

Design and Technology Curriculum

Year A - YEAR 1/2

	Autumn	Spring	Summer
DT focus	Structures	Textiles	Cooking and Nutrition
Key Skills and Techniques	Design Thinking about what others might want from a design. Beginning to recognise how products and designs in the world around us solve certain needs. Considering who they are designing for – identifying the user. Stating what they intend to make and why – identifying the purpose. Talking about ideas, with purpose and user in mind. Talking about existing products when generating ideas. Using basic drawing skills to communicate ideas. Make Choosing between a small number of materials, ingredients or components. Explaining their choices based on personal experiences. Requesting equipment appropriate to the purpose (e.g. scissors for cutting, glue for joining, etc.). Beginning to use objects with a fixed width or length to create even spacing of markings or cuts (e.g. a lolly stick). Refining their grip to cut competently and confidently. Cutting straight and evenly spaced lines. Beginning to cut large shapes and thicker materials like card. Evaluate Discussing existing products, saying what they like about them. Comparing two products and discussing which is better for a specific purpose. Saying what they like about their peers’ designs and products. Accepting feedback and understanding it is meant to improve their work. Technical knowledge Recognising that different structures are used for different purposes. Exploring the features of structures. Describing structures as buildings or freestanding structures. Making stable structures from card. Creating supporting structures to aid stability. Using stable objects like cylinders to create structures.	Design Making a series of drawings to show how something works. Make Planning more than one step ahead. Selecting from a wider range of equipment some of which are used for the same purpose (e.g. joining by sewing instead of glue). Cutting a range of materials with improving control by adjusting grip and positioning the material carefully. Joining materials by aligning edges carefully and applying glue or stitches neatly and evenly. Using templates and known shapes to create and adapt forms for a purpose. Evaluate Evaluating their ideas and creations against simple design criteria. Suggesting improvements to their peers’ designs and products. Technical knowledge Threading large needles. Beginning to sew stitches into a material. Spacing stitches evenly. Pinning fabric to a template. Sewing a running stitch, with evenly spaced, neat, even stitches to join fabric.	Design Using a simple design brief that outlines the intended use, target user and key features of the product, to create simple design criteria. Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas. Make Planning more than one step ahead. Choosing materials, ingredients or components from a wider range of materials, ingredients or components. Explaining their choices based on the properties of materials and components. Selecting from a wider range of equipment some of which are used for the same purpose (e.g. joining by sewing instead of glue). Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Cutting a range of materials with improving control by adjusting grip and positioning the material carefully. Evaluate Discussing a range of existing products and saying what they like and dislike about them. Comparing a range of products and explaining why some better meet different design criteria than others. Evaluating their ideas and creations against simple design criteria. Discussing whether they were able to use the tools and techniques effectively. Suggesting improvements to their peers’ designs and products. Technical knowledge Selecting foods to create a balanced recipe. Selecting foods based on their food group. Describing appearance, smell and taste. Chopping foods safely to make a wrap. Grating foods. Snipping smaller foods instead of cutting.
Key Knowledge	Design To know: The user is the person who will use the product. Different users may want different things from a design. Who they are designing for makes a difference to what they design. The purpose is what something is for. Existing products can help when deciding what to design. Drawings are a way to explain ideas. Make To know: A plan is deciding what to do first and next. Different equipment does different things.	Design To know: That drawings can help explain how something works. Make To know: That careful alignment and neat application make a join stronger and tidier. That templates and geometric shapes can help create accurate forms that improve how a product works. That balanced and consistent finishing improves the overall appearance of their product. Evaluate	Design To know: That a design brief helps to decide what to make. That design criteria are the steps for making a product successful. That the design criteria help when thinking of ideas. Make To know: That a plan is deciding what to do first and next. That some pieces of equipment are better suited to certain jobs. That some tools are sharp like scissors and knives. That following instructions means using tools safely.

