Design and Technology – Medium Term Planning

2023-24

Cycle A	Autumn	Spring	Summer
KS1	**Mechanisms: Making a moving Christmas character** <u>Skills:</u> • Creating a design criteria for a moving Christmas character as a class. • Designing a moving Christmas character for a specific audience in accordance with a design criteria. • Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly. • Evaluating own designs against design criteria. • Using peer feedback to modify a final design. <u>Knowledge:</u> • To know that mechanisms are a collection of moving parts that work	**Structures: Constructing a rotary vehicle e.g. an aeroplane** <u>Skills:</u> • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. • Making stable structures from card, tape and glue. • Learning how to turn 2D nets into 3D structures. • Following instructions to cut and assemble the supporting structure of a rotary vehicle. • Making functioning turbines and axles which are assembled into a main supporting structure. <u>Knowledge:</u> • To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (and, therefore, they are	**Food: A balanced diet** <u>Skills:</u> • Designing a healthy wrap based on a food combination which works well together. • Slicing food safely using the bridge or claw grip. • Constructing a wrap that meets a design brief. • Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products. • Describing the information that should be included on a label. • Evaluating which grip was most effective. <u>Knowledge:</u> • To know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet.

	together as a machine to produce movement. • To know that there is always an input and an output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers. Link: Mechanisms: Making a moving monster - Kapow Primary	the main shape used for vehicles e.g. an aeroplane). • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together. Link: KS1 Y1 Design & Technology Constructing Windmills- Kapow Primary	• To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that 'ingredients' means the items in a mixture or recipe. • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'. Link: Food: A balanced diet - Kapow Primary
LKS2	**Food: Adapting a recipe** Skills: • Designing a food item within a given budget, drawing upon previous taste testing.	**Mechanical Systems: Making a slingshot car** Skills: • Designing a shape that reduces air resistance.	**Digital world: Electronic charm** Skills:

	• Following a baking recipe. • Cooking safely, following basic hygiene rules. • Adapting a recipe. • Evaluating a recipe, considering: taste, smell, texture and appearance. • Describing the impact of the budget on the selection of ingredients. • Evaluating and comparing a range of products. • Suggesting modifications. <u>Knowledge:</u> • To know that the amount of an ingredient in a recipe is known as the 'quantity'. • To know that it is important to use oven gloves when removing hot food from an oven. • To know the following cooking techniques: sieving, creaming, rubbing method, cooling. • To understand the importance of budgeting while planning ingredients for biscuits. <u>Link:</u>	• Drawing a net to create a structure from. • Choosing shapes that increase or decrease speed as a result of air resistance. • Personalising a design. • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. <u>Knowledge:</u> • To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that the shape of a moving object will affect how it moves due to air resistance. <u>Link:</u>	• Problem solving by suggesting potential features on a Micro:bit and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Analysing and evaluating an existing product. <u>Knowledge:</u> • To understand that in programming a 'loop' is code that repeats something again and again until stopped. • To know that a Micro:bit is a pocket-sized, codeable computer. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm. <u>Link:</u> <u>KS2 Y3: Design and Technology: Smart Wearables Unit - Kapow Primary</u>

	Food: Adapting a recipe - Kapow Primary	Mechanical systems: Making a slingshot car - Kapow Primary	
UKS2	**Electrical systems: Electronic Christmas greeting card** Skills: • Designing a Christmas card, identifying and naming the components required for the circuit. • Drawing a design from different perspectives. • Generating ideas through sketching and discussion. • Modelling ideas through prototypes. • Understanding the purpose of greeting cards. • Accurately cutting, folding and assembling a card. • Decorating the card with a high-quality finish. • Making and testing a circuit. • Incorporating a circuit into a base of a card. • Testing their own and others' finished cards, identifying what went well and making suggestions for improvement. • Gathering images and information about existing light up Christmas cards.	**Mechanical systems: Automata toys** Skills: • Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Understanding how linkages change the direction of a force. • Making things move at the same time. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design. • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required. • Measuring, marking and cutting components accurately using a ruler and scissors. • Assembling components accurately to make a stable frame. • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.	**Food: Making a series of savoury dishes** Skills: • Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken. • Following a recipe, including using the correct quantities of each ingredient. • Adapting a recipe based on research. • Working to a given timescale. • Working safely and hygienically with independence. • Evaluating a recipe, considering: taste, smell, texture and origin of the food group. • Taste testing and scoring final products. • Suggesting and writing up points of improvements in productions. • Evaluating health and safety in production to minimise cross contamination. Knowledge: • To know that 'flavour' is how food tastes.

