EYFS – Relevant learning objectives from EYFS Statutory Framework and Development Matters			
Reception (4-5 years)	*Physical Development*		• Progress a more fluent style of moving, with developing style and grace. • Develop their small motor skills so that they can use a range of tools competently, safely and confidently. • Use their core muscle strength to achieve a good posture • when sitting at a table or sitting on the floor.
	Expressive Arts and Design		• Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills.
Early Learning Goals	*Physical Development*	*Fine Motor Skills*	• Use a range of small tools, including scissors, paintbrushes and cutlery
	Expressive Arts and Design	*Creating with Materials*	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used.

Autumn Term	**Spring Term**	**Summer Term**
• Make bread and crumble using harvested, seasonal foods • Make our own rafts for Billy Goats Gruff, experimenting to make them float	• Make a moving picture using a slider • Create a cityscape using joining techniques • Design and make a vehicle for carrying seeds	• Design a plate and prepare picnic foods for our "Buddy Picnic" • Design and make a product to protect us from the sun • Design a way for pirates to cross the water

End points (What we want the children to remember)

Structures	**Food**	**Mechanisms**	**Textiles**
• Use construction kits to build walls, towers and frameworks. • Use of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. • Use different methods to join card and paper.	• Experience of common fruit and vegetables • Cut soft fruit and vegetables using appropriate utensils	• Assemble vehicles with moving wheels using construction kits. • Explore moving vehicles through play. • Design, make and evaluate products for a specified user and purpose. • Develop some cutting, joining and finishing skills with card. • Work with paper to make simple flaps and hinges • Develop simple cutting, shaping and joining skills	• Explore and use different fabrics. • Cut and join fabrics with simple techniques. • Think about the user and purpose of products.

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Year 1 / 2 Cycle A	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Freestanding Structures (Structures)**	**Preparing Fruit and Vegetables (Food)**	
Prior learning – link back	• *Experience of using construction kits to build walls, towers and frameworks.* • *Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card.* • *Experience of different methods of joining card and paper.*	• *Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell.* • *Experience of cutting soft fruit and vegetables using appropriate utensils.*	
YEAR 1/2 OBJECTIVES	• *Go on a walk and/or look at photographs of the local area to explore structures such as playground equipment, street furniture, walls, towers and bridges* • *Where possible, ask the children to draw or photograph the structures they have been exploring and label with the correct technical vocabulary in relation to the structure, materials used and shapes* • *Demonstrate measuring, marking out, cutting, shaping, joining and finishing techniques with a range of tools and new and reclaimed materials that children are likely to use to make their structures. Discuss the suitability of materials for their products according to their characteristics.* • *Ask the children to build and explore a variety of freestanding structures using construction kits* • *Ask children to fold paper or card in different ways to make freestanding structures* • *Discuss with the children what structure they will be designing, making and evaluating* • *Generate some simple design criteria with the children* • *Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with construction kits and other materials*	• *Children examine a range of fruit/vegetables* • *Provide opportunities for children to handle, smell and taste fruit and vegetables in order to describe them* • *Evaluate existing products to determine what the children like best* • *Discuss basic food hygiene practices when handling food* • *Demonstrate how to use simple utensils and provide opportunities for the children to practise food-processing skills such as washing, grating, peeling, slicing, squeezing* • *Discuss healthy eating advice, including eating more fruit and vegetables; using The eatwell plate model* • *Set a context for designing and making which is authentic and meaningful.* • *Discuss with the children the possible products that they might want to design, make and evaluate and who the products will be for* • *Use talk and drawings when planning for a product* • *Talk to the children about the main stages in making, considering appropriate utensils and food processes they learnt about through IEAs and FTs.*	

	•*As a whole class, plan the order in which the structures will be made.* • *Ask children to evaluate their developing ideas and final products against original design criteria.*		
End points (What we want the children to remember)	• ***Know how to make freestanding structures stronger, stiffer and more stable.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Understand where a range of fruit and vegetables come from e.g. farmed or grown at home.*** • ***Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of The eatwell plate.*** • ***Know and use technical and sensory vocabulary relevant to the project.***	
SKILLS	***Designing*** • *Generate ideas based on simple design criteria and their own experiences, explaining what they could make.* • *Develop, model and communicate their ideas through talking, mock-ups and drawings.* ***Making*** • *Plan by suggesting what to do next.* • *Select and use tools, skills and techniques, explaining their choices.* • *Select new and reclaimed materials and construction kits to build their structures.* • *Use simple finishing techniques suitable for the structure they are creating.* ***Evaluating*** • *Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings.*	***Designing*** • *Design appealing products for a particular user based on simple design criteria.* • *Generate initial ideas and design criteria through investigating a variety of fruit and vegetables.* • *Communicate these ideas through talk and drawings.* ***Making*** • *Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely.* • *Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.* ***Evaluating*** • *Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences.* • *Evaluate ideas and finished products against design criteria, including intended user and purpose.*	