	Names of common pieces of equipment. Some tools are sharp like scissors and knives. Spacing cuts or marks evenly can be useful. Different glue can be used to join different things. Evaluate To know: Some products will be better than others. Their ideas or products can be made better. Their ideas can make someone else's work better. Other people's ideas can help make their work better. Technical knowledge To know: A structure is something that has been made and put together. Stable structures do not topple. Shapes and structures with wide, flat bases or legs are the most stable. Adding weight to the base of a structure can make it more stable.	To know: That their suggestions can improve someone else's work. Technical knowledge To know: That sewing is a method of joining fabric. That 'joining' means connecting two pieces of material together. That a template (or fabric pattern) is used to cut out the same shape multiple times.	That changing grip and how a material is held can make cutting safer and more accurate. Evaluate To know: That existing products can be evaluated against design criteria. That design criteria help to decide if their product is a success. What different tools and equipment do. That improve means to make something better. That their suggestions can improve someone else's work. Technical knowledge To know: That 'diet' means the food and drink that a person or animal usually eats. That the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. That a balanced diet is eating foods from different food groups. That 'ingredients' means the items in a mixture or recipe. That different foods have different appearance, taste and smell. That kitchen equipment can be used to prepare foods.
Tasks	KAPOW: Stable Structures(Year 1)	KAPOW: Pouches (Year 2)	KAPOW: A Balanced Diet (Year 2)
Vocabulary	Base Better Compare Design Freestanding Stable Structure Unstable User Worse	decorate (Y1) fabric (Y1) needle (Y1) running stitch (Y2) sew (Y2) template (Y2) thread (Y1)	cut (Y1) design (Y1) design brief (Y2) evaluate (Y2) fruit (Y1) grate (Y2) ingredient (Y1) smell (Y1) snip (Y2) spread (Y2) taste (Y1) vegetable (Y1)
Outcomes: Knowledge and Assessment	Pupils who are secure will be able to: • Explain that structures are things that are built and have a purpose. • Understand that structures with a wider base are more stable than ones with a narrow base. • Explain that extra weight added to the base of a structure makes it more stable. • Design a product for a particular user. • Use a sketch to show ideas. • Choose the best method for joining the parts of the product. • Make evenly spaced cuts. • Use scissors to cut out a shape neatly and accurately. • Explain what they like and dislike about their final product.	Pupils who are secure will be able to: • Sew a running stitch with regular-sized stitches and understand that both ends must be knotted. • Prepare and cut fabric to make a pouch from a template. • Use a running stitch to join the two pieces of fabric together. • Decorate their pouch using the materials provided.	Pupils who are secure will be able to: • Name the main food groups and identify foods that belong to each group. • Describe the taste, texture and smell of a given food. • Think of four different wrap ideas, considering flavour combinations. • Construct a wrap that meets the design brief and their plan.

Year B YEAR 1/2

	Autumn	Spring	Summer
DT Focus	Structures	Mechanisms	Textiles
Key Skills and Techniques	<u>Design</u> Using a simple design brief that outlines the intended use, target user and key features of the product to create simple design criteria. Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas. <u>Make</u> Choosing materials, ingredients or components from a wider range of materials, ingredients or components. Explaining their choices based on the properties of materials and components. Looking for ways to make cutting easier, for example, turning the material they are cutting, not fully closing the scissors, etc. Choosing known geometric shapes when making. Beginning to shape objects to improve how they work. <u>Evaluate</u> Discussing a range of existing products and saying what they like and dislike about them. Comparing a range of products and explaining why some better meet different design criteria than others. Evaluating their ideas and creations against simple design criteria. <u>Technical knowledge</u> Recognising that different structures are used for different purposes. Exploring the features of structures. Making stable structures from card. Creating supporting structures to aid stability. Using stable objects like cylinders to create structures. Building a strong and stiff structure by folding paper. Folding to strengthen or stiffen. Comparing the stability of different shapes. Identifying the weakest part of a structure.	Design Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas. Using labels to explain parts of a design, label materials etc, including using ICT. Integrating moving parts when creating mock-ups. Make Integrating moving parts when creating mock-ups. Planning more than one step ahead. Choosing materials or components from a wider range of materials or components. Choosing between pieces of equipment that are used for the same purpose (e.g. joining) and explaining why their choice suits the task. Explaining their choices based on the properties of materials and components. Following and recalling simple safety instructions. Evaluate Discussing whether they were able to use the tools and techniques effectively. Comparing a range of products and explaining why some better meet different design criteria than others. Evaluating their ideas and creations against simple design criteria. Technical knowledge Recognising and exploring everyday objects that have mechanisms. Exploring everyday objects that use levers (e.g scissors, tongs, door handle, stapler).	Design Stating what they intend to make and why – identifying the purpose. Talking about ideas, with purpose and user in mind. Using basic drawing skills to communicate ideas. Make Choosing between a small number of materials, ingredients or components. Explaining their choices based on personal experiences. Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Using a straightedge to draw a straight line. Beginning to use objects with a fixed width or length to create even spacing of markings or cuts. (e.g. a lolly stick). Using a large plastic needle and large-weave embroidery fabric to begin to create a running stitch. Applying masking tape to fix something in place or join to edges. Adding texture to create visual interest. Evaluate Saying what they like about their peers’ designs and products. Accepting feedback and understanding it is meant to improve their work. Technical knowledge Discussing fabric properties. Threading large needles. Rehearsing sewing techniques with large needles and thick thread, like wool. Sewing a running stitch in large-weave embroidery fabric or hessian. Creating patterns and following them with stitching. Spacing stitches evenly.
Key Knowledge	Design To know: A design brief helps to decide what to make. Design criteria are the steps for making a product successful. Design criteria help when thinking of ideas. Different products work in different ways and have parts that make them work. Make To know: Some properties of materials, such as hard, soft, flexible, waterproof, strong, etc. The names of some geometric shapes, such as triangle, pyramid, square, cube, circle and sphere.	Design To know: That different products work in different ways and have parts that make them work. Drawings can help explain how something works. A label explains part of a drawing. Make To know: Many things that move have parts inside to help make them work. Some properties of materials, e.g., hard, soft, flexible, waterproof, strong, etc. Some pieces of equipment are better suited to certain jobs. Some tools are sharp like scissors and knives.	Design To know: Drawings are a way to explain ideas. Make To know: Choosing different materials or components will affect what the product does or looks like. The names of common pieces of equipment. Following instructions helps with safety. Spacing cuts or marks evenly can be useful. Texture is how something feels. Evaluate To know:

	Evaluate To know: Existing products can be evaluated against design criteria. Design criteria help to decide if their product is a success. Improve means to make something better. Technical knowledge To know: A structure is something that has been made and put together. The shape of a structure affects its strength. Materials can be manipulated to improve strength and stiffness. A strong structure is one which does not break easily. A stiff structure or material is one which does not bend easily.	Following instructions helps with safety. Technical knowledge To know: Many things that move have parts inside to help them work. Mechanisms usually limit unwanted movement. A pivot is the part that a lever moves around.	Their ideas or products can be made better. Their final product might be different to their original idea. Their ideas can make someone else's work better. Other people's ideas can help make their work better. Technical knowledge To know: Evenly spaced stitches help when following a pattern.
Suggested tasks	KAPOW: A Chair for a Bear (Year 2)	KAPOW: Levers (Year 2)	KAPOW: Simple Stitches (Year 1)
Vocabulary	design brief design criteria evaluate flexible improve select stiff strong thicker thinner weak	curved direction evaluate label lever material mechanism pivot purpose rotate select	design even fabric like needle sketch stitch thread
Outcomes: Knowledge and Assessment	Pupils who are secure will be able to: - Describe how chairs are made for different users and purposes. - Explain how design briefs and design criteria help when making a new product. - Name some shapes that are stronger than others. - Describe how making a material thicker makes it more stiff. - Understand and use the vocabulary of strong, weak, stiff and flexible. - Make a stable chair structure for a particular user. - Select suitable materials and join them securely. - Evaluate a product against the design criteria. - Improve parts of a product based on the design criteria.	Pupils who are secure will be able to: - Identify lever mechanisms and describe their movements. - Find pivots and levers on various mechanisms. - Join materials together to make levers. - Investigate what happens when the pivot changes place. - Select appropriate materials to use to make levers work effectively. - Understand how levers can help make tasks easier. - Test the effectiveness of their own levers. - Evaluate their and others' designs and give feedback.	Pupils who are secure will be able to: - Name some objects made of fabric. - Describe the look and feel of different fabrics. - Thread a needle. - Make a series of stitches that match each other in embroidery fabric. - Choose colours and shapes for a design. - Explain their ideas to others verbally and with a sketch. - Choose materials based on their texture. - Follow the general position of the lines of a design with stitches. - Say what they like about someone else's stitching and what could be made better.

Year A - YEAR 3/4

	Autumn	Spring	Summer
DT focus	Structures	Cooking and Nutrition	Textiles
Key Skills and Techniques	Design Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Beginning to use 2D CAD software to communicate their ideas. (sketchpad) Make Creating accurate shapes from templates. Choosing shapes to suit the function of a product. Cutting out more complex shapes accurately. Evaluate Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Reflecting on feedback to decide if and how it could be used to improve future iterations. Investigating and analysing a range of existing products by looking at their functionality and appeal. Technical knowledge Beginning to understand how different structures are built. Strengthening structures by ribbing. Constructing a range of 3D shapes.	Design Noticing simple problems or needs in their everyday life. Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Taking part in structured idea-generation sessions. Coming up with more ideas and considering the feasibility of their ideas in the classroom. Developing designs by adding detail and justifications about materials, tools, methods. Creating prototypes using materials with similar properties to their final design. Make Ordering the main stages of making into a plan. Selecting materials, components or ingredients from a wider choice but within a limited design space (e.g. seasonal ingredients from May and June in the UK). Selecting materials, components or ingredients based on their form as well as their functional properties. Explaining their choices with regard to function and form. Suggesting simple safety rules based on their understanding of tool dangers. Participating in discussions about classroom safety procedures. Following detailed safety instructions. Cutting more complex shapes and a wider range of materials and foods accurately and safely (e.g. using a bridge or claw hold when chopping foods). Evaluate Investigating and analysing a range of existing products by looking at their functionality and appeal. Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. Evaluating how effective their chosen materials and tools were in fulfilling the design brief. Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Reflecting on feedback to decide if and how it could be used to improve future iterations. Technical knowledge Identifying foods with different nutritional properties. Recognising the seasonality of foods. Understanding that many foods are imported from other countries. Following the instructions within a recipe. Tasting seasonal ingredients. Selecting seasonal ingredients. Peeling ingredients safely. Cutting safely with a vegetable knife.	Design Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Developing designs by adding detail and justifications about materials, tools, methods. Creating prototypes using materials with similar properties to their final design. Make Ordering the main stages of making into a plan. Selecting materials, components or ingredients based on their form as well as their functional properties. Using a ruler accurately to measure and mark straight lines. Joining materials securely by selecting and applying appropriate joining methods for the material and purpose. Creating and refine accurate 2D and 3D shapes to suit the function of a product. Evaluate Investigating and analysing a range of existing products by looking at their functionality and appeal. Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. Technical knowledge Threading needles with greater independence. Sewing with smaller needles to create smaller stitches. Selecting similar or different colour thread to hide or show the stitch. Creating a template. Making and testing a paper template. Incorporating a fastening to a design. Sewing using a running stitch.

