Inspiring Children to shine

'Walk as children of light'

Design at Hardwicke Parochial Primary Academy

Purpose of study

At Hardwicke, we understand that Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims in Key Stage 1 and Key Stage 2

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook

Aims in Early Years Foundation Stage

Vocabulary (EYFS/Key stage 1/ Key stage 2)

Please see separate vocabulary document detailing the vocabulary progression within each year group unit.

Hardwicke Year Group Overview

YEAR GROUP	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
YR						
Y1	Food Fruit & vegetables	Mechanisms Making a moving story book	Structures Constructing a windmill	Textiles Puppets	Mechanisms Wheels and axles	
Y2	Mechanisms Fairground wheel	Food A balanced diet	Mechanisms Making a moving monster	Structures Baby bear's chair	Textiles Pouches	
Y3	Textiles Cushions	Electrical systems Electric poster	Mechanical systems Pneumatic toys	Digital world Electronic charm	Food Eating seasonally	Structures Constructing a castle
Y4	Electrical systems Torches	Mechanical systems Making a slingshot car	Digital world Mindful moments timer	Food Adapting a recipe	Structures Pavilions	Textiles Fastenings
Y5	Mechanical systems Making a pop-up book	Digital World Monitoring devices	Food What could be healthier?	Structures Bridges	Textiles Stuffed toys	Electrical systems Electronic greeting cards
Y6	Digital world Navigating the world	Food Come dine with me	Structures Playgrounds	Textiles Waistcoats	Electrical systems Steady Hand Game	Mechanical Systems Automata toys

- Each termly unit contains 4 lessons.
- A unit can be delivered over 4 consecutive weeks or during a whole day (a maximum of 3 D&T days during an academic year)
- If a unit is delivered in a single day (D&T day), classes within a year group must alternate the day so children who are absent have another opportunity to participate.
- Pupil absence is logged by the class teacher and future D&T days are planned accordingly to ensure a child doesn't multiple 'D&T days)

Progression of skills

KS1	Cooking and nutrition	Mechanisms/ Mechanical systems	Structures	Textiles
NC LINK:	*Design* • design purposeful, functional, appealing products for themselves and other users based on design criteria • generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology *Make* • select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] • select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics *Evaluate* • explore and evaluate a range of existing products • evaluate their ideas and products against design criteria *Technical* • build structures, exploring how they can be made stronger, stiffer and more stable • explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products			
YR	•	•	•	•
Key Vocabulary				
Year 1 *Design* *Make* *Evaluate* *Technical* *Additional*	Designing smoothie carton packaging by-hand or on ICT software 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 Tasting and evaluating different food combinations Describing appearance, smell and taste Suggesting information to be included on packaging Understanding the difference between fruits and vegetables To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber)	• Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement • Following a design to create moving models that use levers and sliders • Adapting mechanisms • 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	• 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 windmill • Making functioning turbines and axles which are assembled into a main supporting structure • To understand that the shape of materials can be changed to improve the strength and stiffness of structures	• Using a template to create a design for a puppet • Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction • Reflecting on a finished product, explaining likes and dislikes • 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 know that a blender is a machine which mixes ingredients together into a smooth liquid 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)	• Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move	• 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 that are moved by the wind • To know the three main parts of a windmill are the turbine, axle and structure	• 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
Key Vocabulary				
Year 2 *Design* *Make* *Evaluate* *Technical* *Additional*	• Designing a healthy wrap based on a food combination which work 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 • 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,	• Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties • Creating a class design criterion for a moving monster Designing a moving monster for a specific audience in accordance with a design criterion • Selecting materials according to their characteristics • Following a design brief • 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 different designs • Testing and adapting a design • Evaluating own designs against design criteria • Using peer feedback to modify a final design	• 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 own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure • 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	• Designing a pouch • Selecting and cutting fabrics for sewing Decorating a pouch using fabric glue or 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 • Troubleshooting scenarios posed by teacher Evaluating the quality of the stitching on others' work • 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 • 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

	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'	• To know that different materials have different properties and are therefore suitable for different uses • To know that mechanisms are a collection of moving parts that work together as a machine to produce movement • To know that there is always an input and 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 • To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder • To know that it is important to test my design as I go along so that I can solve any problems that may occur • To know some real-life objects that contain mechanisms	• 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	• To know that a thimble can be used to protect my fingers when sewing
Key Vocabulary					