	• *Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.*		
VOCABULARY	cut, fold, join, fix, structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved, metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder design, make, evaluate, user, purpose, ideas, design criteria, product, function	fruit and vegetable names, names of equipment and utensils, sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard, flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet, choosing, ingredients, planning, investigating tasting, arranging, popular, design, evaluate, criteria	

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Year 1 / 2 Cycle B	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Wheels and Axels (Mechanisms)**	**Sliders and Levers (Mechanisms)**	**Templates and Joining (Textiles)**
Prior learning – link back	• *Assembled vehicles with moving wheels using construction kits.* • *Explored moving vehicles through play.* • *Gained some experience of designing, making and evaluating products for a specified user and purpose.* • *Developed some cutting, joining and finishing skills with card.*	• *Early experiences of working with paper and card to make simple flaps and hinges.* • *Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.*	• *Explored and used different fabrics.* • *Cut and joined fabrics with simple techniques.* • *Thought about the user and purpose of products.*
YEAR 1/2 OBJECTIVES	• *Explore and evaluate a range of wheeled products such as toys and everyday objects* • *Draw an example of a wheeled product, stating the user and purpose, and labelling the main parts e.g. body, chassis, wheels, axles and axle holders.* • *Walk around the school building and grounds, recording how wheels and axles are used in daily life.* • *Read a story or non-fiction book that includes a wheeled product. Use this to introduce relevant vocabulary and to emphasise user and purpose.* • *Using construction kits with wheels and axles, ask children to make a product that moves* • *Show different ways of making axle holders and stress the importance of making sure the axles run freely within the holders.* • *Ensure that children are taught how to mark out, hold, cut and join materials and components correctly* • *Assemble some examples of wheel, axle, axle holder combinations* • *Discuss with the children what they will be designing, making and evaluating within an authentic context.* • *With the children identify a user and purpose for the product and generate simple criteria.*	• *Children explore and evaluate a collection of books and everyday products that have moving parts, including those with levers and sliders. e.g. What is it? Who is it for? What is it for?* • *Introduce and develop vocabulary* • *Demonstrate simple levers and sliders* • *Develop their knowledge and skills by replicating the slider and lever teaching aids* • *Discuss with the children what they will be designing, making and evaluating* • *Generate simple design criteria* • *Develop their ideas through talking, drawing and making mock-ups of their ideas with paper and card* • *Discuss the finishing techniques the children might use* • *As a whole class, talk about the order in which the mechanisms will be made* • *Ask children to evaluate their developing ideas and final products against the original design criteria*	• *Children investigate and evaluate existing products linked to the chosen project. Explore and compare e.g. fabrics, joining techniques, finishing techniques and fastenings used.* • *Make drawings of existing products, stating the user and purpose. Identify and label, if appropriate, the fabrics, fastenings and techniques used.* • *Investigate fabrics to determine which is best for the purpose of the product they are creating.* • *Using prepared teaching aids, demonstrate the use of a template or simple paper pattern. Children could make their own templates or paper patterns. If necessary, they can use ones provided by the teacher.* • *Using prepared teaching aids, demonstrate the correct use of appropriate tools to mark out, and show examples of joining techniques for children to practise in guided groups e.g. running stitch including threading own needle, stapling, lacing and gluing* • *Demonstrate examples of finishing techniques for children to practise in guided groups e.g. sewing buttons, 3-D fabric paint, gluing sequins, printing.* • *Provide the children with a context that is authentic. Discuss with children the purpose and user of the*

