Knowledge map for Design & Technology Key Stage 2

Resource Projects on a Page		Year 3	Year 4	Year 5	Year 6
		4 Food- healthy and varied diet.	Textiles- 2D shapes to 3D product.	Combining different textile shapes	Mechanisms- pulleys or gears
		Designing, making and evaluating a bread-based product with a filling for lunch, such as a wrap, a sandwich, a roll, a blini or a toastie	**Designing, making and evaluating a holder/ purse/wallet for a friend or relative**	**Designing, making and evaluating a soft toy for younger children**	**Designing, making and evaluating a new toy vehicle for children in a particular age range**
AUTUMN TERM	KEY KNOWLEDGE	Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.	Know how to strengthen, stiffen and reinforce existing fabrics. • Understand how to securely join two pieces of fabric together. • Understand the need for patterns and seam allowances. • Know and use technical vocabulary relevant to the project.	generate ideas by carrying out research using e.g. surveys, interviews, questionnaires and the web. Children develop a simple design specification for their product Develop skills of threading needles and joining textiles using a range of stitches Develop skills of 2D paper pattern making using grid or tracing paper to create a 3D dipryl mock-up of a chosen product.	Investigate, analyse and evaluate existing everyday products and existing or pre-made toys that incorporate gear or pulley systems Build a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch. Demonstrate the accurate use of tools and equipment including cutting and stripping wire, and making secure electrical connections.. • Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames
	KEY VOCAB	texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics, function, pattern pieces	**Mock up** –. **Pattern or template Seam allowance** –. **Specification** – **Tacking** – **Prototype, blanket stitch, running stitch, backstitch** –functionality,	Pulley • Gear – Drive belt –. • Gearing up or down –. • Mechanical system • Driver -the gear or pulley that provides the input movement to the system. • Follower –. Mesh – • Motor spindle –.

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	IMPACT QUESTIONS	What kind of food product shall I make that can be carried easily? What ingredients could it contain? How will I make sure it looks appealing as well as tastes and smells good? What techniques will I use to prepare the ingredients and what equipment do I need?	Who is it for? What will it hold? e.g. phone, money, plastic cards, pencils. What shape will the holder be? How will it fasten? What fabric should I use? Which joining techniques would be the best for the fabric and pattern?	How do I make a paper pattern for the product I want to produce? How will I show innovation? Who will be the user of my product and what are their needs, wants and values? What will be the purpose of my product?	What type of toy vehicle shall I make? What will be its purpose? Who will use it? What electrical and mechanical components shall I use? How will I make the body shell for my toy vehicle? Will my product meet the needs, wants and interests of the user group?
	Thread	**FOOD**	**TEXTILES**	**TEXTILES**	**MECHANISMS**

