

Year: 5/6		Subject: Mechanical systems.		Topic Question/Title: Fantastic Fairgrounds!		Term - Autumn 2		Curriculum - A			
Prior Knowledge • 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.						Key Vocabulary pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram.			Outcome Design and make a new fairground ride.		
Future Learning (KS3) • To develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools. • To select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties • To test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • To understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • To understand how more advanced mechanical systems used in their products enable changes in movement and force						Stimulus Video clip of a theme park ride First hand experiences (enrichment)			World of Work Structural engineer, architect		
National Curriculum PoS Design To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design Make To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately To select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities Evaluate To investigate and analyse a range of existing products evaluate their ideas and products against their own design criteria and consider the views of others to improve their work To understand how key events and individuals in design and technology have helped shape the world. Technical knowledge To apply their understanding of how to strengthen, stiffen and reinforce more complex structures To understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]						Technical Knowledge and Understanding			Possible evidence		
						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. Technical knowledge and understanding • 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.			• Investigate, analyse and evaluate existing everyday products and existing or pre-made toys that incorporate gear or pulley systems. Use videos and photographs of products that cannot be explored through first-hand experience. • Using a construction kit, investigate combinations of two different sized pulleys to learn about direction and speed of rotation		
						Application of Key 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.					

Year: 5/6 Subject: D and T PoS: Mechanical System		Topic Question/Title: This isn't a wind up!	Term - Spring 2	Curriculum - A 
Prior Knowledge Children will experience of axles, axle holders and wheels that are fixed or free moving. They will have basic understanding of different types of movement. They will experience of cutting and joining techniques with a range of materials including card, plastic and wood. They will have an understanding of how to strengthen and stiffen structures.		Key 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.		Outcome Designing, making and evaluating a moving toy for children in a particular age range
Future Learning Children will continue to develop their understanding of the design, make and evaluating D.T process in every unit in 5 and 6. In KS3, children will select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture and select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties. They will understand and use the properties of materials and the performance of structural elements to achieve functioning solutions and understand how more advanced mechanical systems used in their products enable changes in movement and force.		Stimulus Selection of moving toys		World of Work Engineer, car designer, mechanic
National Curriculum PoS Design To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design <u>Make</u> To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately To select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities <u>Evaluate</u> To investigate and analyse a range of existing products To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work To understand how key events and individuals in design and technology have helped shape the world <u>Technical knowledge</u> To apply their understanding of how to strengthen, stiffen and reinforce more complex structures To understand and use mechanical systems in their products [for example gears, pulleys, cams, levers and linkages]	Key Knowledge		Possible evidence	
	- 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.		- Develop an authentic and meaningful design brief with the children. - Discuss with the children different types of movement: rotary, oscillating and reciprocating. se 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. - 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.	
	Application of Key Skills		Possible evidence	
	<u>Designing</u> - 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. <u>Making</u> - 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. <u>Evaluating</u> - 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.		- 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. Ensure children secure the wheel with a G-clamp and use a piece of scrap wood under the wheel to avoid drilling through the bench hook or table. Stress the importance of measuring accurately and checking before cutting any holes or gluing. It is important to line up the cam and follower otherwise the mechanism may not work smoothly. How high will the cam lift the follower? - Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to make cam mechanisms and construct wooden frames or card housings, as appropriate. Demonstrate the accurate and safe use of tools and equipment. - 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. The drawings should indicate the design decisions made, including the location of the components, how they work as a system and the appearance and finishing techniques for the product. - Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.	

Year: 5/6 Subject: D and T PoS: CAD designs in Textiles		Topic Question/Title: Detailed designs!		Term - Summer 2	Curriculum - A 
Prior Knowledge • Either in year 5, year B or in year 3/4 children will have experience of stitching, joining and finishing techniques in textiles. They will also have experience of making and using textiles pattern pieces. • All children will have experience of simple computer-aided design application. In year 3/4 children created 3D shell structures using CAD to help their designs. As well as this in this current year A cycle, the children will have looked at 3D modelling within Computing units in Spring 1.			Key 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.		Outcome Designing, making and evaluating a shopping bag for a grandparent using CAD.
Future Learning Children will continue to develop their understanding of the design, make and evaluating D.T process in every unit in 5 and 6. The children in year 6, will complete another unit specifically looking at Textiles. They will in this unit create products using skills of cutting, sewing, using seam allowance and selection of materials in order to meet a design brief. In KS3, children will develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools, select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture and select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties.			Stimulus Explore a range of existing textiles products		World of Work Designer, product developer.
National Curriculum PoS <u>Design</u> To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design <u>Make</u> To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately To select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities <u>Evaluate</u> To investigate and analyse a range of existing products To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work To understand how key events and individuals in design and technology have helped shape the world <u>Technical knowledge</u> To apply their understanding of how to strengthen, stiffen and reinforce more complex structures To apply their understanding of computing to program, monitor and control their products			Key Knowledge		Possible evidence
			<u>Technical knowledge and understanding</u> • 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.		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 e.g. Is the product functional or decorative? Who would use this product? Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles.
			Application of Key Skills		Possible evidence
			<u>Designing</u> • 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. <u>Making</u> • 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. <u>Evaluating</u> • 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.		• 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. Remind/teach how to pin a pattern on to fabric ensuring limited wastage, how to leave a seam allowance and use different cutting techniques. • Set an authentic and meaningful design brief. Children generate ideas by carrying out research using surveys, interviews, questionnaires and the internet. Develop a design specification for their product. • Communicate ideas through detailed, annotated drawings from different perspectives. Drawings should indicate the design decisions made, methods of strengthening, the type of fabrics to be used and the types of stitching that will be incorporated. • Produce step-by-step plans, lists of tools equipment, fabrics and components needed. Allocate tasks within a team if appropriate. • 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. • Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification.