Days Lane Designer and Engineer

Vocabulary:

Electrical Systems
parallel circuit
names of switches and components
input device
output device
monitor control
program

Structures
design specification
frame structure
stiffen
strengthen
reinforce
triangulation
Stability
Temporary
permanent
prototype
Bridge hold

Food
nutrient
vitamins
minerals
savoury

Enrichment experiences:

STEM Visitor

After school cooker club

Opportunities provided via the school's catering company

Skills:

Structures
Accurately assemble, join and combine materials and components.
Accurately apply a range of finishing techniques, including those from art and design.
Generate ideas through cross-sectional and exploded diagrams and prototypes.
Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose.
Confidently select appropriate tools, materials, components and techniques and use them.

Food
Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.

Apply the principles of healthy diet to prepare savoury dishes

Electrical Systems
Use series circuits, switches, bulbs, buzzers, motors and use a computer to programme and control.

Knowledge:

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

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

Evaluate
Investigate and analyse a range of existing products.
Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
Understand how key events and individuals in design and technology have helped shape the world.

Technical knowledge
Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].
Understand and use mechanical systems in their products [for example, levers, pulleys, gears and cams].

Structures
How to reinforce and strengthen a 3D framework.
Generate innovative ideas, drawing on research make design decisions, taking account of constraints such as time, resources and cost.
How sustainable the materials in products are what impact products have beyond their intended purpose.

Electrical Systems
Know how more complex electrical circuits and components can be used to create functional products and how to program a computer to monitor changes in the environment and control their products.
Understand that mechanical and electrical systems have an input, process and output.

Food

Understand and apply the principles of a healthy and varied diet.
Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.
Know how food is processed into ingredients that can be eaten or used in cooking.
Know that different food and drink contain different substances – nutrients, water and fibre – that are needed for health.
Know the main nutrient/s provided by each Eatwell Guide food group.

Vocabulary

	Reception	Year 1	Year 2	Year 3	Year 4:	Year 5:
Food	●Mix, Spread, Snip, Cut**,** Soft, Juicy, Crunchy, Sweet, Sticky, Smooth, Sharp, Crisp, Sour, hard**,** smell**,** tasting. ●Cut, fold, make, card.	● Grate, Shape, Thread, fork, secure grip, Measure, slice, fresh, flesh, skin, seed, pip, core, squeezing, healthy diet, ingredients, food groups, eat well plate.	● Savoury, Crush, Sift, Peel, Claw grip, frozen, tinned, hygienic, sustainability, overfish, fishing, caught combinations.	● Healthy diet, balanced diet, varied diet, names of food groups.	Traditional, culture, grown, reared, caught, harvested,	● seasonal, seasonality, chef, combinations, sensory, knead, slice, chop, claw, bridge
Mechanisms		●Planning, investigating, slider, lever, pivot, slot, bridge/guide, masking tape, paper fastener, join, pull, push, directional language, fix.	● Vehicle, wheel, axle, axle holder, chassis, body, cab, assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism, template.	● Lever, linkage, pivot, slot, bridge, guide, linear, rotary, oscillating, reciprocating, innovative, prototype	● fixing, attaching, tubing, syringe, plunger, pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump	
Structures			●Shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text.	Structure, Free standing, Community, Environment Wildlife, Product, Intended user, Shaping, Joining, Measuring, Construction, Strong, Stiff, Stable, Materials, Suitability, Evaluate		● frame structure, stiffen, strengthen, innovation, functionality, reinforce, triangulation, stability, join, temporary, permanent, prototype, purpose

Textiles		● Joining, tools, fabrics, components, template, mark out, decorate, running stitch, cross stitch, needle, eye.				● Seam allowance, wadding, reinforce, hem, name of textiles and fastenings used, pinking shears, names of stitches, template.
Electrical Systems					● Circuit, switch, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output, design criteria, annotate, design decisions, functionality.	

Year 1 Subject Vocabulary
Product, design, evaluate, appealing, materials, mechanisms, strong, stable

Year 2 Subject Vocabulary
Purpose, function, structures, mechanisms, design criteria, inventor, reared

Year 3&4 Subject Vocabulary
Functionality, intended user, engineer, reinforce, mechanisms, prototype

Year 5&6 Subject Vocabulary
Functionality, innovative, reinforce, structures, mechanical systems

Enrichment experiences					
Reception: STEM food store e.g. Tescos/bakery	**Year 1:** STEM Farm visit	**Year 2:** STEM	**Year 3:** STEM Visit to a museum	**Year 4:** STEM Visit to a museum After school club - cookery	**Year 5:** STEM Visit to a museum After school club - cookery

Knowledge

	Reception	Year 1	Year 2	Year 3	Year 4:	Year 5:
Design	• Think and talk about what they are going to make before they do it. • Plan what they are going to make by drawing it first. • Use a tick list to say what resources they are going to need to make their product or outcome.	●Design purposeful, functional, appealing products for themselves and other users based on design criteria. ●Generate, develop, model and communicate their ideas through talking and drawing.	●Design purposeful, functional, appealing products for themselves and other users based on design criteria. ●Generate, develop, model and communicate their ideas through talking, drawing, templates and mock-ups.	●Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. ●Generate, develop, model and communicate their ideas through discussion, annotated sketches, prototypes, pattern and computer-aided design.	●Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. ●Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams.	●Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. ●Generate, develop, model and communicate their ideas through discussion, annotated sketches, prototypes and pattern pieces.
Make	• Choose the resources needed for the activity.	●Use a range of tools and equipment to perform practical	●Select from and use a range of tools and equipment to	●Use a wider range equipment to perform practical tasks [for	●Select from and use a wider range of tools and equipment to	●Select from and use a wider range of tools and equipment to

	• Handle simple hand tools and equipment effectively. • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Select appropriate materials to make my outcome based on the given task.	tasks [for example, cutting, shaping, joining] ●Select from and use a wide range of materials and components, including textiles and ingredients, according to their characteristics.	perform practical tasks [for example, cutting, shaping, joining and finishing] ●Select from and use a wide range of materials and components, including construction materials and ingredients, according to their characteristics.	example, cutting, shaping, joining and finishing], accurately. ●Select from and use a wider range of materials and components, including construction materials and ingredients, according to their aesthetic qualities.	perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. ●Select from and use a wider range of materials and components, including construction materials, circuit components and ingredients, according to their functional properties and aesthetic qualities.	perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. ●Select from and use a wider range of materials and components, including construction materials, mechanisms and ingredients, according to their functional properties and aesthetic qualities.
Evaluate	• Describe what is liked about a creation and whether it works well. • Suggest improvements that could be made after testing.	●Explore and evaluate a range of existing products. ●Evaluate their ideas and products against given design criteria.	●Explore and evaluate a range of existing products and evaluate their qualities. ●Evaluate their own and others' ideas and products against	●Investigate and analyse a range of existing products. ●Evaluate their ideas and products against their own chosen design criteria. ●Understand how key individuals in	●Investigate and analyse a range of existing products. ●Evaluate their ideas and products against their own design criteria and consider the views of others to	●Investigate and analyse a range of existing products. ●Evaluate their ideas and products against their own design criteria and consider the views of others to improve their

			given design criteria.	design and technology have helped shape the world.	improve their work. ●Understand how key events and individuals in design and technology have helped shape the world.	work, including existing products. ●Understand how key events and individuals in design and technology have helped shape the world, and the impact both past and present.
Technical Knowledge	• Balance blocks to build a bridge. • Show increasing control over an object in pushing, patting. • Push and pull apart larger construction pieces, such as, Duplo. • Begin to test out materials for building houses and castles. • Explore materials for building houses.	●Explore and use mechanisms [for example, levers and sliders], in their products.	●Explore and use mechanisms [for example, wheels and axles], in their products.	●Apply their understanding of computing to their products.	●Understand and use mechanical systems in their products [for example, pulleys, levers and linkages] ●Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].	●Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