	• *Make their wheel and axle product using their design ideas and criteria as an ongoing guide.* • *Discuss how the children might add finishing techniques to their product* • *Evaluate their finished product*		*products they will be designing, making and evaluating. Design criteria developed with the teacher should be used to guide the development and evaluation of the children's products.* • *Ask the children to generate a range of ideas e.g. What parts will the product need to have and what will it be made from? What size will it be? How will it be joined and finished?* • *Through talk, drawings and mock-ups, children to develop and communicate their ideas* • *Talk with the children about the stages in making before assembling quality products* • *Evaluate ongoing work and the final products against the intended purpose*
End points (What we want the children to remember)	• ***Explore and use wheels, axles and axle holders.*** • ***Distinguish between fixed and freely moving axles.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Explore and use sliders and levers.*** • ***Understand that different mechanisms produce different types of movement.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Understand how simple 3-D textile products are made, using a template to create two identical shapes.*** • ***Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling.*** • ***Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons.*** • ***Know and use technical vocabulary relevant to the project.***
SKILLS	***Designing*** • *Generate initial ideas and simple design criteria through talking and using own experiences.* • *Develop and communicate ideas through drawings and mock-ups.* ***Making*** • *Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing.*	***Designing*** • *Generate ideas based on simple design criteria and their own experiences, explaining what they could make.* • *Develop, model and communicate their ideas through drawings and mock-ups with card and paper.* ***Making*** • *Plan by suggesting what to do next.* • *Select and use tools, explaining their choices, to cut, shape and join paper and card.*	***Designing*** • *Design a functional and appealing product for a chosen user and purpose based on simple design criteria.* • *Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.* ***Making***

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	• *Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics.* ***Evaluating*** • *Explore and evaluate a range of products with wheels and axles.* • *Evaluate their ideas throughout and their products against original criteria.*	• *Use simple finishing techniques suitable for the product they are creating.* ***Evaluating*** • *Explore a range of existing books and everyday products that use simple sliders and levers.* • *Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.*	• *Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.* • *Select from and use textiles according to their characteristics.* ***Evaluating*** • *Explore and evaluate a range of existing textile products relevant to the project being undertaken.* • *Evaluate their ideas throughout and their final products against original design criteria.*
VOCABULARY	vehicle, wheel, axle, axle holder, chassis, body, cab assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism, names of tools, equipment and materials used, design, make, evaluate, purpose, user, criteria, functional	slider, lever, pivot, slot, bridge/guide, card, masking tape, paper fastener, join, pull, push, up, down, straight, curve, forwards, backwards, design, make, evaluate, user, purpose, ideas, design criteria, product, function	names of existing products, joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish, features, suitable, quality mock-up, design brief, design criteria, make, evaluate, user, purpose, function

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Year 3/4 Cycle A	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Simple circuits and switches (Electrical systems)**	**Healthy and Varied Diet (Food)**	**Shell Structures/2D to 3D Product (Textiles)**
Prior learning – link back	• *Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers.* • *Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.*	• *Know some ways to prepare ingredients safely and hygienically.* • *Have some basic knowledge and understanding about healthy eating and The eatwell plate.* • *Have used some equipment and utensils and prepared and combined ingredients to make a product.*	• *Have joined fabric in simple ways by gluing and stitching.* • *Have used simple patterns and templates for marking out.* • *Have evaluated a range of textile products.*
YEAR 1/2 OBJECTIVES	• *Discuss, investigate and, where practical, disassemble different examples of relevant battery-powered products, including those which are commercially available* • *Ask children to investigate examples of switches, including those which are commercially available, which work in different ways* • *Remind children about the dangers of mains electricity* • *Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs and buzzers* • *Demonstrate how to find a fault in a simple circuit and correct it, giving pupils opportunities to practise* • *Use a simple computer control program with an interface box or standalone control box to physically control output devices e.g. bulbs and buzzers* • *Ask the children to make a variety of switches by using simple classroom materials* • *Teach children how to avoid making short circuits* • *Develop a design brief with the children within a context which is authentic and meaningful.*	• *Children investigate a range of food products e.g. the content of their lunchboxes over a week, a selection of foods provided for them, food from a visit to a local shop. Link to the principles of a varied and healthy diet using The eatwell plate* • *Carry out sensory evaluations on the contents of the food from e.g. a variety of bought food products such as a range of wraps or sandwiches. Record results, for example using a table* • *Gather information about existing products available relating to your product. Visit a local supermarket and/or use the internet.* • *Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed* • *Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking.* • *Discuss basic food hygiene practices when handling food*	• *Children investigate a range of textile products* • *Give children the opportunity to disassemble appropriate textiles products to gain an understanding of 3-D shape, patterns and seam allowances.* • *Use questioning to develop understanding* • *Demonstrate a range of stitching techniques and allow children to practise sewing two small pieces of fabric together, demonstrating the use of, and need for, seam allowances.* • *Allow children to use a textile product they have taken apart to create a paper pattern using 2-D shapes.* • *Provide a range of fabrics – children to consider whether fabrics are suitable for the chosen purpose and user* • *Children to create a design brief, supported by the teacher, set within a context which is authentic and meaningful. Discuss the intended user, purpose and appeal of their product. Create a set of design criteria* • *Ask children to sketch and annotate a range of possible ideas*

