Design and Technology Skills and Progression Map

Design and Technology Key Aspects:

1. **Investigation of existing products (comparing and contrasting)**
2. **Significant people (KS2)**
3. **Practice of skills**
4. **Designing a final product (user, purpose, design specification and design criteria)**
5. **Making using their designs**
6. **Evaluating their final product**

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Investigation – exploring, comparing and contrasting existing products	• All products are designed for a specific purpose. • **Name different products and describe what they are used for.**	• Everyday products are objects that are used routinely at home and school, such as a toothbrush, cup or pencil. • All products are designed for a specific purpose. • **Name and explore a range of everyday products and describe**	• **Identify the features and properties of existing products and how they fulfil their intention.** • Products can be improved in different ways, such as making them easier to use, more hardwearing or more attractive. • **Explain how an everyday product could be improved.**	• Particular products have been designed for specific tasks, such as nail clippers, the spinning top and the cool box. • **Summarise how an existing product benefits the use**	• Design features are the aspects of a product's design that the designer would like to emphasise, such as the use of a particular material or feature that makes the product easier to use or more durable. • **Reach informed conclusions about the design**	• Culture is the language, inventions, ideas and art of a group of people. A society is all the people in a community or group. • Culture affects the design of some products. For example, knives and forks are used in the western world, whereas chopsticks are	• **Analyse how an invention or product has significantly changed or improved people's lives.** • For example, the Morrison shelter, designed by John Baker in 1941, was an indoor air-raid shelter used in over half a million homes during the Second World War. It saved the lives of many people

		how they are used and why they are important. • **Two products can be compared by looking at a set of criteria and scoring both products against each one.** • **Describe the similarities and differences between two products.**			**features of a familiar product.**	used mainly in China and Japan. • The design of products needs to take into account the culture of the target audience. For example, colours might mean very different things in different cultures. • **Justify how the design of a product has been influenced by the culture or society in which it was designed or made.**	caught in bombing raids.
Significant people designers linked to the final product		• Many key individuals have helped to shape the world. These include engineers, scientists, designers, inventors and many other people in important roles. • **Name and identify the work of some designers locally, nationally and globally.**		• Key inventions in design and technology have changed the way people live. • **Reason how key events in**	• Significant designers and inventors can shape the world. • **Summarise how and why a significant designer or**	• Many new designs and inventions influenced society. • **Make reasoned judgements about the**	• **Present a detailed account of the significance of a favourite designer or inventor.** • The significance of a designer or

		• **Explain why a designer or inventor is important.**	**design and technology have shaped the world.**	**inventor shaped the world.**	**social influence of a significant designer or inventor.** • E.g., labor-saving devices in the home reduced the amount of housework, which was traditionally done by women. This enabled them to have jobs.	inventor can be measured in various ways. Their work may benefit society in health, transport, communication, education, the built environment or technology. It may enhance culture in different areas, such as fashion, ceramics or computer games.
Practice of skills using specific skills, equipment and understanding technical knowledge	• Follow procedures for safety and hygiene. • **Safely use and explore** a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function	KS1 – Follow procedures for safety and hygiene Know: • The simple working characteristics of materials and components • The movement of simple mechanisms such as levers, sliders, wheels and axles • How freestanding structures can be made stronger, stiffer and more stable • 3-D textiles product can be assembled from two identical fabric shapes	LKS2: Follow procedures for safety and hygiene Know: • How mechanical systems such as levers and linkages or pneumatic systems create movement • How simple electrical circuits and components can be used to create functional products • How to program a computer to control their products • How to make strong, stiff shell structures		UKS2: Follow procedures for safety and hygiene Know: • How mechanical systems such as cams or pulleys or gears create movement • How more complex electrical circuits and components can be used to create functional products • How to program a computer to monitor changes in the environment and control their products • How to reinforce and strengthen a 3D framework	

		• Food ingredients should be combined according to their sensory characteristics • Correct technical vocabulary for the projects they are undertaking		• That food ingredients can be fresh, pre-cooked and processed		• That a 3D textiles product can be made from a combination of fabric shapes • That a recipe can be adapted by adding or substituting one or more ingredients	
<u>Designing a product –</u> considering user, purpose, design specification and criteria	• To represent their ideas verbally or as pictures	• Design criteria are the explicit goals that a project must achieve. • To design products that appeal to themselves • **To discuss their thought-out plans and draw them before making**	• To design according to agreed criteria. • **To annotate diagrams of proposed designs.** • Generate and communicate their ideas through a range of different methods. Ideas can be communicated in a variety of ways, including: ***written work, drawings and diagrams, modelling, speaking and using information and communication technology.***	• To **generate** realistic designs. • Generate their own simple design criteria. • **To draw a *cross section diagram* of their design**	• To design a practical product • **To draw an expanded *labelled diagram* with *some measurements***	• To design a product that takes into account another user's design criteria. • **Make reasoned judgements when choosing specific ingredients or substituting**	• To **generate** detailed designs and **justify** their choices • **Select appropriate materials and explain choices**

