To describe how a moving toy was made
- To be able to talk about what they see then use this to inspire a make of their own
- To identify facial features on themselves and toys
- To identify key features of basic board games and design

Key Vocabulary
puppet theatre, curtains, stage, compare, like, dislike, moving toy, features, board game, dice, counter, design, make

Come Fly With Me! Asia

- To know that Chinese dragons are an important feature of Chinese culture and make their own model using bright colours
- To identify some features of Chinese dress and design their own Chinese style outfit
- To know what a diva lamp is for

Key Vocabulary
dragon, Chinese, colour, bright, traditional, compare, feature, diva lamp, salt dough, Diwali

No Place Like Home

- To know that photographs can be used to design and make 3D models of houses
- To know that the needs of the user are important to designing and making
- To know how to use simple cutting tools when making
- To identify features of a den made from natural materials

Key Vocabulary
house, feature, photograph, 3D model, kennel, bed, cage, tank, user, needs, tools, cut, explain, den

Help Is At Hand

- To design a new lanyard with clear information and space for a photograph
- To be able to talk about preferences and design a pizza for themselves
- To identify what someone else prefers and design specifically for them

Key Vocabulary
badge, lanyard, design, photograph, I.D., words, preference, cook, share, favourite, junk modelling, gift

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	What On Earth...? • To design and make a clay pot with the purpose of growing seeds • To identify the features of a range of fabrics and talk about which they consider to be pretty • To use their imagination when designing and making a model of a giant • To know that some materials can be repurposed and reused to make something else • To understand some of the processes involved in designing and making a particular item **Key Vocabulary** design, make, pattern, texture, gift wrap, model, fabric, plant pot, clay, mould

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PATHFINDERS

Knowledge Building					
Food Technology	**Users and Purposes**	**Product Research**	**Design Technology Vocabulary**	**Product Features**	**Invention and Development**
Know how to prepare food safely and hygienically, without using a heat source	Know why they need to make products suitable for intended end users and how this influences design	Know the importance of research and using their findings in the design process	Know the names and properties of materials commonly used in the manufacture of products	Know the importance of including useful features within a product design	Know about significant inventors and developers and how they improved life for others

Skills Progression	
Design Technology Skills Pathfinders 1 / Y1	**Design Technology Skills Pathfinders 2 / Y2**
Dt1 Explore the sensory qualities of materials Dt2 Explore ways to construct models Dt3 Identify a target group for what they intend to design and make Dt4 Recognise how structures can be made, stronger, stiffer and more stable Dt5 Generate and talk about their own ideas Dt6 Follow safe procedures Dt7 Take account of simple properties of materials when deciding how to cut, shape, combine and join them Dt8 Use tools and materials with help	Dt9 Explore a range of existing products Dt10 Discover where foods come from in choosing, preparing and tasting different dishes Dt11 Identify a purpose for what they intend to design and make Dt12 Identify simple design criteria then plan what to do next, using a variety of methods Dt13 Observe and take account of properties of materials when deciding how to cut, shape, combine and join them Dt14 Identify what they could have done differently or how they could improve their work in the future Dt15 Evaluate a range of existing products Dt16 Communicate their ideas using a variety of methods e.g. drawing, making, mock-ups, ICT Dt17 Measure, mark, cut out and shape a range of materials Dt18 Use mechanisms in the products e.g. wheels, sliders Dt19 Use simple finishing techniques Dt20 Talk about their ideas, saying what they like and dislike, and evaluate against their design criteria

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Knowledge Progression	
Pathfinders 1 / Year 1	**Pathfinders 2 / Year 2**
Happily Ever After Pupils will be using The Extraordinaires Fairy project in this unit. They will be introduced to the 'persona' of the Fairy to help them think more like the end user who they are designing for. Pupils will work through the stages of the design process, from research, design, make and evaluation. They will need to research products that are already available on the market and then adapt their ideas to ensure they think of something original but useful and useable by the user they are designing for. Pupils will look at simple ways to improve their design and be introduced to ways in which they can analyse their work and also that of their peers. **Concepts** **NC –** Design purposeful, functional, appealing products for themselves and other users based on design criteria **NC –** Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology **NC –** Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) **NC –** Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics **NC –** Understand the important of exploring and evaluating a range of existing products **NC –** Evaluate their ideas and products against design criteria • Design and make a prototype of a bag suitable for the client (Fairy) to carry things in	**INTER-NATION MEDIA STATION - Nan's Outfit - Additional Textiles** Pupils will explore some basic textile skills of cutting around a template, adding embellishments and stitching two pieces of fabric together in order to design a t-shirt or top for Nan, mentioned in the Part One literacy unit. They will initially need to design the top for Nan before making a prototype of their design. **Concepts** **NC –** Design purposeful, functional, appealing products for themselves and other users based on design criteria **NC –** Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) **NC –** Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics • Design and make a T-shirt or top for Nan to wear on her big day out

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COME FLY WITH ME! ARCTIC CIRCLE - Mechanisms - Sliders and Levers 1

Pupils will develop skills needed in order to design and make a simple moving object, focusing on basic sliders and levers. They will be introduced to vocabulary such as mechanism, lever and slider and explore different ways these can be made with simple materials, tools and techniques. Pupils will be familiarised with some early safety tips such as asking adults to cut or slice cardboard with sharp knives or cutters.

Skills Development Task

Concepts

NC - Explore and use mechanisms (for example, levers, sliders, wheels and axles), in their products

NC - Design purposeful, functional, appealing products for themselves and other users based on design criteria

NC - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

NC - Select from and use a range of tools and equipment to perform practical tasks

NC - Explore and use mechanisms (for example, levers, sliders, wheels and axles), in their products

- Design, make and evaluate a moving picture which uses a simple mechanism (slider or lever) and be made from card
- Design, make and evaluate a moving picture to accompany a fact sheet on an animal that lives in the Arctic.

ZERO TO HERO - The Gift

In this unit, pupils will design and make a gift for one of the famous people studied within the Zero to Hero unit. Pupils will need to consider the three key questions in the design phase of their task:- Who is the gift for? How does the design and function of the gift suit the person it is intended for? Where and when might this person use this gift?

Concepts

NC - Design purposeful, functional, appealing products for themselves and other users based on design criteria

NC - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

NC - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

- Design and make a useful gift for one of the famous people in the Zero to Hero unit

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UNITY IN THE COMMUNITY – Structures

Pupils will be introduced to how important design technology is to create strong and stable structures. They will observe a range of homes in relation to their local area and use what they have found to design and make a model of a home that a new neighbour would like to live in.

Skills Development Task

Concepts

NC – Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing)

NC – Build structures

Land Ahoy

Pupils will be introduced to using The Extraordinaires Pirate project in this unit. They will be user who they the 'persona' of the Pirate to help them think more like the end are designing for. Pupils will work through the stages of the design process, from research, design, make and evaluation. They will need to research products that are already available on the market and then adapt their ideas to ensure they think of something original but useful and usable by the user they are designing for. Pupils will look at simple ways to improve their design and be introduced to ways in which they can analyse their work and also that of their peers.

Concepts

NC – Design purposeful, functional, appealing products for themselves and other users based on design criteria

NC – Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

NC – Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing)

NC – Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

NC – Understand the important of exploring and evaluating a range of existing products

NC – Evaluate their ideas and products against design criteria

- Design and make a prototype of a bag suitable for the client (Pirate) to carry things in

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LIGHT UP THE WORLD - Mechanisms - Sliders and Levers 2 Pupils will develop skills needed in order to design and make a simple moving object, focusing on basic sliders and levers. They will be introduced to vocabulary such as mechanism, lever and slider and explore different ways these can be made with simple materials, tools and techniques. Pupils will be familiarised with some early safety tips such as asking adults to cut or slice cardboard with sharp knives or cutters. **Skills Development Task** **Concepts** **NC -** Design purposeful, functional, appealing products for themselves and other users based on design criteria **NC -** Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology **NC -** Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) • Design and make a pop-up leaflet to help explain the importance of sun safety.	**GOING WILD - Textiles** In this area of design technology, pupils will be familiarised with a range of fabrics and how they can be joined together with both glue and needle and thread. Pupils will learn how to create simple stitches to join 2 pieces of fabric together and then add other materials to create features. They will need to think about what they are making so that it relates to the brief. **Skills Development Task** **Concepts** **NC -** Select from and use a range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) **NC -** Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics • Design and make finger puppets for the nursery rhyme, 'Two Little Sparrows'