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	• *Discuss with children the purpose of the battery-powered products that they will be designing and making and who they will be for* • *Using annotated sketches, cross-sectional and exploded diagrams, as appropriate, ask the children to develop, model and communicate their ideas* • *Ask the children to consider the main stages in making and testing before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs* • *Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed*	• *Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for* • *Develop and agree on design criteria with the children within a context that is authentic and meaningful* • *Ask children to generate a range of ideas encouraging realistic responses.* • *Using discussion, annotated sketches and information and communication technology if appropriate, ask the children to develop and communicate their ideas.* • *Ask children to consider the main stages in making the food product, before preparing/cooking the product including the ingredients and utensils they will need.* • *Evaluate as the assignment proceeds and the final product against the intended purpose and user*	• *Plan the main stages of making e.g. using a flowchart or storyboard.* • *Children to assemble their product using their existing knowledge, skills and understanding* • *Evaluate as the process is undertaken and the final product in relation to the design brief and criteria*
End points (What we want the children to remember)	• ***Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.*** • ***Apply their understanding of computing to program and control their products.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Know how to use appropriate equipment and utensils to prepare and combine food.*** • ***Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught.*** • ***Know and use relevant technical and sensory vocabulary appropriately.***	• ***Know how to strengthen, stiffen and reinforce existing fabrics.*** • ***Understand how to securely join two pieces of fabric together.*** • ***Understand the need for patterns and seam allowances.*** • ***Know and use technical vocabulary relevant to the project.***
SKILLS	***Designing*** • *Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups.* • *Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.* ***Making***	***Designing*** • *Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose.* • *Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas.* ***Making***	***Designing*** • *Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s.* • *Produce annotated sketches, prototypes, final product sketches and pattern pieces.* ***Making*** • *Plan the main stages of making.*

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	• *Order the main stages of making.* • *Select from and use tools and equipment to cut, shape, join and finish with some accuracy.* • *Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities.* ***Evaluating*** • *Investigate and analyse a range of existing battery-powered products.* • *Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.*	• *Plan the main stages of a recipe, listing ingredients, utensils and equipment.* • *Select and use appropriate utensils and equipment to prepare and combine ingredients.* • *Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.* ***Evaluating*** • *Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs.* • *Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.*	• *Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing.* • *Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern.* ***Evaluating*** • *Investigate a range of 3-D textile products relevant to the project.* • *Test their product against the original design criteria and with the intended user.* • *Take into account others' views.* • *Understand how a key event/individual has influenced the development of the chosen product and/or fabric.*
VOCABULARY	series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device, user, purpose, function, prototype, design criteria, innovative, appealing, design brief	name of products, names of equipment, utensils, techniques and ingredients, texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet, planning, design criteria, purpose, user, annotated sketch, sensory evaluations	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance, user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics, function, pattern pieces

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Year 3/4 Cycle B	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Pneumatics (Mechanical Systems)**	**Shell structures using Computer aided Design (Structures)**	**Levers and Linkages (Mechanical Systems)**
Prior learning – link back	• *Explored simple mechanisms, such as sliders and levers, and simple structures.* • *Learnt how materials can be joined to allow movement.* • *Joined and combined materials using simple tools and techniques*	• *Experience of using different joining, cutting and finishing techniques with paper and card.* • *A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.* • *Familiarity with general purpose software that can be used to draw accurate shapes, such as Microsoft Word, or simple computer-aided design (CAD), such as 2D Primary by Techsoft.*	• *Explored and used mechanisms such as flaps, sliders and levers.* • *Gained experience of basic cutting, joining and finishing techniques with paper and card.*
YEAR 3/4 OBJECTIVES	• *Children investigate, analyse and evaluate familiar objects that use air to make them work* • *Construct a simple pneumatic system by joining a balloon to 5mm tubing and then to a washing-up liquid bottle* • *Demonstrate lifting an object and ask the children to think about ways in which this might be used in a product* • *Demonstrate a range of pneumatic mechanisms using prepared teaching aids including two syringes joined by plastic tubing; three syringes connected using a T-connector and using different sized syringes* • *Demonstrate how to assemble the systems using syringes, tubing, balloons and plastic bottles. Introduce ways in which pneumatic systems can be used to operate levers.* • *Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.* • *Provide the materials and ask the children to try out and draw the three systems they have been shown*	• *Children investigate a collection of different shell structures including packaging* • *Children take a small package apart identifying and discussing parts of a net including the tabs* • *Evaluate existing products to determine which designs children think are the most effective* • *Demonstrate simple drawing software such as Techsoft 2D Primary or Microsoft Word* • *Ask children to use the software to open existing drawings including nets and to draw nets of their own, using gridlines and pre-shaped tools* • *Let the children explore and be guided to try out different fill and font tools to become familiar with the graphic design aspects of the available software to achieve the desired appearance of their products.* • *Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling pre-drawn nets in numerous ways using scoring, cutting and assembling techniques. Allow children to construct a simple box and show how a window can be cut out and acetate sheet added*	• *Children investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms.* • *Use questions to develop children's understanding e.g. Who might it be for? What is its purpose? What do you think will move? How will you make it move? What part moved and how did it move? How do you think the mechanism works? What materials have been used? How effective do you think it is and why? What else could move?* • *Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids.* • *Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.* • *Children should develop their knowledge and skills by replicating one or more of the teaching aids* • *Develop a design brief with the children within a context which is authentic and meaningful.* • *Discuss with children the purpose of the products they will be designing and making and who the products will be for. Ask the children to generate a*

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	• *Develop a design brief with the children within a context which is authentic and meaningful.* • *Discuss with children the purpose of the products they will be designing and making and who the products will be for* • *Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas.* • *Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.* • *Evaluate the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.*	• *Develop a design brief with the children within a context which is authentic and meaningful.* • *Discuss the uses and purposes of their shell structure* • *Ask the children to develop a design using computer-aided design (CAD) software to create nets, addressing the needs of the user and the purpose.* • *Using computer-aided design (CAD) software ask the children to print out their nets to develop prototypes in order to evaluate and refine their ideas* • *Ask children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. Encourage the children to work with accuracy, using their computer-aided design (CAD) skills as appropriate* • *Evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed*	*range of ideas, encouraging creative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's products.* • *Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas.* • *Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.* • *Evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.*
End points (What we want the children to remember)	• ***Understand and use pneumatic mechanisms.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.*** • ***Develop and use knowledge of how to construct strong, stiff shell structures.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Understand and use lever and linkage mechanisms.*** • ***Distinguish between fixed and loose pivots.*** • ***Know and use technical vocabulary relevant to the project.***
SKILLS	***Designing*** • *Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user.* • *Use annotated sketches and prototypes to develop, model and communicate ideas.* ***Making*** • *Order the main stages of making.*	***Designing*** • *Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product.* • *Develop ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas.* ***Making*** • *Plan the order of the main stages of making.*	***Designing*** • *Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.* • *Use annotated sketches and prototypes to develop, model and communicate ideas.* ***Making*** • *Order the main stages of making.* • *Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.*

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	• *Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.* • *Select from and use finishing techniques suitable for the product they are creating.* ***Evaluating*** • *Investigate and analyse books, videos and products with pneumatic mechanisms.* • *Evaluate their own products and ideas against criteria and user needs, as they design and make.*	• *Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy.* • *Explain their choice of materials according to functional properties and aesthetic qualities.* • *Use computer-generated finishing techniques suitable for the product they are creating.* ***Evaluating*** • *Investigate and evaluate a range of shell structures including the materials, components and techniques that have been used.* • *Test and evaluate their own products against design criteria and the intended user and purpose*	• *Select from and use finishing techniques suitable for the product they are creating.* ***Evaluating*** • *Investigate and analyse books and, where available, other products with lever and linkage mechanisms.* • *Evaluate their own products and ideas against criteria and user needs, as they design and make.*
VOCABULARY	components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener, pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight, linear, rotary, oscillating, reciprocating, user, purpose, function, prototype, design criteria, innovative, appealing, design brief, research, evaluate, ideas, constraints, investigate	shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision, evaluating, design brief design criteria, innovative, prototype	mechanism, lever, linkage, pivot, slot, bridge, guide, system, input, process, output, linear, rotary, oscillating, reciprocating, user, purpose, function, prototype, design criteria, innovative, appealing, design brief

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Year 5/6 Cycle A	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Using Computer Aided Design in Textiles (Textiles)**	**Celebrating Culture and Seasonality (Food)**	**Monitoring and Control (Electrical Systems)**
Prior learning – link back	• *Experience of stitching, joining and finishing techniques in textiles.* • *Experience of making and using textiles pattern pieces.* • *Experience of simple computer-aided design applications.*	• *Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet.* • *Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.*	• *Initial experience of using computer control software and an interface box, a standalone box or microcontroller, e.g. Crumble.* • *Some experience of writing and modifying a program to make a light turn on or flash on and off.* • *Understanding of the essential characteristics of a series circuit and experience of creating a battery-powered, functional, electrical product*
YEAR 5/6 OBJECTIVES	• *Children investigate and evaluate a range of existing textiles products and how they have been constructed using disassembly, and evaluate what the fabric shapes look like, how the parts have been joined, how the product has been strengthened and stiffened, what fastenings have been used and why.* • *Investigate work by designers and their impact on fabrics and products. Use questions to develop understanding* • *Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles* • *Develop computer-aided design (CAD) skills by using pattern making software to generate, modify, scale, save and print pattern pieces. Recognise that designs can be easily modified and repeated on the computer without the need for a physical product. Investigate using art packages on the computer to design prints that can be applied to textiles using iron transfer paper* • *Develop skills of 2-D paper pattern making using CAD and create a 3-D paper or Dipryl mock-up of a chosen product* • *Develop skills of threading needles and joining textiles using a range of stitches, building upon children's earlier experiences of stitches e.g.*	• *Children use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. This could include a visit to a local bakery, farm, farm shop or supermarket* • *Children carry out sensory evaluations of a variety of existing food products and ingredients relating to the project* • *Use a range of questions to support children's ability to evaluate food ingredients and products* • *Research key chefs and how they have promoted seasonality, local produce and healthy eating* • *Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients.* • *Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically.* • *Techniques could be practised following a basic recipe to prepare and cook a savoury food product.* • *Ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell.*	• *Discuss a range of relevant products (such as nightlights, garden lights, alarm systems, security lighting, electronic moneyboxes) that respond to changes in the environment using a computer control program* • *Investigate sensors such as light dependent resistors (LDRs) and a range of switches such as push-to-make, push-to-break, toggle, micro and reed switches. To gain an understanding of how they are operated by the user and how they work, ask the children to use each component to control a bulb in a simple circuit. Remind children about the dangers of mains electricity.* • *Children could research famous inventors related to the project e.g. Thomas Edison – light bulb* • *Through teacher demonstration and explanation, recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products.* • *Using a model circuit, demonstrate and enable children to practise using different input and output devices* • *Remind children how to avoid making short circuits.* • *Drawing on science understanding, ask the children to explore a range of electrical systems that could be used to control their products, including a simple*

	improving appearance and consistency of stitches and introducing new stitches • *Develop skills of sewing textiles by joining right side together and making seams* • *Set an authentic and meaningful design brief* • *Communicate ideas through detailed, annotated drawings from different perspectives* • *Produce step-by-step plans, lists of tools equipment, fabrics and components needed* • *Develop their design using CAD software to produce pattern pieces and art programmes to produce decoration and design prints that can be applied to textiles* • *Make high quality products applying knowledge, understanding and skills from IEAs and FTs. Incorporate simple computer-aided manufacture (CAM) if appropriate e.g. printing on fabric* • *Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification*	• *When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. Which shape is most appealing and why?* • *Develop a design brief and simple design specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating.* • *Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.* • *Ask children to generate a range of ideas encouraging innovative responses. Agree on design criteria* • *Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.* • *Ask children to record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt through IEAs and FTs.* • *Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.*	*series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where appropriate, parallel circuits where two output devices are controlled independently by two separate switches.* • *Drawing on related computing activities, ensure that children can write and modify computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to microcontrollers, interface boxes or standalone boxes* • *Develop an authentic and meaningful design brief with the children.* • *Ask the children to generate innovative ideas by drawing on research and develop a design specification for their product, carefully considering the purpose and needs of the intended user.* • *Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams, including the microcontroller, interface box or standalone box to be used* • *Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.* • *Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.* • *Critically evaluate throughout and the final product*
End points (What we want the children to remember)	• ***A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.*** • ***Fabrics can be strengthened, stiffened and reinforced where appropriate.***	• ***Know how to use utensils and equipment including heat sources to prepare and cook food.*** • ***Understand about seasonality in relation to food products and the source of different food products.*** • ***Know and use relevant technical and sensory vocabulary.***	• ***Understand and use electrical systems in their products.*** • ***Understand the use of computer control systems in products.*** • ***Apply their understanding of computing to program, monitor and control their products.*** • ***Know and use technical vocabulary relevant to the project.***