	• Explore which materials to use when building bridges and structures that would help meet the criteria e.g. fit a billy goat on the bridge and a troll underneath.					
Food	●Shows some understanding that good practices with regard to eating can contribute to good health ●Children know the importance of a healthy diet	●Use the basic principles of a healthy and varied diet to prepare dishes. ●Understand where food comes from. ●All food comes from plants and animals. ●How to name and sort foods into the five groups in the 'eat well' plate. That everyone should eat at least five portions of fruit or veg each day.	●Use the basic principles of a healthy and varied diet to prepare dishes. ●Understand where food comes from. ●Understand sustainability in fishing ●We need a variety and balance of food (and drinks) to stay healthy, as depicted in the Eatwell Guide ●Food is grown, reared and caught	●Understand and apply the principles of a healthy and varied diet. ●Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. ●Food products can be fresh, pre-cooked and processed. ●A healthy diet is made up from a variety and balance of different food and drink.	●Understand and apply the principles of a healthy and varied diet. ●Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques ●know where and how a variety of ingredients are grown, reared, caught and processed. ●That what people around the world eat depends on	●Understand and apply the principles of a healthy and varied diet. ●Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. ●That a recipe can be adapted by adding and substituting one or more ingredients. ●Understand seasonality, and know where and how a variety of

		●Know safety and hygiene procedures. We need food and drink to stay alive.	in the UK and in the wider world.	which part of a plant different foods come from ●We need to eat foods in the proportions shown by the Eatwell Guide (as well as eating a variety of foods from within the groups) to have a healthy diet.	reasons such as availability, preference, resources, time, culture and religion.	ingredients are grown, reared, caught and processed. ●Impact of ignoring seasonality when cooking ●Food (and some drinks) provide energy for the body so we can be active and stay healthy.
Mechanisms		●They should know the movements of simple mechanisms such as levers and sliders.	●They should know the movements of simple mechanisms such as wheels and axles.		●How mechanical systems such as levers and linkages or pneumatic systems create movement.	
Structures			●How to make strong, stiff shell structures. Know how freestanding structures can be made stronger and more stable.	●Know how freestanding structures can be made stronger and more stable		●Engineers who have developed ground-breaking designs.

Textiles		●Materials have functional and aesthetic qualities. ●That a 3-D textiles product can be made from two identical pieces of fabric.				●That a 3D textiles product can be made from a combination of fabric shapes. ●How well products meet user needs and wants how much products cost to make.
Electrical Systems					●How simple electrical circuits can make functional products.	

Skills						
	Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4:**	**Year 5:**
Design, Make and Evaluate	**40-60 (exploring and using media and materials):** Manipulates materials to achieve a planned effect Constructs with a purpose in mind, using a variety of resources Use simple tools and techniques competently and appropriately Selects appropriate resources and adapts work where necessary Selects tools and techniques needed to shape, assemble and join materials they are using	●Cut, shape and join materials. Use mechanisms [for example, levers, sliders Evaluate their ideas.	●Measure, mark out, cut and shape materials and components. ●Describe the purpose of their products. Evaluate their ideas. ●Explore and evaluate a range of existing products ●Use mechanisms [for example, wheels and axles], in their products.	●Assemble, join and combine materials. ●Gather information about needs and wants of particular individuals and groups. Investigate and analyse a range of existing products. ●Use CAD to develop and communicate their ideas. ●Model ideas using prototypes. Order main stages of making.	●Assemble, join and combine materials ●Develop their own design criteria and use these to inform their ideas. ●Model ideas using prototypes. ●Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. ●Carry out research using surveys, interviews, questionnaires ●Gather information about needs and wants of particular	●Demonstrate resourcefulness when tackling practical problems. ●Formulate step by step plans as a guide to making.

	40-60 (moving and handling): Uses simple tools to effect changes to materials Handles tools, objects, construction and malleable materials safely and with increasing control **Early Learning Goal (exploring and using media and materials):** They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function They use what they have learnt about media and materials in original ways, thinking about uses and purposes				individuals and groups ●Use electrical circuits accurately in their products	

	They represent their own ideas, thoughts and feelings through design and technology **Early Learning Goal (moving and handling):** They handle equipment and tools effectively					
Food	**40-60 (health and self-care):** Eats a healthy range of foodstuffs and understands need for variety in food **Early Learning Goal (health and self-care):** Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe	●Use the basic principles of a healthy and varied diet to prepare dishes ●Mix and spread food.	●Use the basic principles of a healthy and varied diet to prepare dishes ●How to cut, peel and grate.	●Use the basic principles of a healthy and varied diet to prepare dishes ●How to cut, chop and slice.	●Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. ●How to cut, grate	●Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. ●How to measure, knead and cut in a variety of holds

	Use the basic principles of a healthy and varied diet to prepare dishes					