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Key Vocabulary								
Pathfinders 1 / Year 1			**Pathfinders 2 / Year 2**		
Happily Ever After			**Land Ahoy**		
profile	evaluate	bag	profile	evaluate	remote control
detail	user	size	detail	user	appliance
needs	product	backpack	needs	product	physical difficulty
needs analysis	purpose	hands-free	needs analysis	purpose	power
research	use	pockets	research	use	hook hand
design	Fairy		design	Pirate	adaptations

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Key Vocabulary			
Pathfinders 1 / Year 1		**Pathfinders 2 / Year 2**	
Mechanisms - Sliders and Levers		**Textiles**	
mechanism	paper fastener	finger puppet	needle
slider	knife	felt	thread
lever	rotary cutter	fabric	features
pivot	moving picture	pin	seam allowance
fold	rotate	sew	template
window	slot	glue	embellishment

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Key Vocabulary	
Pathfinders 1 / Year 1	
Structures	
building structure materials strong stable weak cardboard sticks paper neighbour string stiff	

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ADVENTURERS

Knowledge Building					
Food Technology	**Users and Purposes**	**Product Research**	**Design Technology Vocabulary**	**Product Features**	**Invention and Development**
Know how to prepare and cook safely and hygienically, including use of a heat source	Understand the purpose of their product and know which design features will appeal to intended users	Understand the link between choice of materials, functionality and aesthetics	Know the names of a wide range of tools and techniques, including how to employ them	Understand how important performance and appearance are in product design	Understand the role and importance of problem-solving within the invention process

Skills Progression	
Design Technology Skills Adventurers 1 / Y3	**Design Technology Skills Adventurers 2 / Y4**
Dt21 Generate, develop and explain ideas for products to meet a range of needs Dt22 Explore ways of meeting design challenge with a food focus using a range of cooking techniques Dt23 Identify a purpose and establish criteria for a successful product Dt24 Evaluate work, adapting and improving where appropriate Dt25 Communicate, design ideas in different ways e.g. discussion, annotated sketches, cross-sectional diagrams and prototypes Dt26 Selecting appropriate tools and techniques, name and describe them Dt27 Measure, mark, cut out and shape a range of materials and assemble, join and combine components and materials with some accuracy	D28 Use research to inform their design Dt29 Explore ways of meeting design challenges with a textile focus D30 Evaluate work, adapting and improving through the views of others to improve their work Dt31 Communicate design ideas, in different ways e.g. discussion, annotated sketches, cross-sectional diagrams and prototypes Dt32 Select from and use a range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities Dt33 Join and combine materials and components accurately in temporary and permanent ways Dt34 Measure, mark, cut out and shape a range of materials and assemble, join and combine components and materials with increasing accuracy

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Knowledge Progression	
Adventurers 1 / Year 3	**Adventurers 2 / Year 4**
THAT'S ALL FOLKS - Mechanisms - Levers and Linkages 2 Pupils will use levers by embed and build on previous knowledge of how to construct and integrating them with linkages. They will explore a range of lever and linkage types and their methods of construction. In this second part, pupils will design a 'puppet' with a scissor mechanism that could be used in a stop-motion animation. Thoughtful and considered design is needed in this task. **Skills Development Task** **Concepts** **NC -** 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 **NC -** Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **NC -** Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages) • Design, make and evaluate a prop or model to be used in an animation.	**Lightning Speed** Pupils will be familiar with using The Extraordinaires Evil Genius project in this unit. They will be the initial processes of studying the persona of the user, their needs analysis and what it is they are designing. In Adventurers, pupils will be expected to work through the stages in more detail, for example, when thinking of ways to improve, they will need to analyse a specific feature of their design and describe how it could be made better. Pupils will need to consider how they will make their product not only functional but also look attractive to the user. **Concepts** **NC -** 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 **NC -** Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **NC -** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) accurately **NC -** 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 **NC -** Investigate and analyse a range of existing products **NC -** Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

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- Design and make a model of a new communications device for the Evil Genius