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SKILLS	***Designing*** • *Generate innovative ideas through research including surveys, interviews and questionnaires.* • *Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes including using computer-aided design.* • *Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.* ***Making*** • *Produce detailed lists of equipment and fabrics relevant to their tasks.* • *Formulate step-by-step plans and, if appropriate, allocate tasks within a team.* • *Select from and use a range of tools and equipment, including CAD, to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost.* ***Evaluating*** • *Investigate and analyse textile products linked to their final product.* • *Compare the final product to the original design specification.* • *Test products with intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.* • *Consider the views of others to improve their work*	***Designing*** • *Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.* • *Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.* • *Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.* ***Making*** • *Write a step-by-step recipe, including a list of ingredients, equipment and utensils* • *Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients.* • *Make, decorate and present the food product appropriately for the intended user and purpose.* ***Evaluating*** • *Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams.* • *Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements.* • *Understand how key chefs have influenced eating habits to promote varied and healthy diets.*	***Designing*** • *Develop a design specification for a functional product that responds automatically to changes in the environment.* • *Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams.* ***Making*** • *Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.* • *Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.* • *Create and modify a computer control program to enable their electrical product to respond to changes in the environment.* ***Evaluating*** • *Continually evaluate and modify the working features of the product to match the initial design specification.* • *Test the system to demonstrate its effectiveness for the intended user and purpose.*
VOCABULARY	computer aided design (CAD), computer aided manufacture (CAM) font, lettering, text, graphics, menu, scale, modify, repeat, copy, flip, design brief, design criteria, design decisions, innovative, prototype seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces, names of textiles and fastenings used, pins, needles, thread,	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs, fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality, utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out,	reed switch, toggle switch, push-to-make switch, push-to-break switch, light dependent resistor (LDR), tilt switch, light emitting diode (LED), bulb, bulb holder, battery, battery holder, USB cable, wire, insulator, conductor, crocodile clip, program, system, input device, output device, series circuit, parallel circuit, function, innovative, design specification,

	pinking shears, fastenings, iron transfer paper, annotate, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype	shape, sprinkle, crumble, design specification, innovative, research, evaluate, design brief	design brief, user, purpose

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Year 5/6 Cycle B	Autumn Term	Spring Term	Summer Term
KEY FOCUS	**Cams (Mechanical Systems)**	**Pulleys or Gears (Mechanical Systems)**	**Frame Structures (Structures)**
Prior learning – link back	• *Experience of axles, axle holders and wheels that are fixed or free moving.* • *Basic understanding of different types of movement.* • *Experience of cutting and joining techniques with a range of materials including card, plastic and wood.* • *An understanding of how to strengthen and stiffen structures.*	• *Experience of axles, axle holders and wheels that are fixed or free moving.* • *Basic understanding of electrical circuits, simple switches and components.* • *Experience of cutting and joining techniques with a range of materials including card, plastic and wood.* • *An understanding of how to strengthen and stiffen structures.*	• *Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials.* • *Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.*
YEAR 5/6 OBJECTIVES	• *Discuss with the children different types of movement: rotary, oscillating and reciprocating. Make simple models of different types of cams or have toys in which the cam mechanisms can be seen. Use videos, photographs and computer animations of products that cannot be explored through first-hand experience.* • *Encourage children to look for different types of movement in the home and in school.* • *Use observational drawings and questions to develop understanding of the products in the handling collection and those that children have researched* • *Children could research and, if possible, visit engineering and manufacturing companies that are relevant to the product they are designing and making e.g. car engine manufacturers* • *Give children pre-cut cams made from MDF or wooden wheels to mount on a piece of board and observe their movement with a follower.* • *Demonstrate how to use a hand drill safely to make an off-centre cam and position it accurately in a housing* • *Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench*	• *Investigate, analyse and evaluate existing everyday products and existing or pre-made toys that incorporate gear or pulley systems* • *Use observational drawings and questions to develop understanding of each product in the collection* • *Children could research and, if possible, visit engineering and manufacturing companies that are relevant to the product they are designing and making e.g. Jaguar Land Rover, JCB, local companies* • *Using a construction kit, investigate combinations of two different sized pulleys to learn about direction and speed of rotation* *AND/OR* • *Using a construction kit, explore combinations of two different size gears meshed together. Investigate the direction and speed of rotation focusing on how the size of the driver gear affects the speed of the follower gear. Ask the children to use the number of teeth on each gear to decide upon the gear ratios e.g. 10 tooth driver gear meshed with a 20 tooth follower gear produces a ratio of 2:1* • *Build a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch*	• *Children investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas* • *Children could research key events and individuals related to their study of frame structures e.g. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge. They could also learn about locally important design and technology activity related to their project* • *Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks* • *Demonstrate how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of e.g. dowel* • *Demonstrate the accurate use of tools and equipment. Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate.* • *Demonstrate skills and techniques for accurately joining framework materials together* • *Discuss the brief of designing and making a small-scale frame structure*