Key Knowledge	Make To know: That creating accurate shapes improves how they look and sometimes their function. Evaluate To know: Good suggestions help give better feedback. That they can choose to use feedback or not. Technical knowledge To know: That a shell structure is a hollow shape with a thin outer layer. That 3D shapes can form structures. Structures can be strengthened by manipulating materials and shapes.	Design To know: That a problem or need is something that a designer can help to solve. That thinking together can help generate ideas. That not everything can be made in the classroom. That extra information on drawings or diagrams can help the user understand a design or idea. Make To know: That ordering the steps of a build can make it easier. That form is the look and shape of something. That function is what something does and how it works. That different pieces of equipment will be used at different stages in a plan. That different tools and equipment have different dangers. That different tools and techniques are suited to specific materials and levels of resistance. That finishing techniques can improve both the look and performance of a product. Evaluate To know: That some products are more successful than other because of their function. That choices of materials and equipment can affect the final product. That feedback is ideas and suggestions from other people that can help improve their work. That the better the suggestions the better the feedback. That they can choose to use feedback or not. Technical knowledge To know: That not all fruits and vegetables can be grown in the UK. That climate affects food growth. That vegetables and fruit grow in certain seasons. That cooking instructions are known as a 'recipe'. That imported food is food which has been brought into the country. That similar coloured fruits and vegetables often have similar nutritional benefits. That the appearance of food is as important as taste. To know which foods are grown in the UK in a specified season. To know which foods can be cut and peeled using equipment.	Design To know: That extra information on drawings or diagrams can help the user understand a design or idea. That a prototype is a detailed model that helps a user understand how a product will work. Make To know: That ordering the steps of a build can make it easier. That a ruler is used to measure and mark length precisely. That stronger and long lasting joins may be needed depending on the materials and how the product will be used. That accurate shaping and refining of 2D and 3D forms improves appearance and performance. Evaluate To know: That some products are more successful than other because of their function. Technical knowledge To know: That smaller stitches with similar colour thread to the fabric can hide the stitching. That different fastening types are useful for different purposes. That a fastening is something that holds two pieces of material together.
Suggested tasks	KAPOW: Product Packaging (Year 3)	KAPOW: Eating Seasonally (Year 3)	KAPOW: Fastenings (Year 4)
Vocabulary	computer-aided design (CAD) feedback form function net	cut (Y1/2) design (Y1/2) evaluate (Y1/2) flavour (Y3/4) fruit (Y1/2)	design criteria (Y2) fabric (Y1) fastening (Y3/4) mock-up (Y1) pinning (Y3/4)

	shell structure tab three-dimensional (3D)	grate (Y1/2) ingredients (Y1/2) mock-up (Y1/2) peel (Y1/2) seasonality (Y3/4) snip (Y1/2) taste (Y1/2) texture (Y3/4) vegetable (Y1/2)	stitch (Y1) template (Y2)
Outcomes: Knowledge and Assessment	Pupils who are secure will be able to: - Investigate and analyse a range of existing packaging products, identifying shapes, form and function. - Evaluate what makes good packaging and what shapes suit which products. - Design, make and evaluate product packaging, following a design criteria. - Use CAD software (Sketchpad) to create 2D shapes that form the net of 3D shapes, including the tabs. - Give and receive feedback and identify errors in nets to help suggest improvements. - Cut, fold and stick the parts of a net together to make a 3D shape. - Use ribbing to strengthen packaging. - Decorate packaging with an intentional design that shows its function.	Pupils who are secure will be able to: - Explain that fruits and vegetables grow in different countries based on their climates and identify which grow where. - Understand that seasonal fruits and vegetables grow in a given season and that eating them in season positively affects the environment. - Identify which foods grow in which season and find recipes that contain seasonal foods. - Know that importing food impacts the environment. - Identify the equipment used to prepare food and explain why food needs to be prepared safely. - Describe the taste of various fruits and vegetables and identify flavours. - Design a seasonal dish and describe the ingredients' nutritional benefits. - Evaluate the dishes and give and receive feedback to identify strengths.	Pupils who are secure will be able to: - Identify the features, benefits and disadvantages of a range of fastening types. - Write design criteria and design a sleeve that satisfies the criteria. - Make a template for their book sleeve. - Assemble their case using any stitch they are comfortable with.