ATHENS VS SPARTA - Mechanisms - Structures In Pathfinders, pupils learnt that good design is an important component in the construction of strong structures. In this unit, pupils will discover how a strong structure and an accurate mechanism can be combined to make a siege weapon. Pupils will need to carefully consider the purpose of their product and include some key features to allow it to work. They will also need to work through processes of problem solving in order to achieve the best firing mechanism. **Skills Development Task** **Concepts** **NC -** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) accurately Apply their understanding of how to strengthen, stiffen and reinforce more complex structures • Design, make and evaluate a siege weapon (trebuchet)	**COME FLY WITH ME! AFRICA - Food Technology** This unit focuses on food technology. Pupils will expand their understanding of where food comes from by recognising that a lot of food products come from African countries, and they will look at Fairtrade as an organisation that ensures farmers and growers get a fair price for their produce. Pupils will learn how to prepare and make a range of African inspired dishes. They will need to consider hygiene and safety when using heat sources and also think about how their food is presented from a design technology perspective. **Concepts** **NC -** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) accurately **NC -** 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 **NC -** Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques **NC -** Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed • To learn some basic cooking skills

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Knowledge Progression	
Adventurers 1 / Year 3	**Adventurers 2 / Year 4**
Under The Canopy Pupils will be using The Extraordinaires Tribal Child project in this unit. They will be familiar with the initial processes of studying the persona of the user, their needs analysis and what it is they are designing. In Adventurers, pupils will be expected to work through the stages in more detail, for example, when thinking of ways to improve, they will need to revisit the user's profile and assess how their design could be made more suitable. Pupils need to think carefully about the materials being used with links to functionality and aesthetics. **Concepts** **NC –** 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 **NC –** Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **NC –** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) accurately **NC –** 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 **NC –** Investigate and analyse a range of existing products **NC –** Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work • Design and make a prototype of a new toy for tribal child made of natural materials	**LAW AND ORDER – Mechanisms – Levers and Linkages 1** Pupils will embed and build on previous knowledge of how to construct and use levers by integrating them with linkages. They will explore a range of lever and linkage types and their methods of construction. Pupils will use this knowledge by designing and making a celebration card using one of these moving levers. Thoughtful and considered design is needed in this task. **Skills Development Task** **Concepts** **NC –** Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages) • Construct some of the examples of levers and linkages • Design, make and evaluate a celebration card that includes a mechanical system. The picture must use levers and linkages

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	PICTURE OUR PLANET – Textiles Pupils already have some experience of working with textiles and combining two pieces of materials together using needle and thread. In this unit, pupils will need to use sewing skills to make a soft toy, therefore they will learn how to use stuffing to pad out two pieces of fabric. They will also need to consider how their toy looks as well as being robust enough for a toddler to play with. **Skills Development Task** **Concepts** **NC –** Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **NC –** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing) accurately **NC –** 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 **NC –** Investigate and analyse a range of existing products • Design and make an animal soft toy, aimed at toddlers, in association with the Scottish Wildlife Trust
	PICTURE OUR PLANET – Food Technology Pupils will learn about the history of the traditional Scottish sweet, Tablet. They will need to follow the recipe provided and then experiment with different flavours to make it individual to them. They will take feedback on their creations, and this could then be expanded to selling their flavoured table at a later date. **Concepts** **NC –** understand and apply the principles of a healthy and varied diet • To make the traditional Scottish sweet, tablet

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Key Vocabulary					
Adventurers 1 / Year 3		**Adventurers 2 / Year 4**			
Levers and Linkages		**Lightning Speed**			
paper fastener	scissor	profile	evaluate	communication	
link	mechanism	detail	user	device	
rotate	model	needs	product	invention	
slide	muppet	needs analysis	purpose	gadgets	
operate		research	use	robots	
pivot point		design	Evil Genius		

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Key Vocabulary							
Adventurers 1 / Year 3			**Adventurers 2 / Year 4**			
Structures			**Come Fly With Me! Africa**			
design	MDF (medium	bench hook	seeds	Preparation	dice	food hygiene
model	density	dowel	grow	method	slice	bake
siege weapon	fibreboard)	plan view	produce	servings	simmer	mix
trebuchet	washer	clam/peg	seasonality	grams	boil	ingredient
construct	screw		season (salt &	ounces	griddle	
timber	saw		pepper)	tbsp / tsp	fry	