Making a product – using plans to inform	Making: Preparing a healthy snack Applying skills from 'Toolkit' topic to design something (must have a purpose e.g., boat that floats) Simple moving vehicle	Making: Piece of playground equipment – PoaP Freestanding structure Baking bread – PoaP **adapted** preparing fruit and vegetables Moon buggies – PoaP wheels and axles	Making: Moving Christmas card – PoaP slides and levers Lavander bags – PoaP templates and joining Pasta salad – PoaP preparing fruit and vegetables	Making: Moving toy – PoaP Pneumatics Moving storybook – PoaP levers and linkages Food packaging for roman biscuit – PoaP shell structures	Making: Making healthy wraps – PoaP healthy and varied diet Illuminating light (torch)- PoaP Simple circuits and switches Gift box – PoaP CAD shell structures	Making: A rollercoaster – PoaP Pulleys or gears Savoury scones – PoaP celebrating seasonality Pyramid monuments – PoaP frame structures	Making: Evacuee bag – PoaP combing different fabric shapes Working toy – PoaP CAMs Nightlight – PoaP monitoring and control
	• Follow procedures for safety and hygiene • Make products to fulfil a purpose • Safely use a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	**End of KS1:** Follow procedures for safety and hygiene • Use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components • Specific tools are used for particular purposes. For example, scissors are used for cutting and glue is used for sticking. Select the appropriate tool for a simple practical task. • Measure, mark out, cut and shape materials and components • Assemble, join and combine materials and components • Use finishing techniques, including those from art and design		**End of LKS2:** Follow procedures for safety and hygiene • Measure, mark out, cut and shape materials and components with some accuracy • Materials for a specific task must be selected on the basis of their properties. These include physical properties as well as availability and cost. • Assemble, join and combine materials and components with some accuracy • Apply a range of finishing techniques, including those from art and design, with some accuracy • Refer to their design criteria as they design and make		**End of UKS2:** Follow procedures for safety and hygiene • Accurately measure, mark out, cut and shape materials and components • Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. Useful tools for joining include glue guns. Tools should only be used with adult supervision and safety rules must be followed. Select, name and use tools with adult supervision. • Select appropriate tools for a task and use them safely and precisely. • Accurately assemble, join and combine materials and components • Accurately apply a range of finishing techniques, including those from art and design • Use techniques that involve a number of steps	

						• Demonstrate resourcefulness when tackling practical problems	
Evaluation	• To **describe** what they have made and its purpose • Share their creations, **explaining the process they have used**	• **Name and explore** existing products to inform their own. • **Talk about their own and each other's work, identifying *strengths or weaknesses and offering support.*** • **Describe** how their products could be improved	• To **evaluate** the success of their project **comparing and contrasting** it against a success criterion and say what they could do better in the future	• **Evaluate** how well their system works in own design • Reflect on the combination of ingredients and how well these work together or satisfy the design criteria. • Use their design criteria to evaluate completed products. • Suggest improvements to their products and describe how to implement them, beginning to take the views of others into account.	• **Use their design criteria to evaluate completed products.** • ***Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive appearance, what changes were made during the making process and why the changes were made.*** • Evaluation also includes suggesting improvements and explaining why they should be made. Identify what has worked well	• Testing a product against the design criteria will highlight anything that needs improvement or redesign. • Changes are often made to a design during manufacture. • **Test and evaluate** products against a detailed design specification and make adaptations as they develop the product.	• Design is an iterative process, meaning **critiques**, alterations and improvements are made continually throughout the manufacturing process. • **Evaluating a product while it's being manufactured, and explaining these evaluations to others, can help to refine it.** • Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others. • **Reflect on how technology has had an impact**

					and what aspects of their products could be improved, acting on their own suggestions and those of others when making improvements.		**on designing and making products**
Structure		**Key Stage 1:** Different materials can be used for different purposes, depending on their properties. Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. A broader base will also make a structure more stable. **Explore how a structure can be made stronger, stiffer and more stable.**		**Lower Key Stage 2:** Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. ***A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials.*** Prototype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them.		**Upper Key Stage 2**: Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them). Frameworks can be built using lolly sticks, skewers and bamboo canes. ***Build a framework using a range of materials to support mechanisms.***
Mechanisms and movement	• Understanding what makes things move	**Key stage 1:** An axle is a rod or spindle that passes through the centre of a wheel to		**Lower Key Stage 2:** Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a		**Upper Key Stage 2:** Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams.	