	• Analysing a selection of existing light up Christmas cards. Knowledge: • To know that 'form' means the shape and appearance of an object. • To know the difference between 'form' and 'function'. • To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To know that 'form over purpose' means that a product looks good but does not work very well. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind. Link: Electrical systems: Electronic greetings cards (archived) - Kapow Primary	• Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes they would make/do if they were to do the project again. Knowledge: • To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs. • To know that an automata is a hand-powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product. Link: Mechanical systems: Automata toys - Kapow Primary	• To know that many countries have 'national dishes' which are recipes associated with that country. • To know that 'processed food' means food that has been put through multiple changes in a factory. • To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork). Link: Food: Come dine with me - Kapow Primary *Possible visit to Rethink food

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2022-23

Cycle B	Autumn	Spring	Summer
KS1	**Mechanisms: Making a moving Christmas card** <u>Skills:</u> • Explaining how to adapt mechanisms, using bridges or guides to control the movement. • Designing a moving Christmas card for a given audience. • Following a design to create moving models that use levers and sliders. • Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. • Reviewing the success of a product by testing it with its intended audience. <u>Knowledge:</u> • To know that a mechanism is the parts of an object that move together. • To know that a slider mechanism moves an object from side to side.	**Structures: Making a chair/throne** <u>Skills:</u> • Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. • Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of their own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of their own structure.	**Food: Fruit and vegetables** <u>Skills:</u> • Designing packaging (e.g. a smoothie carton) by-hand or on ICT software. • Chopping fruit and vegetables safely to make a food product e.g. fruit salad, soup, fruit kebab etc. • Identifying if a food is a fruit or a vegetable. • Learning where and how fruits and vegetables grow. • Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging. <u>Knowledge:</u> • To understand the difference between fruits and vegetables.

	• To know that a slider mechanism has a slider, slots, guides and an object. • To know that bridges and guides are bits of card that purposefully restrict the movement of the slider. Link: Mechanisms: Making a moving story book - Kapow Primary	Knowledge: • To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily. • To know that a 'stiff' structure or material is one which does not bend easily. Link: Structures: Baby Bear's chair - Kapow Primary	• To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). • To know that a fruit has seeds and a vegetable does not. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground. • To know that vegetables can come from different parts of the plant. Link: D&T Fruit and Vegetables KS1 Y1 - Kapow Primary **Wow experiences** Themed food workshops with Classroom Kitchen: Cookery-Workshops-Advanced-Booking-Form.pdf (secureservercdn.net)
LKS2	**Food: Eating seasonally** Skills:	**Electrical systems: Torches** Skills:	**Structures: Constructing a building/monument** Skills:

	• Creating a healthy and nutritious recipe for a savoury food item using seasonal ingredients, considering the taste, texture, smell and appearance of the dish. • Knowing how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe. • Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment. • Suggesting points for improvement when making a seasonal savoury item. <u>Knowledge:</u> • To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'.	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria. • Evaluating electrical products. • Testing and evaluating the success of a final product. <u>Knowledge:</u> • To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. • To understand common features of an electric product (switch, battery or plug, dials, buttons etc.) • To understand that an electric product uses an electrical system to work (function). • To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits	• Designing a building/monument with key features to appeal to a specific person/purpose. • Drawing and labelling a building/monument design using 2D shapes. • Designing and/or decorating a building/monument features on CAD software. • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • Suggesting points for modification of the individual designs. <u>Knowledge:</u> • To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures. • To know the following features of a building/monument: columns, towers, walls, windows, archway,

	• To know that imported food is food that has been brought into the country. Link: Food: Eating seasonally - Kapow Primary	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit. Link: Electrical systems: Torches - Kapow Primary Y3 KS2 D&T Electrical Systems: Electric Poster Unit - Information design (kapowprimary.com)	door, spires and gatehouse – and their purpose. • To understand that a building/monument need to be strong and stable to remain standing and withstand different weather conditions. Link: D&T Structures: Constructing a castle KS2 - Kapow Primary
UKS2	**Structures: Bridges** Skills: • Designing a stable structure that is able to support weight. • Creating a frame structure with focus on triangulation. • Making a range of different shaped beam bridges.	**Digital World: Navigating the world** Skills: • Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Developing a product idea through annotated sketches.	**Food: What could be healthier?** Skills: • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.

	• Using triangles to create truss bridges that span a given distance and support 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 saw safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriate 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. <u>Knowledge</u> • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges.	• Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combine one or more 3D objects, using CAD. • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N,E, S,W cardinal compass. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept. • <u>Knowledge:</u> • To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the	• Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe. • Cutting and preparing recipes safely *school visit • Using equipment safely, including knives, hot pans and hobs *school visit • Knowing how to avoid cross-contamination *school visit • Following a step-by-step method carefully to make a recipe *school visit • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups. <u>Knowledge:</u> • 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 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. Link: D&T KS2 Structure: Bridges - Kapow Primary	product can function without human input. • To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing. Link: KS2 Year 6: D&T: Digital World: Navigating the World - Kapow Primary	• 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. Link: Food: What could be healthier? - Kapow Primary *A school visit to Wagamama to complete a healthy eating workshop.