KS2	**Cooking and nutrition**	**Mechanisms/ Mechanical systems**	**Structures**	**Textiles**	**Electrical Systems**	**Digital World**
NC LINK:	*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* • 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					
Year 3 *Design* *Make* *Evaluate* *Technical* *Additional*	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish • Knowing how to prepare themselves and a work space 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 tart • 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' • To know that imported food is food which has been brought into the country • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from	• Designing a toy which uses a pneumatic system • Developing design criteria from a design brief • Generating ideas using thumbnail sketches and exploded diagrams • Learning that different types of drawings are used in design to explain ideas clearly • Creating a pneumatic system to create a desired motion • Building secure housing for a pneumatic system • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy • Selecting materials due to their functional and aesthetic characteristics • Manipulating materials to create different effects by cutting, creasing, folding, weaving • Using the views of others to improve designs • Testing and modifying the outcome, suggesting improvements • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client • To understand how pneumatic systems work • To understand that pneumatic systems can be used as part of a mechanism • To know that pneumatic systems operate by drawing	• 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 • 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 • 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	• Designing and making a template from an existing cushion and applying individual design criteria • Following design criteria to create a cushion • Selecting and cutting fabrics with ease using fabric scissors • Threading needles with greater independence • Tying knots with greater independence • Sewing cross stitch to join fabric Decorating fabric using appliqué • Completing design ideas with stuffing and sewing the edges • Evaluating an end product and thinking of other ways in which to create similar items • To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric • To know that when two edges of fabric have been joined together it is called a seam • To know that it is important to leave space on the fabric for the seam • To understand that some products are turned inside out after sewing so the stitching is hidden	• Carry out research based on a given topic (e.g. The Romans) 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 • 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) • 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	• Problem solving by suggesting potential 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 • 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 • Analysing and evaluating an existing product • Identifying the key features of a pouch • 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

	far away and this can negatively impact the environment • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health • To know safety rules for using, storing and cleaning a knife safely • To know that similar coloured fruits and vegetables often have similar nutritional benefits	in, releasing and compressing air • To understand how sketches, drawings and diagrams can be used to communicate design ideas • To know that exploded-diagrams are used to show how different parts of a product fit together • To know that thumbnail sketches are small drawings to get ideas down on paper quickly			to review developing design ideas and check that they fulfil their needs • 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).	• 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
Key Vocabulary						
Year 4 *Design* *Make* *Evaluate* *Technical* *Additional*	• Designing a biscuit within a given budget, drawing upon previous taste testing • Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe • Evaluating a recipe, considering: taste, smell, texture and appearance	• 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	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight • Creating a range of different shaped frame structures	• Writing design criteria for a product, articulating decisions made • Designing a personalised book sleeve • Making and testing a paper template with accuracy and in keeping with the design criteria	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design idea • Making a torch with a working electrical circuit and switch	• 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

	• Describing the impact of the budget on the selection of ingredients • Evaluating and comparing a range of products Suggesting modifications • 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	• 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 • 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.	• Making a variety of free standing frame structures of different shapes and sizes • Selecting appropriate materials to build a strong structure and for the cladding • Reinforcing corners to strengthen a structure • Creating a design in accordance with a plan • Learning to create different textural effects with materials • Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs • To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own • To know that a pavilions ia a decorative building or structure for leisure activities • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks • To know that a product's function means its purpose • To understand that the target audience means the person or group of people a product is designed for • To know that architects consider light, shadow and patterns when designing	• Measuring, marking and cutting fabric using a paper template • Selecting a stitch style to join fabric, working neatly sewing small neat stitches Incorporating fastening to a design • Testing and evaluating an end product against the original design criteria • Deciding how many of the criteria should be met for the product to be considered successful • Suggesting modifications for improvement • Articulating the advantages and disadvantages of different fastening types • To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro • To know that different fastening types are useful for different purposes • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions	• Using appropriate equipment to cut and attach materials • Assembling a torch according to the design and success criterion • Evaluating electrical products • Testing and evaluating the success of a final product • 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 • To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens • To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison	moment timer Using and manipulating shapes and clipart, using computer-aided design (CAD), to produce a logo • Following a list of design requirements • 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 • 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 • 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
Key Vocabulary						
Year 5 *Design* *Make* *Evaluate* *Technical* *Additional*	• 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 • To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues	• 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 • 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	• 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	• Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components • Creating a 3D stuffed toy from a 2D design • Measuring, marking and cutting fabric accurately and independently • Creating strong and secure blanket stitches when joining fabric • Threading needles independently • Using applique to attach pieces of fabric decoration • Sewing blanket stitch to join fabric • Applying blanket stitch so the space between the stitches are even and regular • Testing and evaluating an end product and giving point for further improvements • To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric	• Designing an electronic greetings card with a copper track circuit and components • Creating a labelled circuit diagram showing positive and negative parts in relation to the LED and the battery • writing design criteria for an electronic greeting card Compiling a moodboard relevant to my chosen theme, purpose and recipient • Making a functional series circuit • Creating an electronics greeting card, referring to a design criteria Mapping out where different components of the circuit will go • Evaluating a peer's product against design criteria and suggesting modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of circuit component • Stating what Sir Rowland Hill invented and why it was important for greeting cards	• 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 • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices

	• 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	• To know that designers often want to hide mechanisms to make a product more aesthetically pleasing	weakness and reinforcing them as necessary • Suggesting points for improvements for own bridges and those designed by others • 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	• To understand that it is easier to finish simpler designs to a high standard • To know that soft toys are often made by creating appendages separately and then attaching them to the main body • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely	• Analysing and evaluating a range of existing greeting cards • To know the key components used to create a functioning circuit • To know that copper is a conductor and can be used as part of a circuit To understand that breaks in a circuit will stop it from working • To understand that a series circuit only has one path for the electrical current to flow from positive to negative • To know that we use symbols to represent components in a circuit diagram • To know the names of the components in a basic series circuit: crocodile wires, LED (light-emitting diode), battery holder, battery, cell • To know that product analysis is critiquing the strengths and weaknesses of a product • To know that 'mass production' is when a product is made in large quantities by a machine, usually in a factory • To know that one-off production is when only one of a product is made by hand • To know that 'bespoke' means a product was made for a particular reason or person • To understand the development of personal message exchange through to the invention of the Penny Black stamp, and exchanging of greeting cards	• Explaining key functions in my program (audible alert, visuals) • Explaining how my product would be useful for an animal carer including programmed features • 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 • To understand what a virtual model is and the pros and cons of traditional vs CAD modelling

					• To know that a moodboard may include words, sketches, textures, colours, material samples etc. and can act as inspiration when designing	
Key Vocabulary						
Year 6 *Design* *Make* *Evaluate* *Technical* *Additional*	• 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	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-working • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required • Measuring, marking and cutting components accurately using a ruler and scissors	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs • Building a range of play apparatus structures drawing upon new and prior knowledge of structures • Measuring, marking and cutting wood to create a range of structures • Using a range of materials to reinforce and add decoration to structures • Improving a design plan based on peer evaluation	• Designing a waistcoat in accordance to specification linked to set of design criteria to fit a specific theme • Annotating designs • 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	• Designing a steady hand game - identifying and naming the components required • Drawing a design from three different perspectives • Generating ideas through sketching and discussion • Modelling ideas through prototypes • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function' • Constructing a stable base for a game • Accurately cutting, folding and assembling a net	• Writing a design brief from information submitted by a client • Developing design criteria to fulfil the client's request • Considering and suggesting additional functions for my navigation tool • Developing a product idea through annotated sketches • 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

	• 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 • 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)	• 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 • Evaluating the work of others and receiving feedback on own work • Applying points of improvements • Describing changes they would make/do if they were to do the project again • 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 • To understand how to use a bench hook and saw safely • To know that a set square can be used to help mark 90° angles	• Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure • To know that structures can be strengthened by manipulating materials and shapes • To understand what a 'footprint plan' is • To understand that in the real world, design , can impact users in positive and negative ways • To know that a prototype is a cheap model to test a design idea	• Sewing accurately with even regularity of stitches • Evaluating work continually as it is created • 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	• Decorating the base of the game to a high quality finish • Making and testing a circuit Incorporating a circuit into a base • 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 • 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	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 • Identifying key industries that utilise 3D CAD modelling and explain why • Describing how the product concept fits the client's request and how it will benefit the customers • Explaining the key functions in my program, including any additions • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool • 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 • To know that accelerometers can detect movement • To understand that sensors can be useful in products as they mean the 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
Key Vocabulary						