Year B - YEAR 3/4

	Autumn	Spring	Summer
DT focus	Digital World	Electrical Systems	Mechanical Systems
Key Skills and Techniques	Design Noticing simple problems or needs in their everyday life. Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Beginning to use 2D CAD software to communicate their ideas. Developing drawing and sketching skills with a focus on clarity and simplicity. Developing designs by adding detail and justifications about materials, tools and methods. Make Selecting materials, components or ingredients based on their form as well as their functional properties. Explaining their choices with regard to function and form. Creating and refining accurate 2D and 3D shapes to suit the function of a product. Applying precise and varied finishing techniques to enhance appearance and surface quality. Evaluate Investigating and analysing a range of existing products by looking at their functionality and appeal. Analysing why specific products, designers or inventors are successful. Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Technical Beginning to use understanding from computing to control products. Begin to use a BBC micro:bit as the starting point for a product. Using code to control button presses. Using code to sense light. Using a micro:bit simulator to test code.	Design Noticing simple problems or needs in their everyday life. Using empathy and conducting simple surveys to recognise the needs of others. Coming up with more ideas and considering the feasibility of their ideas in the classroom. Developing drawing and sketching skills with a focus on clarity and simplicity. Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams) Make Selecting materials, components or ingredients from a wider choice but within a limited design space (e.g. seasonal ingredients from May and June in the UK). Explaining their choices with regard to function and form. Following detailed safety instructions. Evaluate Investigating and analysing a range of existing products by looking at their functionality and appeal. Analysing why specific products, designers or inventors are successful. Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Technical Recognising and exploring everyday electrical products. Identifying some electrical components. Using batteries and other electrical components safely. Creating a working electrical circuit. Incorporating switches into circuits.	Design Taking part in structured idea generation sessions. Developing drawing and sketching skills with a focus on clarity and simplicity. Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (e.g. sketches, cross-sectional diagrams, thumbnail sketches and exploded diagrams). Creating prototypes using materials with similar properties to their final design. Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Developing designs by adding details and justifications about materials, tools and methods. Make Following detailed safety instructions. Using a ruler as a measuring tool with increasing accuracy by creating spaced marks using millimetres and measuring lengths of objects. Handle different sizes and types of scissors with confidence. With close supervision, using a hot glue gun to join wooden materials (e.g. lolly sticks). Selecting equipment required for a series of tasks based on the plan and explaining why each piece is suitable for each stage. Evaluate Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. Reflecting on feedback to decide if and how it could be used to improve future iterations. Investigating and analysing a range of existing products by looking at their functionality and appeal. Analysing why specific products, designers or inventors are successful. Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. Evaluating how effective their chosen materials and tools were in fulfilling the design brief.
Key Knowledge	Design To know: A problem or need is something that a designer can help to solve. Not everything can be made in the classroom. CAD is computer-aided design. CAD can be used to better communicate ideas. Extra information on drawings or diagrams can help the user understand a design or idea.	Design To know: A problem or need is something that a designer can help to solve. A target audience is a group of people that might like the idea. Not everything can be made in the classroom. Extra information on drawings or diagrams can help the user understand a design or idea. A cross-sectional diagram shows the inside of a product. Make	Design To know: Extra information on drawings or diagrams can help the user understand a design or idea. An exploded diagram shows how the parts of a product fit together. A prototype is a detailed model that helps users understand how a product will work. A problem or need is something that a designer can help to solve. A target audience is a group of people that might like the idea.

	A prototype is a detailed model that helps a user understand how a product will work. Make To know: Form is the look and shape of something. Function is what something does and how it works. Different pieces of equipment will be used at different stages in a plan. Evaluate To know: Some products are more successful than others because of their function. Designers and inventors create products. Feedback is ideas and suggestions from other people that can help improve their work. Technical To know: Creating simple programs can help control products. Some features of a micro:bit. A simulator is able to replicate the functions of an existing piece of technology.	To know: Form is the look and shape of something. Function is what something does and how it works. Evaluate To know: Some products are more successful than other because of their function. Designers and inventors create products. Choices of materials and equipment can affect the final product. Technical To know: An electrical system is a group of parts (components) that work together to transport electricity around a circuit. Some common features of an electric product (e.g. switch, battery, plug, dials, buttons, etc). A battery contains stored electricity that can be used to power products. An electrical circuit must be complete for electricity to flow. A switch can be used to complete and break an electrical circuit.	Make To know: Different tools and equipment have different dangers. A ruler can be used to measure length. Scissors are useful for cutting out complex shapes. A hot glue gun can be used to join materials. Different pieces of equipment will be used at different stages in a plan. Evaluate To know: The better the suggestions, the better the feedback. They can choose to use feedback or not. Some products are more successful than others because of their function. Designers and inventors create products. Choices of materials and equipment can affect the final product. Feedback is ideas and suggestions from other people that can help improve their work. Technical To know: A mechanical system can allow us to move something more easily. Mechanical systems have more than one mechanism that moves to make them work. Mechanical systems are often hidden in products to make them look more appealing.
Suggested tasks	KAPOW: Wearable Technology (Year 3)	KAPOW: Exploring Electrical Products (Year 4)	KAPOW: Mechanical Cars (Year 4)
Vocabulary	code (Y3) computer-aided design (Y3) control (Y3) design criteria (Y2) form (Y3) function (Y3) input (Y3) label (Y2) LED (Y3) output (Y3) product (Y1) program (Y3) sketch (Y1) successful (Y3) technology (Y3) user (Y1)	battery bulb buzzer circuit cross-sectional diagram electricity research switch target audience wire	Chassis Bearing Force Machine Mechanism air resistance Prototype Target Audience
Outcomes: Knowledge and Assessment	Pupils who are secure will be able to: - Discuss some key developments in lighting technology and why they help us. - Describe the form and function of a wearable product. - Identify who the product is for and why they might use it. - Create design criteria that list what the product must do or be like.	Pupils who are secure will be able to: - Identify everyday products that use electrical components and name the components. - Make and test toggle and push switches in electrical circuits. - Explain why switches are useful in electrical products. - Compare a toggle switch and a push switch.	Pupils who are secure will be able to: - Describe key design improvements in the history of the automobile. - Measure and compare the distance travelled by different mechanical cars. - Choose and use appropriate tools and materials to make mechanical cars.

