Design and Technology

Disciplinarians Concepts: Design, Make and Evaluate

Food, Structures, Textiles, Digital World, Electrical Systems, Mechanisms / Mechanical Systems

Autumn

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
My Planet **Our Planet** **Reception** **Expressive Arts and Design** Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills. **Physical Development** • Develop their small motor skills so that they can use a range of tools competently, safely and confidently . ***My Planet*** ***Our Planet***	***I'm Here*** **Food** **Making a Smoothie** **Knowledge** • Understanding the difference between fruits and vegetables • 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 (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber) **Skills** **Design** • Designing smoothie carton packaging by-hand or on ICT software **Make** • Chopping fruit and vegetables safely to make a smoothie • Identifying if a food is a fruit or a vegetable • Learning where and how fruits and vegetables grow **Evaluate**	***Children should be seen and not heard*** **Textiles** **Making a Puppet** **Knowledge** • To know that 'joining technique' means connecting two pieces of material together • To know that there are various temporary methods of joining fabric by using staples. glue or pins • To understand that different techniques for joining materials can be used for different purposes • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times • To know that drawing a design idea is useful to see how an idea will look **Skills** **Design** • Using a template to create a design for a puppet **Make** • Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction **Evaluate**	**Stones, Bones and Survival** Stone Age **Textiles** **Making a Pouch** **Knowledge** • To know that sewing is a method of joining fabric • To know that different stitches can be used when sewing • To understand the importance of tying a knot after sewing the final stitch • To know that a thimble can be used to protect my fingers when sewing **Skills** **Design** • Designing a pouch **Make** • Selecting and cutting fabrics for sewing • Decorating a pouch using a running stitch • Threading a needle • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric • Neatly pinning and cutting fabric using a template **Evaluate** • Troubleshooting scenarios posed by teacher • Evaluating the quality of the stitching on others' work	**Settle and Stamp** **Food** **Adapting a Recipe – Anglo Saxon bread** **Knowledge** • 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 **Skills** **Design** • Designing a biscuit within a given budget, drawing upon previous taste testing **Make** • Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe **Evaluate** • Evaluating a recipe, considering: taste, smell, texture and appearance	**Tomb Raiders** ***Mechanical Systems*** **Pop-up Book** **Pop up Mummy** **Knowledge** • 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 **Skills** **Design** • 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 **Make**	***The Great War*** ***Textiles*** **Knowledge** • To understand that it is important to design clothing with the client/ target customer in mind • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric • To understand the importance of consistently sized stitches **Skills** **Design** • Designing a waistcoat in accordance to specification linked to set of design criteria to fit a specific theme • Annotating designs **Make** • Using a template when pinning panels onto fabric • Marking and cutting fabric accurately, in accordance with a design • Sewing a strong running stitch, making small, neat stitches and following the edge • Tying strong knots • Decorating a waistcoat - attaching objects using thread and adding a secure fastening • Learning different decorative stitches •

	Tasting and evaluating different food combinations • Describing appearance, smell and taste • Suggesting information to be included on packaging	Reflecting on a finished product, explaining likes and dislikes	• Discussing as a class, the success of their stitching against the success criteria • Identifying aspects of their peers' work that they particularly like and why	• Describing the impact of the budget on the selection of ingredients • Evaluating and comparing a range of products • Suggesting modifications	• 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 **Evaluate** • Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement	Sewing accurately with even regularity of stitches **Evaluate** • Evaluating work continually as it is created

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Spring

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Frozen Planet ***Underwater Planet*** **Reception** **Expressive Arts and Design** Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills. **Physical Development** • Develop their small motor skills so that they can use a range of tools competently, safely and confidently **ELG** **Physical Development** Use a range of small tools, including scissors, paintbrushes **Expressive Arts and Design**	***Castles and Kingdoms*** ***Structures*** ***Making a Chair*** **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 • To know that natural structures are those found in nature • To know that man-made structures are those made by people **Skills**	***Britain is Great*** **Food** **Knowledge** • To know that 'diet' means the food and drink that a person or animal usually eats • To understand what makes a balanced diet • 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	***Riotous Romans*** ***Digital World*** **Knowledge** • 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 •To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result •To know that in Design and technology the term 'smart' means a programmed product •To know the difference between analogue and digital technologies • To understand what is meant by 'point of sale display' • To know that CAD stands for Computer-aided design **Skills** **Design** • Problem solving by suggesting potential	***Victorious Vikings*** ***Electrical Systems*** **Knowledge** • 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 list examples of common electric products (kettle, remote control 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 • To understand the importance and purpose of information design • To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached). **Skills** **Design**	***The Time of Illumination*** **Food** **Knowledge** • To know that 'flavour' is how a food or drink tastes • 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) **Skills** **Design** • Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken **Make** • Following a recipe, including using the correct quantities of each ingredient	***Time Travel*** ***Structures*** ***Greek* Parthenon** **Knowledge** • Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Know and use technical vocabulary relevant to the project **Skills** **Design** • Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches **Make** • Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.

• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used	**Design** • Generating and communicating ideas using sketching and modelling • Learning about different types of structures, found in the natural world and in everyday objects **Make** • 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 **Evaluate** • Exploring the features of structures • Comparing the stability of different shapes • Testing the strength of own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure	do; we call these 'hidden sugars'	features on a Micro: bit and justifying my ideas • Developing design ideas for a technology pouch • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge **Make** • Using a template when cutting and assembling the pouch • Following a list of design requirements • Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch • Applying functional features such as using foam to create soft buttons **Evaluate** • Analysing and evaluating an existing product • Identifying the key features of a pouch	• Carry out research based on a given topic - Vikings to develop a range of initial ideas • Generate a final design for the electric poster with consideration to the client's needs and design criteria • Design an electric poster that fits the requirements of a given brief • Plan the positioning of the bulb (circuit component) and its purpose **Make** • Create a final design for the electric poster • Mount the poster onto corrugated card to improve its strength and withstand the weight of the circuit on the rear • Measure and mark materials out using a template or ruler • Fit an electrical component (bulb) • Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge) **Evaluate** • Learning to give and accept constructive criticism on own work and the work of others • Testing the success of initial ideas against the design criteria and justifying opinions • Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs	• Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence **Evaluate** • 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	• Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. • Use finishing and decorative techniques suitable for the product they are designing and making. **Evaluate** • Investigate and evaluate a range of existing frame structures • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests • Research key events and individuals relevant to frame structures.

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Summer

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Hot Planet **Fantasy Planet** **ELG** **Physical Development** Use a range of small tools, including scissors, paintbrushes **Expressive Arts and Design** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used	***Time Travellers*** ***Mechanisms*** **Knowledge** • To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles • To know that wheels need to be round to rotate and move • To understand that for a wheel to move it must be attached to a rotating axle • To know that an axle moves within an axle holder which is fixed to the vehicle or toy • To know that the frame of a vehicle (chassis) needs to be balanced **Skills** **Design** • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement **Make** • Adapting mechanisms **Evaluate** • Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move	***We make a difference*** ***Structures*** ***Swedish Windmill*** **Knowledge** • 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 (e.g. the main shape used for windmills and lighthouses) • 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 • To know that a client is the person I am designing for • To know that design criteria is a list of points to ensure the product meets the clients needs and wants • To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity • To know that windmill turbines use wind to turn and make the machines inside work • To know that a windmill is a structure with sails	***King Maker*** ***Structures*** ***Constructing a Castle*** **Knowledge** • 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 castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose • To know that a façade is the front of a structure • To understand that a castle needed to be strong and stable to withstand enemy attack • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled • To know that a design specification is a list of success criteria for a product **Skills** **Design** • Designing a castle with key features to appeal to a specific person/purpose • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours • Designing and/or decorating a castle tower on CAD software	***Industrial Revolution*** ***Mechanical Systems*** **Knowledge** • 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. • To understand that products change and evolve over time • To know that aesthetics means how an object or product looks in design and technology • To know that a template is a stencil you can use to help you draw the same shape accurately • To know that a birds-eye view means a view from a high angle (as if a bird in flight) • To know that graphics are images which are designed to explain or advertise something •To know that it is important to assess and evaluate design ideas and models against a list of design criteria. **Skills**	***Earth in Crises*** ***Digital World*** **Knowledge** • To understand what variables are in programming • To know some of the features of a Micro:bit • To know that an algorithm is a set of instructions to be followed by the computer • To know that it is important to check my code for errors (bugs) • To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device •Understand the terms 'ergonomic' and 'aesthetic' •Know that a prototype is a 3D model made out of cheap materials, that allows us •To test design ideas and make better decisions about size, shape and materials **Skills** **Design** • Writing design criteria for a programmed timer (Micro:bit) • Exploring different mindfulness strategies • Applying the results of my research to further inform my design criteria • Developing a prototype case for my mindful moment timer	***The Americas*** ***Electrical Systems*** **Knowledge** • To know that batteries contain acid, which can be dangerous if they leak • To know the names of the components in a basic series circuit including a buzzer 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 • To understand the diagram perspectives 'top view', 'side view' and 'back **Skills** **Design** • Designing a steady hand game - identifying and naming the components required • Drawing a design from three different perspectives • Generating ideas through sketching and discussion

		that are moved by the wind • To know the three main parts of a windmill are the turbine, axle and structure **Skills** **Design** • Learning the importance of a clear design criteria • Including individual preferences and requirements in a design **Make** • 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 windmill • Making functioning turbines and axles which are assembled into a main supporting structure **Evaluate** • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria. Technical knowledge and understanding	**Make** • Constructing a range of 3D geometric shapes using nets • Creating special features for individual designs • Making facades from a range of recycled materials **Evaluate** • 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	**Design** • Designing a shape that reduces air resistance • Drawing a net to create a structure from • Choosing shapes that increase or decrease speed as a result of air resistance • Personalising a design **Make** • Measuring, marking, cutting and assembling with increasing accuracy • Making a model based on a chosen design **Evaluate** • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance	• Using and manipulating shapes and clipart, using computer-aided design (CAD), to produce a logo • Following a list of design requirements **Make** • Developing a prototype case for my mindful moment timer • Creating a 3D structure using a net • Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press **Evaluate** • Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages • Evaluating my micro:bit program against points on my design criteria and amending them to include any changes I made • Documenting and evaluating my project • Understanding what a logo is and why they are important in the world of design and business • Testing my program for bugs (errors in the code) • Finding and fixing the bugs (debug) in my code	• Modelling ideas through prototypes • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function' **Make** • Constructing a stable base for a game • Accurately cutting, folding and assembling a net • Decorating the base of the game to a high quality finish • Making and testing a circuit Incorporating a circuit into a base **Evaluate** • Testing own and others finished games, identifying what went well and making suggestions for improvement • Gathering images and information about existing children's toys • Analysing a selection of existing children's toys