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Key Vocabulary	
Adventurers 1 / Year 3	**Adventurers 2 / Year 4**
Under The Canopy	**Levers and Linkages**
rofile etail eeds eeds analysis search esign traditional natural evaluate user product purpose use Tribal Child methods materials	paper fastener model muppet ink rotate slide operate pivot point scissor mechanism
	Textiles
	soft toy template outline / pattern materials wool toddlers' toy sew stuffing

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Design Technology

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NAVIGATORS

Knowledge Building					
Food Technology	**Users and Purposes**	**Product Research**	**Design Technology Vocabulary**	**Product Features**	**Invention and Development**
Know how to use a range of techniques such as peeling, slicing, grating, kneading and spreading	Know what impact products have beyond their intended purpose	Know how to gather information about the needs and wants of groups and individuals	Know the correct technical vocabulary for the projects they are undertaking	Understand the relationship between a product's features and its functionality and usability	Know and understand the importance of patent, copyright and trademark in the design process

Skills Progression	
Design Technology Skills Navigators 1 / Y5	**Design Technology Skills Navigators 2 / Y6**
Dt35 Investigate ways of meeting design challenges with a construction focus Dt36 Investigate how the work of individuals in design and technology has helped to shape the world Dt37 Identify users' views and take these into account Dt38 Analyse a range of existing products Dt39 Estimate and measure using appropriate instruments and units Dt40 Plan what they have to do, including how to use materials, equipment and processes Dt41 Communicate design ideas in different ways e.g. discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer aided design Dt42 Apply knowledge of mechanical and electrical control when designing and making functional products Dt43 Refine sequences of instructions to control events or make things happen	Dt44 Explore alternative ways of making their product, if first attempts fail Dt45 Check work as it develops and modify as necessary Dt46 Evaluate their products, identifying strengths and areas for development, and make appropriate changes Dt47 Draw on and use various sources of information, including ICT sources Dt48 Generate and clarify ideas for products, considering intended purpose Dt49 Plan what they have to do, suggesting a sequence of actions and alternatives if needed Dt50 Choose how to communicate design ideas as they develop, considering use and purpose Dt51 Select from a wide range of tools and equipment to perform practical tasks accurately

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Knowledge Progression

Navigators 1 / Year 5

Mission Control

Pupils will be extensive using The Extraordinaires Spaceman project in this unit. Pupils will have experience of the processes involved in researching, designing, making and evaluating a range of products for a variety of users. In this unit, pupils are required to consider the needs of a real-life Extraordinaire. They will need to think about the impact their product has beyond its intended purpose; how will it work with the rest of the Spaceman's equipment and in his limited workspace? Pupils will also need to address the relationship between the product's features and its functionality.

Concepts

NC – Use research and develop design criteria to inform the design of innovative, functional, appealing
products that are fit for purpose, aimed a particular individuals or groups

NC – Generate, develop, model and communicate their ideas through discussion, annotated sketches,
cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

NC – Select from and use a wider range of tools and equipment to perform practical tasks (for example,
cutting, shaping, joining and finishing), accurately

NC – 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

NC – Investigate and analyse a range of existing products

NC – Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

- Design a model of a time-keeping device suitable for a spaceman

Navigators 2 / Year 6

A World Of Bright Ideas

Pupils will be trademark and compare brand introduced to new vocabulary and understand how important patent, copyright are in the invention and development of products. They will names and logos; recognising that a memorable logo is a great way of encouraging people to remember a brand or product.

Concepts

NC– Understand how key events and individuals in design and technology have helped shape the world

- To understand the meaning of the term 'copyright' and learn about why it is important
- To know about and understand what a patent is
- To know about and understand what a trademark is
- To design a new brand for a range of greetings cards

Mechanisms - Structures 2

Pupils will now use their advanced knowledge of frames and structures to build a 'racer' vehicle with a strong, stable structure and a motor powered by a simple electrical circuit. Pupils will be required to consider not only their design but also the materials, tools and techniques they will use in order to complete their project.

Skills Development Task

Concepts

NC - select from and use a wider range of tools and equipment to perform practical tasks (for example,
cutting, shaping, joining and finishing), accurately

NC - Understand and use mechanical systems in their products (for example, gears, pulleys cams, levers
and linkages)

NC - Understand and use electrical systems in their products (for example, series circuits incorporating
switches, bulbs, buzzers and motors

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- Design, make and evaluate a three wheeled 'racer'

COME FLY WITH ME! AMERICA – Mechanisms – Structures 1

Previously, pupils have learnt how specific mechanisms play a role in constructing strong and useful structures. In this unit, pupils will work through several processes to initially build a strong frame and then join these frames together to form a bridge. Pupils will be required to consider not only their design but also the materials, tools and techniques they will use in order to complete their project.

Skills Development Task

Concepts

NC – Select from and use a wider range of tools and equipment to perform practical tasks (for example,
cutting, shaping, joining and finishing), accurately

NC – Apply their understanding of how to strengthen, stiffen and reinforce more complex structures

- Create a frame structure
- Join up frames to create a bridge

I HAVE A DREAM – Textiles

Pupils will draw on the knowledge and skills learnt in previous pathways to create a useable and aesthetically pleasing textile product. They will use sewing skills to join more than one piece of fabric together using more complex stitches, as well as have potential opportunity to use a sewing machine. They will need to stuff and secure their cushion so that it is comfortable for someone to use.

Skills Development Task

Concepts

NC – Generate, develop, model and communicate their ideas through discussion, annotated sketches,
cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

NC – 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

- Make a cushion following a pattern

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Knowledge Progression	
Navigators 1 / Year 5	**Navigators 2 / Year 6**
You're Not Invited Pupils will be using The Extraordinaires Soldier project in this unit. Pupils will have extensive experience of the processes involved in researching, designing, making and evaluating a range of products for a variety of users. In this unit, pupils are required to consider the needs of a real-life Extraordinaire. They will need to think about the impact their product has beyond its intended purpose; how will it work with the rest of the Soldier's equipment? Pupils will also need to address the relationship between the product's features and its functionality. **Concepts** **NC –** Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed a particular individuals or groups **NC –** Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **NC –** Select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing), accurately **NC –** 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 **NC –** Investigate and analyse a range of existing products **NC –** Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	**WARS OF THE WORLD – Electronics 1** Through science, pupils have experimented with designing, making and testing a range of electrical circuits with different components. Now, they will implement this knowledge and these skills to produce a circuit that has a clear purpose. Pupils will need to consider the features of their circuit and how it relates to its functionality. They will also address that their design has an impact in other ways. **Skills Development Task** **Concepts** **NC –** Understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors **NC –** Apply their understanding of computing to program, monitor and control their products • Design, make and evaluate a device to send Morse Code signals

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and make a sleeping place suitable for a soldier

FULL OF BEANS – Electronics 2

Through science, pupils have experimented with designing, making and testing a range of electrical circuits with different components. Now, they will implement this knowledge and these skills to produce a circuit that has a clear purpose. Pupils will need to consider the features of their circuit and how it relates to its functionality. They will also address that their design has an impact in other ways.

Skills Development Task

Concepts

NC – Understand and use electrical systems in their products (for example, series circuits incorporating
switches, bulbs, buzzers and motors

NC – Apply their understanding of computing to program, monitor and control their products
Design, make and evaluate a traffic control system

GLOBAL WARNING – Board Game Product Design

Pupils will design and make a board game based on learning about pollution and waste. They will evaluate existing games before designing and making a prototype of their game in small 'business groups'. Once complete, they will present and demonstrate their game.

Concepts

NC - 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

NC - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

NC - 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

NC - Investigate and analyse a range of existing products

- To design and make a prototype board game on pollution and waste using existing board games as research

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Key Vocabulary				
Navigators 1 / Year 5			**Navigators 2 / Year 6**	
Mission Control			**A World Of Bright Ideas**	
profile	evaluate	safety	copyright	brand name
detail	user	backup plan	symbol	logo
needs	product	time-keeping	patent	pitch
needs analysis	purpose	device	rights	panel
research	use	watch	permissions	collaboration
design	Spaceman	clock	trademark	end product
		limited space		

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Key Vocabulary							
Navigators 1 / Year 5			**Navigators 2 / Year 6**				
Mechanisms - Structures			**Textiles**				
structure	pulley	3v motor	outline	sew	stuffing		
frame	axle	wire cutter	pattern	stitch			
strengthen	components	dowel	pattern pieces	blanket stitch			
frame structures	aerodynamic	multi-core wire	recycled fabrics	running stitch			
bridge	lightweight	connectors	millimetres	back stitch			
weight	rubber washer		pin	backing piece			