	• Use the words program, code and control to describe how their product would work. • Use code to control LEDs, including the use of the light sensor. • Test and explain whether my code works as I want it to. • Use computer-aided design to show design ideas for a product. • Label the key features of the product. • Describe the choices I have made to make my product more successful.	• Research a design problem by asking questions and conducting a survey. • Describe a target audience as a group of people that a product is designed for and identify the target audience for a new product. • Identify what a cross-sectional diagram is and why it is useful. • Draw a cross-sectional diagram with labels that shows the inside of a product.	• Draw exploded diagrams and annotated sketches of my different mechanical cars. • Use a problem statement to identify the design criteria. • Assess the product against the design criteria. • Conduct market research into existing products. • Provide specific feedback and adjust my design to incorporate customer feedback.
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Year A - YEAR 5/6

	Autumn	Spring	Summer
DT focus	Cooking and Nutrition	Textiles	Digital World
Key Skills and Techniques	Design Noticing wider-reaching problems or needs in the community. Identifying a wide range of needs and potential barriers through market research. Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Developing more independence in generating ideas. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas’ practicality and originality. Make Producing lists of equipment, materials and tools that they need for a task. Creating a step-by-step plan for making. Selecting materials, components or ingredients based on research or user needs.	Design Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Developing more independence in generating ideas. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas’ practicality and originality. Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. Beginning to select methods to communicate their ideas, justifying their choices. (eg. prototypes, cross-sectional, exploded diagrams, CAD etc). Make Assessing risks associated with different tools and equipment. Understanding and explaining the importance of each safety rule. Consistently apply safety instructions.	Design Noticing wider-reaching problems or needs in the community. Identifying more complex problem statements that consider multiple factors and constraints with guidance. Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Developing more independence in generating ideas. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about the practicality and originality. Using 3D CAD software to communicate their ideas. Using a series of prototypes to refine and improve their designs. Make Selecting materials, components or ingredients based on research or user needs. Explaining their choices, referring to their research. Considering which equipment will work well together. Balancing aesthetics and functionality when creating parts of a design.

	Explaining their choices, referring to their research. Understanding and explaining the importance of each safety rule. Consistently apply safety instructions. Using appropriate cutting tools and techniques to achieve accurate and aesthetic cuts. Shaping and refining materials and components to balance aesthetics and functionality. Selecting and applying finishes to enhance appearance and protect the product. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Evaluating the work of a range of designers to help inform their designs. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Providing feedback that is helpful, specific, and encouraging. Technical knowledge Understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. Recognising that meat is farmed and reared. Adapting a traditional recipe. Cutting and preparing vegetables safely. Using equipment safely, including knives, hot pans and hobs. Following a step by step method carefully to make a recipe. Knowing how to avoid cross-contamination.	Using a ruler to accurately measure and draw lines and marks. Select appropriate scissors to handle delicate cutting tasks and challenging materials. Cutting patterns and drawings accurately. Choosing PVA glue over hot glue for safety when joining materials in less intensive projects. Balancing aesthetics and functionality when creating parts of a design. Using nets to create 3D objects. Considering when best to apply finishing effects. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Evaluating the work of a range of designers to help inform their designs. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Technical knowledge Threading needles independently. Beginning to follow simple patterns or templates that require accurate cutting or measuring. Using pins effectively to secure a template to fabric without creases or bulges. Attaching objects like buttons using thread. Tying strong knots.	Considering when best to apply finishing effects. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Evaluating the work of a range of designers to help inform their designs. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Providing feedback that is helpful, specific and encouraging. Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had. Technical knowledge Designing products that require an understanding of computing to work. Understand the functions of the micro:bit and use these when creating products. Designing, writing and debugging programs that show directions.
Key Knowledge	Design To know: That problems can be large and small. That environmental impact is how making the product might affect the environment. That different materials have different costs That original and innovative ideas are different from what has been made before. Make To know: That materials and equipment lists help to plan better. That research can help decide on form and function. That some equipment can work well with other equipment. That precision in cutting affects how well parts fit, function and look. That the form of a product influences how it looks, feels and performs. Evaluate To know: That looking at other designers work can help inform designs.	Design: To know: Different materials have different costs. Original and innovative ideas are different from what has been made before. Drawings and diagrams can be communicated in 3D. Improving on prototypes can help to improve the final design. Make To know: Materials and equipment lists help to plan better. Aesthetics are the way something looks. Research can help decide which materials are best for both aesthetics and functional properties. Risks are things that might go wrong. Different measuring tools can be useful depending on what is being measured. The shape of an object can affect both its aesthetics and function. Aesthetics is how something looks. Nets can be folded to create 3D shapes. Texture can provide functional properties as well as aesthetic.	Design To know: Problems can be large and small. Market research is a way of collecting information about problems or needs. Environmental impact is how making the product and the product itself might affect the environment. Different materials have different costs. Original and innovative ideas are different from what has been made before. Drawings and diagrams can be communicated in 3D. Improving on prototypes can help to improve the final design. Make To know: Aesthetics are the way something looks. Research can help decide which materials are best for both aesthetics and functional properties. Some equipment can work well with other equipment. Risks are things that might go wrong. The shape of an object can affect both its aesthetics and function.

