Design and Technology Curriculum: Year 5

What are the aims and intentions of this curriculum?

That by the end of KS2, children:

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 mechanical systems in their products [for example, gears, pulleys, cams, 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 computing to program, monitor and control their products

Cooking and Nutrition

- 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.

Term	**Topic**	**Knowledge** **Technical Knowledge*	**Skills** **Design *Make *Evaluate*	**Vocabulary**

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1	**Food: What could be healthier?**	To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues To know that I can adapt a recipe to make it healthier by substituting ingredients To know that I can use a nutritional calculator to see how healthy a food option is To understand that 'cross-contamination' means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects	Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients Writing an amended method for a recipe to incorporate the relevant changes to ingredients Designing appealing packaging to reflect a recipe Cutting and preparing vegetables safely Using equipment safely, including knives, hot pans and hobs Knowing how to avoid cross-contamination Following a step-by-step method carefully to make a recipe Identifying the nutritional differences between different products and recipes Identifying and describing healthy benefits of food groups	Beef, Cross-contamination, Diet, Ethical issues, Farm, Healthy, Ingredients, Method, Nutrients, Packaging, Reared, Recipe, Research, Substitute, Supermarket, Vegan, Vegetarian, Welfare
2	**Electrical systems: Doodlers**	To know that series circuits only have one direction for the electricity to flow. To know when there is a break in a series circuit, all components turn off. To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. To know a motorised product is one which uses a motor to function. To know that product analysis is critiquing the strengths and weaknesses of a product. To know that 'configuration' means how the parts of a product are arranged.	Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. Developing design criteria based on findings from investigating existing products. Developing design criteria that clarifies the target user. Altering a product's form and function by tinkering with its configuration. Making a functional series circuit, incorporating a motor. Constructing a product with consideration for the design criteria. Breaking down the construction process into steps so that others can make the product. Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. Determining which parts of a product affect its function and which parts affect its form.	Circuit component configuration current develop DIY investigate motor motorised problem solve product analysis series circuit

			Analysing whether changes in configuration positively or negatively affect an existing product. Peer evaluating a set of instructions to build a product.	stable target user
3	**Mechanical systems: Making a pop-up book**	To know that mechanisms control movement To understand that mechanisms that can be used to change one kind of motion into another To understand how to use sliders, pivots and folds to create paper-based mechanisms To know that a design brief is a description of what I am going to design and make To know that designers often want to hide mechanisms to make a product more aesthetically pleasing	Designing a pop-up book which uses a mixture of structures and mechanisms Naming each mechanism, input and output accurately Storyboarding ideas for a book Following a design brief to make a pop-up book, neatly and with focus on accuracy Making mechanisms and/or structures using sliders, pivots and folds to produce movement Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result Evaluating the work of others and receiving feedback on own work Suggesting points for improvement	Aesthetic, Computer-aided design (CAD), Caption, Design, Design brief, Design criteria, Exploded-diagram, Function, Input, Linkage, Mechanism, Motion, Output, Pivot, Prototype, Slider, Structure, Template
4	**Digital world: Monitoring devices**	To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met To understand key developments in thermometer history To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future To know the 6Rs of sustainability	Researching (books, internet) for a particular (user's) animal's needs Developing design criteria based on research Generating multiple housing ideas using building bricks Understanding what a virtual model is and the pros and cons of traditional and CAD modelling Placing and manoeuvring 3D objects, using CAD Changing the properties of, or combine one or more 3D objects, using CAD Understanding the functional and aesthetic properties of plastics Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range Stating an event or fact from the last 100 years of plastic history	Alert, Ambient, Boolean, Consumables, Decompose, Development, Device, Duplicate, Durable, Electronic, Inventor, Lightweight, Man-made, Manipulate, Manoeuvre, Microplastics, Model, Monitor, Monitoring device, Moulded Plastic, Plastic pollution, Programming comment, Programming loop, Reformed, Replica,

		To understand what a virtual model is and the pros and cons of traditional vs CAD modelling	Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices Explaining key functions in my program (audible alert, visuals) Explaining how my product would be useful for an animal carer including programmed features	Research, Sensor, Strong, Sustainability, Synthetic, Thermometer, Thermoscope, Value, Variable, Versatile, Water-resistant, Work plane
5	**Structures: Bridges**	To understand some different ways to reinforce structures To understand how triangles can be used to reinforce bridges To know that properties are words that describe the form and function of materials To understand why material selection is important based on their properties To understand the material (functional and aesthetic) properties of wood To understand the difference between arch, beam, truss and suspension bridges To understand how to carry and use a saw safely	Designing a stable structure that is able to support weight Creating frame structure with focus on triangulation Making a range of different shaped beam bridges Using triangles to create truss bridges that span a given distance and supports a load Building a wooden bridge structure Independently measuring and marking wood accurately Selecting appropriate tools and equipment for particular tasks Using the correct techniques to saws safely Identifying where a structure needs reinforcement and using card corners for support Explaining why selecting appropriating materials is an important part of the design process Understanding basic wood functional properties Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary Suggesting points for improvements for own bridges and those designed by others	Abutment, Accurate, Arched bridge, Beam bridge, Coping saw, Evaluation, File, Mark out, Material properties, Measure, Predict, Reinforce, Research, Sandpaper, Set square, Suspension bridge, Tenon saw, Test, Truss bridge, Wood