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		Year 3	Year 4	Year 5	Year 6
		Mechanisms- pneumatics.	Shell structures using CAD	**Frame structures**	Frame structures using CAD
		Designing, making and evaluating a moving 'creature in a box' toy for small children	**Designing, making and evaluating CAD-based packaging to protect and display a food product for sale**	**Designing and making a small-scale shelter for children to use in the school wildlife area**	**Designing, making and evaluating CAD structures to design a vehicle for a toy**
SPRING TERM	KEY KNOWLEDGE	analyse and evaluate familiar objects that use air to make them work Construct a simple pneumatic system Use correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.	investigate a collection of different shell structures including packaging To use simple drawing software such as Techsoft 2D Primary or Microsoft Word. Explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares, ellipses, trapezoids and triangles. Using computer-aided design (CAD) software ask the children to print out their nets to develop prototypes in order to evaluate and refine their ideas	develop an understanding of using triangulation to add strength to a structure. How to build 3-D frameworks such as cubes, cuboids and pyramids. To know which skills and techniques are used to accurately joining framework materials together To know which techniques are used in using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate.	To use simple 3D CAD software such as Tinkercad to explore the interface and drawing tools to practise drawing and manipulating shapes such as cubes, spheres, cylinders, and triangles. use the inbuilt simulation tools to test their structures. to develop a design using computer-aided design (CAD) software to create structures, addressing the needs of the user and the purpose.
	KEY VOCAB	Compressed – Input – Output Pivot – Lever – Pneumatic – Hydraulic Pressure Inflate – Deflate – Syringe – System	**CAD – Shell structure –. Edge – Face Vertex – Font – Net – Cuboid • Prism –**	**Modelling – Compression –. Strut – Tension – Tie – Diagonal – Horizontal – Vertical – Triangulation – Frame structure**	**CAD –.Frame structure. Handle** – a. **Dimension Work plane – Triangulation Compression –.Tension –• CAM –**
	IMPACT QUESTIONS	What sort of moving toy shall I make and who will it be for? Which pneumatic system will work best? *Why do the syringes move at different speeds?*	How can CAD help me make a package that is accurate, strong and appealing? Which materials will I use? How can I use CAD to get the graphic effects that I want?	How well does the frame structure meet users' needs and purposes? Why were materials chosen? What methods of construction have been used? How has the framework been strengthened, reinforced and stiffened? How does the shape of the framework affect its strength??	How can CAD help me make a structure that is accurate, strong and appealing? Which materials will I use? Which shape(s) will be the best to provide the best support? How will I strengthen or reinforce my structure? How can I use CAD to create the structure that I want?
	Thread	**MECHANISMS**	**STRUCTURES**	**STRUCTURES**	**STRUCTURES**

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		Year 3	Year 4	Year 5	Year 6
		Electrical systems- simple circuits and switches.	**Electrical systems- simple programming and control**	Food- celebrating culture and seasonality.	**electrical systems- complex switches**
		Designing, making and evaluating a night light for a brother, sister or friend	**Designing, making and evaluating a personalised, programmable nightlight for themselves or another child**	SUMMER **Designing, making and evaluating a yeast-based snack for parents and children for lunch**	**Designing, making and evaluating an alarm to protect a valuable artefact**
SUMMER TERM	KEY KNOWLEDGE	to investigate examples of switches, including those which are commercially available, which work in different ways e.g. push-to-make, push-to-break, toggle switch. to find a fault in a simple circuit and correct it, Use a simple microcontroller program with an interface box or standalone control box to physically control output devices e.g. bulbs and buzzers.	children to know the use of a microcontroller to control output devices, e.g. bulbs and buzzers, using a repeating sequence of instructions to know the purpose of the battery-powered, programmable products that they will be designing and making and how they will work more effectively for the intended user than those that are manually controlled To write, test and debug programs that will control the electrical product they have made for a clearly defined purpose e.g. bulb on a nightlight switching off after a period of time when the user has gone to sleep or LEDs flashing on and off to illuminate a sign in a shop window.	Children use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. *Which shape is most appealing and why?*	Children need to learn how to write a sequence of instructions where a decision is made e.g. when a switch is pressed a buzzer is activated. • They use a 'control language' or create a flowchart to produce a series of instructions. • Children's computing knowledge and skills need to focus on using input and output devices connected to a standalone box or interface box. • They use their learning in computing to control and monitor productsthey have designed and made e.g. alarm system.
	KEY VOCAB	Circuit – Conductor – Insulator Prototype – Push-to-break switch – Push-to-make switch – Reed switch –. Toggle switch System –. Output devices – Input devices –	Program –. Microcontroller – • Light emitting diode (LED) – • System – Output devices Input devices –. Process	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality	**Modelling** –. **Open switch** – **Closed switch** – **Normally open** – **Normally closed** – **Computer control input** – **Output devices • Input devices**

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	IMPACT QUESTIONS	What switch will work best for my night light? How will I make the base, casing and shade? Will the night light meet the needs of the user and achieve its purpose?	How will I control my night light so that it turns on and off when I want it to? How will it be powered? What will I use as a housing to contain the parts of the product?	What ingredients could it contain? How could it be innovative? What techniques will I use and what equipment do I need?	How can computer control improve my alarm system? What output devices should I use? What tools and components will I need?
	Thread	**Electrical Systems**	**Electrical Systems**	**FOOD**	**Electrical Systems**