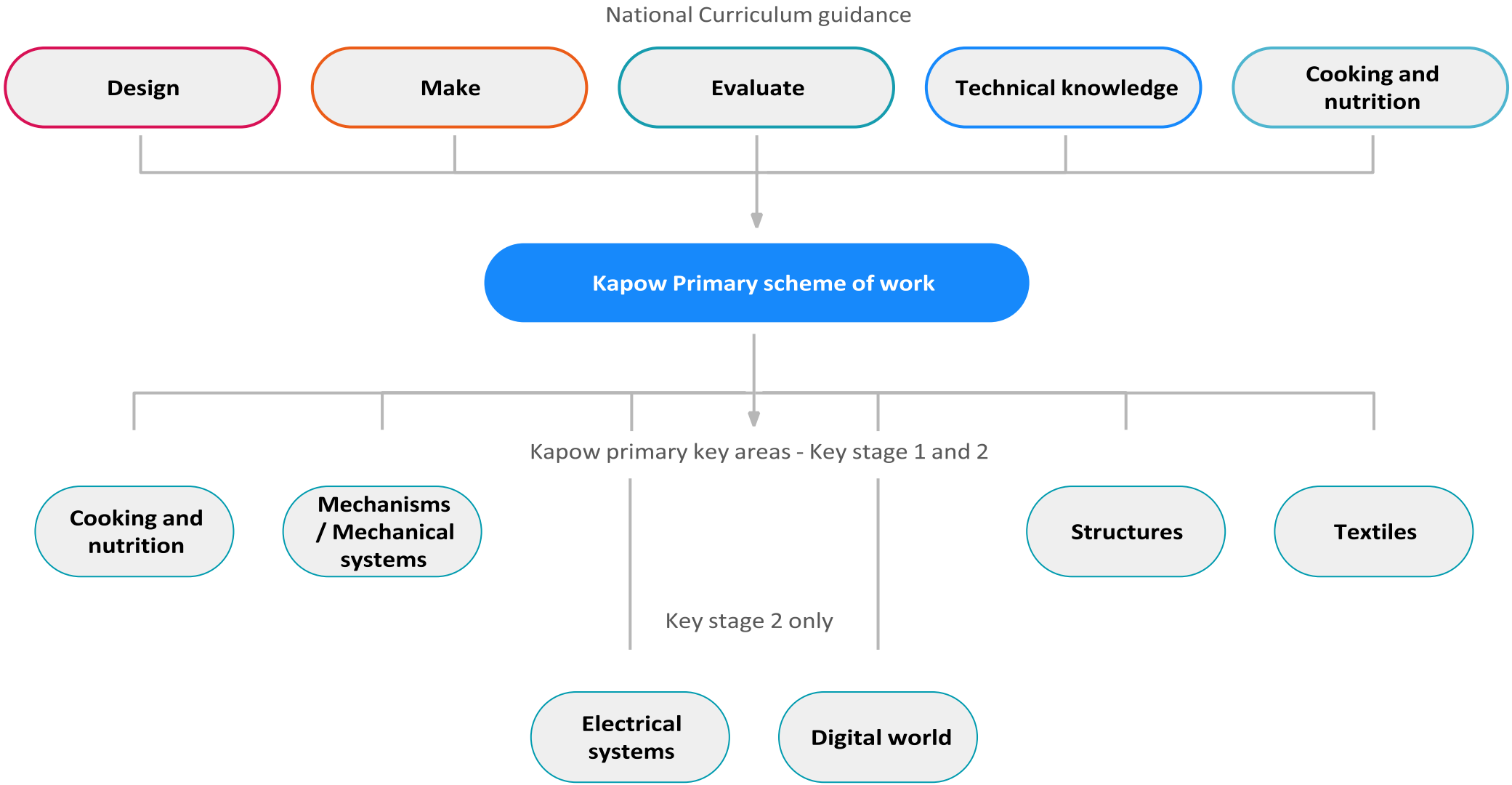
National Curriculum guidance
Design
Make
Evaluate
Technical knowledge
Cooking and nutrition
Kapow Primary scheme of work
Kapow primary key areas - Key stage 1 and 2
Cooking and nutrition
Mechanisms / Mechanical systems
Structures
Textiles
Key stage 2 only
Electrical systems
Digital world

Progression of skills and knowledge

Structures

Class 2
Baby bear's chair

Skills	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
Knowledge	Technical	• 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
	Additional	• To know that natural structures are those found in nature • To know that man-made structures are those made by people