		connect two wheels. ***Use wheels and axles to make a simple moving model.*** A mechanism is a device that takes one type of motion or force and produces a different one. A mechanism makes a job easier to do. Mechanisms include sliders, levers, linkages, gears, pulleys and cams. ***Use a range of mechanisms (levers, sliders, wheels and axles) in models or products***. Sliders move from side to side or up and down, and are often used to make moving parts in books.	model monster's mouth. These effects can be achieved using syringes and plastic tubing. ***Use mechanical systems in their products, such as pneumatics*** . Levers consist of a rigid bar that rotates around a fixed point, called a fulcrum. They reduce the amount of work needed to lift a heavy object. **Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products.**	Mechanisms can be used to add functionality to a model. For example, pulleys in cable cars or transport systems and cams in 3-D moving toys or pictures. Other mechanisms include pneumatics and hydraulics. **Explore and use a range of mechanisms (levers, axles, cams, gears and pulleys) in models or products.** **Explain and use mechanical systems in their products to meet a design brief.**
Electricity			**Lower Key Stage 2:** Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for lights and televisions. ***Incorporate circuits that use a variety of components into models or products.***	**Upper Key Stage 2:** Computer programs can control electrical circuits that include a variety of components, such as switches, lamps, buzzers and motors. ***Understand and use electrical circuits that incorporate a variety of components (switches, lamps, buzzers and motors) and use programming to control their products.***
Use of ICT			**Lower Key Stage 2:** Computer-aided design is when computers are used to help design products. ***It has advantages over paper design in that it will show how finished products will look.*** Different colours and textures can also be trialled.	**Upper Key Stage 2:** Use ICT to research and analyse existing products. Computer monitoring uses sensors as a scientific tool to record information about environmental changes over time. Use a sensor to monitor an environmental variable, such as temperature, sound or light.

Cutting and joining textiles	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function • To use scissors safely	**Key Stage 1:** ***Use simple tools to effectively cut and shape materials needed for their products***. Scissors are used to cut fabrics. ***Glue and simple stitches, such as running stitch, can be used to join fabrics***. Running stitch is made by passing a needle in and out of fabric at an even distance. ***Cut and join textiles using glue and simple stitches.*** Fabric can be decorated using materials and small objects, such as buttons and sequins. Decorations can be attached to the fabric by gluing, stapling or tying. ***Use gluing, stapling or tying to decorate fabric, including buttons and sequins.***	**Lower Key Stage 2:** Application of textiles in Art & Design	**Upper Key Stage 2:** Pinning with dressmaker pins and tacking with quick, temporary stitches holds fabric together in preparation for and during sewing. ***Pin and tack fabrics in preparation for sewing and more complex pattern work.*** Fastenings hold a piece of clothing together. Types of fastenings include zips, press studs, Velcro and buttons. ***Use different methods of fastening for function and decoration, including press studs, Velcro and buttons.***

Origins of food	• Understand some important processes and changes in the natural world around them	**Key Stage 1:** Some foods come from animals, such as meat, fish and dairy products. Other foods come from plants, such as fruit, vegetables, grains, beans and nuts. **Sort foods into groups by whether they are from an animal or plant source.** **Identify the origin of some common foods (milk, eggs, some meats, common fruit and vegetables).** Understand that food has to be farmed, grown elsewhere (e.g., home) or caught.	**Lower Key Stage 2:** The types of food that will grow in a particular area depend on a range of factors, such as the rainfall, climate and soil type. For example, many crops, such as potatoes and sugar beet, are grown in the south-east of England. Wheat, barley and vegetables grow well in the east of England. **Identify and name foods that are produced in different places.** Particular areas of the world have conditions suited to growing certain crops, such as coffee in Peru and citrus fruits in California in the United States of America. **Identify and name foods that are produced in different places in the UK and beyond.**	**Upper Key Stage 2:** Seasonality is the time of year when the harvest or flavour of a type of food is at its best. Buying seasonal food is beneficial for many reasons: the food tastes better; it is fresher because it hasn't been transported thousands of miles; the nutritional value is higher; the carbon footprint is lower, due to reduced transport; it supports local growers and is usually cheaper. **Describe what seasonality means and explain some of the reasons why it is beneficial.** Know that a recipe can be adapted by adding or substituting one or more ingredients. Organic produce is food that has been grown without the use of man-made fertilisers, pesticides, growth regulators or animal feed additives. Organic farmers use crop rotation, animal and plant manures, hand-weeding and biological pest control. **Explain how organic produce is grown.**
Food preparation, cooking and nutrition	• To understand the need for a healthy diet • To give examples of healthy/unhealthy foods • To have food outdoors	**Key Stage 1:** **Measure and weigh** food items using non-standard measures, such as spoons and cups (Year 1). Fruit and vegetables are an important part of a healthy diet. It is recommended that people eat at least five portions of fruit and vegetables every day. **Name and sort foods into the 5 food groups** (Eat Well Plate). **Understand** how this links to a healthy balanced diet. Some ingredients need to be prepared before they can be cooked or eaten.	**Lower Key Stage 2:** Preparation techniques for savoury dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning. Prepare and cook a simple sweet or savoury dish. **Identify the main food groups** (carbohydrates, protein, dairy, fruits and vegetables, fats and sugars) and explain their uses. Cooking techniques include ***baking, boiling, frying, grilling and roasting. Identify and use a range of cooking techniques to prepare a simple meal or snack.***	**Upper Key Stage 2:** Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet one. Use an increasing range of preparation and cooking techniques to cook a savoury dish. A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions. **Evaluate meals and consider if they contribute towards a balanced diet.**

		Prepare ingredients by peeling, grating, chopping and slicing. Prepare simple dishes safely and hygienically, without using a heat source	A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meat, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk. Design a healthy snack or packed lunch and explain why it is healthy.	*Follow a recipe that requires a variety of techniques and source the necessary ingredients independently.*