	hooks, square section wood, card triangles and hand drills to make cam mechanisms and construct wooden frames or card housings, as appropriate • *Develop an authentic and meaningful design brief with the children.* • *Children generate innovative ideas by carrying out research including surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product* • *Communicate ideas through detailed, annotated sketches from different views and/or exploded diagrams* • *Produce detailed step-by-step plans and lists of tools, equipment and materials needed* • *Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Children should use a range of decorative finishing techniques to ensure a well finished final product that matches the intended user and purpose.* • *Evaluate throughout and the final product in use, comparing it to the original design specification*	• *Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. Demonstrate the accurate use of tools and equipment.* • *Develop an authentic and meaningful design brief with the children.* • *Children generate innovative ideas by carrying out research including surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product* • *Communicate ideas through detailed, annotated drawings from different views and/or exploded diagrams* • *Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate allocate tasks within a team.* • *Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Children should use a range of decorative finishing techniques to ensure a well finished final product that matches the intended user and purpose* • *Evaluate throughout and the final product in use*	• *Children should produce a detailed, step-by-step plan, listing tools and materials* • *Children's sketches should be annotated with notes to help develop and communicate their ideas* • *Encourage children to model their ideas first using materials such as paper, card and paper straws* • *Encourage children to make their products with accuracy. They should regularly evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user*
End points (What we want the children to remember)	• ***Understand that mechanical systems have an input, process and an output.*** • ***Understand how cams can be used to produce different types of movement and change the direction of movement.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Understand that mechanical and electrical systems have an input, process and an output.*** • ***Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.*** • ***Know and use technical vocabulary relevant to the project.***	• ***Understand how to strengthen, stiffen and reinforce 3-D frameworks.*** • ***Know and use technical vocabulary relevant to the project.***

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SKILLS	***Designing*** • *Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.* • *Develop a simple design specification to guide their thinking.* • *Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.* ***Making*** • *Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.* • *Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.* ***Evaluating*** • *Compare the final product to the original design specification.* • *Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.* • *Consider the views of others to improve their work.* • *Investigate famous manufacturing and engineering companies relevant to the project.*	***Designing*** • *Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.* • *Develop a simple design specification to guide their thinking.* • *Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.* ***Making*** • *Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.* • *Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.* ***Evaluating*** • *Compare the final product to the original design specification.* • *Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.* • *Consider the views of others to improve their work.* • *Investigate famous manufacturing and engineering companies relevant to the project.*	***Designing*** • *Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources.* • *Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost.* • *Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches.* ***Making*** • *Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.* • *Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks.* • *Use finishing and decorative techniques suitable for the product they are designing and making.* ***Evaluating*** • *Investigate and evaluate a range of existing frame structures.* • *Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.* • *Research key events and individuals relevant to frame structures.*
VOCABULARY	cam, snail cam, off-centre cam, peg cam, pear shaped cam, follower, axle, shaft, crank, handle, housing, framework, rotation, rotary motion, oscillating motion, reciprocating motion, annotated sketches, exploded diagrams, mechanical system, input movement, process, output movement, design	pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output, design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief	frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent, design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional

	decisions, functionality, innovation, authentic, user, purpose, design specification, design brief		