Progression of skills and knowledge

Structures

Class 3

Pavilions

Skills	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
	Make	• Creating a range of different shaped frame structures • 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
	Evaluate	• Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs
Knowledge	Technical	• To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own
	Additional	• To know that a pavilions is 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

Progression of skills and knowledge

Structures

Class 4

Playgrounds

Skills	**Design**	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs
	Make	• 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
	Evaluate	• Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure
Knowledge	**Technical**	• To know that structures can be strengthened by manipulating materials and shapes
	Additional	• 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

Progression of skills and knowledge

Mechanisms / mechanical systems

Class 2

		Making a moving storybook	Fairground wheel
Skills	Design	• Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience	• Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties
	Make	• Following a design to create moving models that use levers and sliders	• Selecting materials according to their characteristics • Following a design brief
	Evaluate	• 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	• Evaluating different designs • Testing and adapting a design
Knowledge	Technical	• 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 • 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	• To know that different materials have different properties and are therefore suitable for different uses
	Additional	• To know that in Design and technology we call a plan a 'design'	• 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

Progression of skills and knowledge

Mechanisms / mechanical systems

Class 3

Making a slingshot car

Skills	**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
Knowledge	**Technical**	• 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.
	Additional	• 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.

Progression of skills and knowledge

Mechanisms / mechanical systems

Class 4

Automata toys

Skills	Design	•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
	Make	• 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
	Evaluate	• 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
Knowledge	Technical	• 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
	Additional	• 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

Progression of skills and knowledge

		Class 3
		Torches
Skills	Design	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas
	Make	• 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
	Evaluate	• Evaluating electrical products • Testing and evaluating the success of a final product
Knowledge	Technical	• 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
	Additional	• 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

Progression of skills and knowledge

		Class 4 Doodlers
Skills	Design	• 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 finding from investigating existing products • Developing design criteria that clarifies the target user
	Make	• 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
	Evaluate	• 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 • Analysing whether changes in configuration positively or negatively affect an existing product • Peer evaluating a set of instructions to build a product
Knowledge	Technical	• To know 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
	Additional	• 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

Progression of skills and knowledge

Cooking and nutrition

		Class 2	
		Fruit and vegetables	**A balanced diet**
Skills	**Design**	• Designing smoothie carton packaging by-hand or on ICT software	• Designing a healthy wrap based on a food combination which work well together
	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	• Slicing food safely using the bridge or claw grip • Constructing a wrap that meets a design brief
	Evaluate	• Tasting and evaluating different food combinations • Describing appearance, smell and taste • Suggesting information to be included on packaging	• 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
Knowledge	**Cooking and nutrition**	• 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 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)	• 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 do; we call these 'hidden sugars'

Progression of skills and knowledge

Cooking and nutrition

Class 3

		Eating seasonally	Adapting a recipe
Skills	Design	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish	• Designing a biscuit within a given budget, drawing upon previous taste testing
	Make	• 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	• Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe
	Evaluate	• 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	• 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
Knowledge	Cooking and nutrition	• 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 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	• 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

Class 4

What could be healthier?

Skills	Design	• 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
	Make	• 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
	Evaluate	• Identifying the nutritional differences between different products and recipes • Identifying and describing healthy benefits of food groups
Knowledge	Cooking and nutrition	• 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

Progression of skills and knowledge

Textiles

Class 2

Puppets

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	• Reflecting on a finished product, explaining likes and dislikes
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

Progression of skills and knowledge

Textiles

Class 3

Fastenings

Skills	Design	• Writing design criteria for a product, articulating decisions made • Designing a personalised book sleeve
	Make	• Making and testing a paper template with accuracy and in keeping with the design criteria • 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
	Evaluate	• 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
Knowledge		• 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

Progression of skills and knowledge

Textiles

Class 4

Stuffed toys

Skills	Design	• Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components
	Make	• 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
	Evaluate	• Testing and evaluating an end product and giving point for further improvements
Knowledge		• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric • 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

Progression of skills and knowledge

Digital world (KS2 only)

		Class 3
		Mindful moments timer
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 • 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
Knowledge	**Technical**	• 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
	Additional	•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

Progression of skills and knowledge

		Class 4	
		Monitoring devices	**Navigating the world**
Skills	**Design**	• 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	• 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
	Make	• 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	• 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
	Evaluate	• 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 • Explaining key functions in my program (audible alert, visuals) • Explaining how my product would be useful for an animal carer including programmed features	• 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
Knowledge	**Technical**	• 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 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

Progression of skills and knowledge

	Additional	• 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 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