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Key Vocabulary	
Navigators Year 5 and 6 **Electronics**	
Samuel Morse	circuit
series	circuit diagram
dots and dashes	sequence
parallel	signals
Morse Code	
1.5v lamp	
brighter	

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End Goals
Explorers / EYFS
Our aim in teaching design technology in Explorers is to inspire pupils to not only be creative but create for a purpose. Pupils should be aware that when they are designing and making, they need to think about it is they are making and the reasons why they are making it; what is the purpose? In this phase, pupils will have had the opportunity to carry out some basic product research by pointing out some of the key features of a product, such as in Help Is At Hand knowing that a lanyard requires a photograph and the name of the person. They should also be able to give some simple feedback and evaluation by stating whether they like or dislike a product. Pupils should be able to name the tools and materials they are using to make their designs and recognise some techniques of how they are constructing their models. Explorers should also have had an introduction to the role of inventors as people who invent useful products and that they don't always succeed first time; they often have to try numerous times before they get their product right.
Pathfinders / KS1
Our aim in teaching design technology in Pathfinders is to broaden pupils' awareness of designing for purpose. By the end of this phase, pupils should recognise that inventors and designers are not designing for themselves, they are designing for end users. This can be one person, as the pupils will have experienced with their first Extraordinaires projects, or it can be for a large group of people. Pupils should be able to carry out some research into existing products and use this to guide their own designs noting useful features. As well as learning about designing for a more focused purpose, pupils should have started to be aware of a range of skills and techniques that will help them when it comes to modelling their designs. They should recognise the importance of using suitable materials and notice how some everyday objects can be used to make effective mechanisms. Pupils should be aware that models of their designs may require testing, especially if there are moving parts and adjustments may need to be made to make them work efficiently. Evaluative vocabulary should be extended beyond 'like' and 'dislike' with comment on how their work could be improved or note features that are particularly pleased with.

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Adventurers / LKS2

Our aim in teaching design technology in Adventurers is to encourage pupils to make links between purpose, functionality and aesthetics. In this phase, pupils will have the opportunity to design for two more Extraordinaires. These personas require more thought and consideration of their requirements than in Pathfinders. Pupils should know that they need to not only focus on purpose and some key features but now bear in mind how the product looks and feels for their user. They should consider materials that not only work well for construction but look aesthetically pleasing too.

The Adventurers phase sees pupils learn some basic cooking skills and recognition of where their food comes from. Pupils should be aware that much of their food comes from overseas and that seasonality is important when trying to source various ingredients. They should know how to prepare food hygienically and cook safely whilst remembering that food, like other products they have designed and made, needs to be presented attractively for people to enjoy.

By the end of this phase, pupils should be more confident in evaluating their own work and be able to give more detailed criticism, both positively and negatively. They should understand the importance of problem solving in the invention process and be able to make adjustments to their designs. Pupils should now be able to give some feedback to their peers, suggesting ways they could improve or noting a feature that is particularly well designed.

Navigators / UKS2

Our aim in teaching design technology in Navigators is to embed knowledge and skills from the previous phases with a greater awareness of design in the wider world. Pupils should be aware that products can often have more than one function or purpose and be able to recognise the impact this has on its useability. They should know that there is a clear relationship with the features of a product and the functionality of it. They should ask themselves regularly, does this feature enhance this product? Is this feature necessary to the needs of the end user?

The Navigator Extraordinaires are based on real people; a soldier and a spaceman, both of whom have very specific requirements and restrictions. Pupils should be able to consider the wider issues these personas have when designing and making their products for them. Thoughts on how versatile their product is and how it could impact on other equipment should be considered.

By the end of this phase, pupils should have an awareness of the legalities that comes with designing and making a unique product. They should know the terms of 'trademark', 'patent', 'copyright', 'brand' and 'logo'. They should understand that these terms and processes allow inventors to keep their inventions safe and ensure that they earn the recognition they deserve for a design that is their own work. Additionally, Navigators should be able to see the links between design technology and other subjects such as science. They should see that their knowledge of electricity, for example, can be put to practical use in technology tasks.

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