	That their final product can still be improved by different materials or techniques. That evaluating their designs in detail will help them understand its successful and less successful parts. Technical knowledge To know: That meat comes from animals. That recipes can be adapted to suit nutritional needs and dietary requirements. That I can use a nutritional calculator to see how healthy a food option is. That adapting means changing ingredients. That the steps in a recipe fit together and what happens if they are changed. That ‘cross-contamination’ means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. That coloured chopping boards can prevent cross-contamination.	Evaluate To know: Sustainability means thinking about the materials that were used to make a product and how the product was made. Looking at other designers’ work can help inform designs. Their final product can still be improved by using different materials or techniques. Evaluating their designs in detail will help them understand its successful and less successful parts. Explaining how they used feedback to improve their design can help them create better products in the future. Technical knowledge To know: Using a template (or clothing pattern) helps to accurately mark out a design on fabric. Complete products are sometimes made in parts that are sewn together. Consistently sized stitches improve the aesthetic of a product.	The finish can make a product suitable for use outside. Evaluate To know: Sustainability means thinking about the materials that were used to make a product and how the product was made. Looking at other designers’ work can help inform designs. Their final product can still be improved by using different materials or techniques. Evaluating their designs in detail will help them understand their successful and less successful parts. Feedback should be positive, helpful and specific. That explaining how they used feedback to improve their design can help them create better products in the future. Technical knowledge To know: Coding can complete tasks when used with a controller like the micro:bit. Features of a micro:bit that are useful for the product. Conditional statements (and, or, if) in programming can be used to monitor and control products. Some micro:bit functions can detect movements.
Suggested tasks	KAPOW: Developing a Recipe (Year 5)	KAPOW: Bags (Year 6)	KAPOW: Navigating the World (Year 6)
Vocabulary	cross-contamination (Y5/6) equipment list (Y5/6) farm (Y5/6) nutritional value (Y5/6) rear (Y5/6) recipe (Y3/4)	Innovate Pattern piece Seam allowance	aesthetic alternative constraints design criteria (KS1) innovative iteration (LKS2) target audience (LKS2) user (KS1)
Outcomes: DT and Design Knowledge and Assessment	Pupils who are secure will be able to: - Describe the process of beef production. - Research a traditional recipe and make changes to it. - Add nutritional value to a recipe by selecting ingredients. - Prepare and cook a version of bolognese sauce.	Pupils who are secure will be able to: - Explore and compare real textile products, thinking about how they look, how they are used and how they affect the environment. - Develop and test design ideas by creating pattern pieces and making prototypes to explore how well they work. - Use labelled drawings and diagrams to show clear design ideas, including how pattern pieces will fit together. - Use fabrics and materials suitable for the product, thinking about how they look and how well they work. - Make 3D textile shapes by carefully cutting, folding and joining materials to match the design. - Join fabrics securely using stitches or knots and add decorative details to improve the appearance. - Use pins, scissors and other tools carefully to keep fabric flat and measure and cut accurately. - Evaluate how well the final product meets the design criteria and suggest improvements.	Pupils who are secure will be able to: - Describe user needs for an outdoor adventure product and recognise some design constraints. - Understand user needs by exploring and analysing existing products. - Create 3D CAD designs to represent product ideas for an adventure tool that works as a pedometer and a compass. - Refine designs through understanding constraints and suggesting improvements. - Identify useful BBC micro:bit features for a specific product and program an input and output into the micro:bit to enable it to count steps and give directions. - Test the code’s accuracy to ensure it works as intended and identify any changes needed to make it function properly. - Use conditions to program compass points and explain why they need to be accurate for the product to work. - Evaluate a product against a design criteria and explain what works well and what improvements could be made.

Year B - YEAR 5/6

	Autumn	Spring	Summer
DT focus	Mechanical Systems	Structures	Electrical Systems
Key Skills and Techniques	Design Noticing wider-reaching problems or needs in the community. Identifying a wide range of needs and potential barriers through market research. Writing more complex problem statements that consider multiple factors and constraints. Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. Using a series of prototypes to refine and improve their designs. Make Consistently apply safety instructions. Select appropriate scissors to handle delicate cutting tasks and challenging materials. Cutting patterns and drawings accurately. In supervised groups, using hot glue guns safely. Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. Choosing PVA glue over hot glue for its safety when joining materials in less intensive projects. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Providing feedback that is helpful, specific, and encouraging. Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	Design Identifying more complex problem statements that consider multiple factors and constraints with guidance. Developing more independence in generating ideas. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. Using 3D CAD software to communicate their ideas. Using a series of prototypes to refine and improve their designs. Make Producing lists of equipment, materials and tools that they need for a task. Selecting materials, components or ingredients based on research or user needs. Assessing risks associated with different tools and equipment. Understanding and explaining the importance of each safety rule. Consistently apply safety instructions. Using a ruler to accurately measure and draw lines and marks. In small groups, cutting harder wood with a saw. Cutting in a back-and-forth sawing motion where appropriate. Balancing aesthetics and functionality when creating parts of a design. Considering when best to apply finishing effects. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. Considering alternative materials, tools or techniques that could enhance the product. Technical Understanding how to reinforce structures to make them more stable. Using triangulation to strengthen or stabilise a structure.	Design Developing more independence in generating ideas. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. Make Considering which equipment will work well together. Using appropriate cutting tools and techniques to achieve accurate and aesthetic cuts. Selecting and applying joining methods to create strong, durable and well-finished products. Selecting and applying finishes to enhance appearance and protect the product. Evaluate Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. Evaluating the work of a range of designers to help inform their designs. Providing feedback that is helpful, specific, and encouraging. Technical knowledge Using different components to produce different results from electrical systems. Creating working electrical circuits with a wider variety of electrical components. Applying knowledge from science to improve the function of an electrical system.

Key Knowledge	To know: Mechanical systems that use gears in everyday objects (e.g. bicycle, clock, etc.). Gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another. Gears allow us to increase the output of a mechanism. Market research is a way of collecting information about problems or needs. Constraints are things that might stop our ideas from being successful. Original and innovative ideas are different from what has been made before. Annotations are detailed labels and comments on diagrams. Risks are things that might happen. Hot glue creates a strong bond quickly. It is often better to choose safer equipment. Sustainability means thinking about the materials that were used to make a product and how the product was made. Their final product can still be improved by different materials or techniques. Evaluating their designs in detail will help them understand their successful and less successful parts. Feedback should be positive, helpful and specific. That explaining how they used feedback to improve their design can help them create better products in the future.	Design To know: Constraints are limits or conditions when making a product. Environmental impact is how the product and making the product might affect the environment. Original and innovative ideas are different from what has been made before. Drawings and diagrams can be communicated in 3D. Annotations are detailed labels and comments on diagrams. Improving on prototypes can help to improve the final design. Make To know: Materials and equipment lists help with planning. Risks are things that might go wrong. The shape of an object can affect both its aesthetics and function. Aesthetics is how something looks. The finish can make a product suitable to be used outside. Evaluate To know: Sustainability means thinking about the materials that were used to make a product and how the product was made. Their final product can still be improved by using different materials or techniques. Evaluating their designs in detail will help them understand its successful and less successful parts. Technical To know: A frame structure supports or holds a shape, and is made up of strong parts joined together, like a skeleton or a climbing frame. How to reinforce structures. Triangles can be used to reinforce structures. Triangles can create strong and stable structures. Bracing is a way of reinforcing a structure.	Design To know: To know that drawings and diagrams can be communicated in 3D. To know that annotations are detailed labels and comments on diagrams. To know that improving on prototypes can help to improve the final design. Make To know: To know that research can help decide on form and function. To know that some equipment can work well with other equipment. To know that precision in cutting affects how well parts fit, function and look. To know that joins may need reinforcement or adjustment to improve strength and stability. To know that the form of a product influences how it looks, feels and performs. Evaluate To know: To know that looking at other designers work can help inform designs. To know that evaluating their designs in detail will help them understand its successful and less successful parts. Technical knowledge To know: To know the names of components that can form an electrical system.
Suggested tasks	KAPOW: Gears and Pulleys (Year 5)	KAPOW: Playground Pioneers (Year 6)	KAPOW: Steady Hand Game (Year 6)
Vocabulary	Annotate Axle Force Gear Gear system Input Machine Market research Mechanism Output Problem statement Pulley Pulley system Renewable energy Research	aesthetic alternative constraint innovate reinforce triangulation	assemble (Y5/6) battery (Y3/4) bulb (Y3/4) buzzer (Y3/4) circuit (Y3/4) electrical component (Y5/6) form (Y3/4) function (Y3/4) LED (Y3/4)

	Sustainability Teeth		
Outcomes: Knowledge and Assessment	Pupils who are secure will be able to: ● Give examples of machines that use gears and/or pulleys. ● Describe how gears and pulleys work and their purpose. ● Design and make a gear and pulley system. ● Write a problem statement. ● Write questions for market research, provide feedback and research market competitors. ● Write and use a design brief to guide design. ● Evaluate a product against a set of design criteria, provide useful feedback and incorporate changes. ● Draw and annotate an eco-gadget bike design.	Pupils who are secure will be able to: ● Explain the term constraints and why some are more important than others. ● Use sketches with labels to communicate ideas. ● Use 3D CAD software to communicate ideas. ● Modify a design to make it stronger and more stable using knowledge of triangulation and reinforcing. ● Select appropriate materials and tools for cutting and joining. ● Make a plan and equipment list for a project. ● Reinforce and stabilise a prototype of a structure. ● Apply a quality finish in a neat way and explain why the finish is important. ● Critically evaluate the success of a structure within constraints and suggest alternative, more sustainable, materials. ● Explain design decisions.	Pupils who are secure will be able to: ● Explain simply what is meant by ‘form’ (the shape of a product) and ‘function’ (how a product works). ● State what they like or dislike about an existing children’s toy and why. ● Learn about skills developed through play and apply this knowledge in a survey of one or more children’s toys. ● Identify the components of a steady hand game. ● Design a steady hand game of their own according to their design criteria, using four different perspective drawings. ● Create a secure base for their game, with neat edges, that relates to their design. ● Make and test a functioning circuit and assemble it within a case.