

Mechanisms / mechanical systems

		Year 2 – Fairground Wheel	
		Kapow Skills and Knowledge Progression	National Curriculum
Skills	Design	Selecting a suitable linkage system to produce the desired motion.	Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
		Designing a wheel.	Design: Design purposeful, functional, appealing products for themselves and other users based on design criteria.
	Make	<ul style="list-style-type: none"> Selecting materials according to their characteristics. 	Make: Select from and use a wide range of materials and components, including construction materials, textiles, and ingredients, according to their characteristics.
		<ul style="list-style-type: none"> Following a design brief. 	Design: Generate, develop, model, and communicate their ideas through talking, drawing, templates, mock-ups, and, where appropriate, information and communication technology.
	Evaluate	Evaluating different designs.	Evaluate: Evaluate their ideas and products against design criteria.
		Testing and adapting a design	Evaluate: Evaluate their ideas and products against design criteria.
Knowledge	Technical	<ul style="list-style-type: none"> To know that different materials have different properties and are therefore suitable for different uses. 	Make: Select from and use a wide range of materials and components, including construction materials, textiles, and ingredients, according to their characteristics.
	Additional	To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder.	Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
		<ul style="list-style-type: none"> To know that it is important to test my design as I go along so that I can solve any problems that may occur. 	Evaluate: Evaluate their ideas and products against design criteria.

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Year 2 – Making a Moving Monster			
		Kapow Skills and Knowledge Progression	National Curriculum
Skills	Design	Creating a class design criteria for a moving monster.	Design: Design purposeful, functional, appealing products for themselves and other users based on design criteria.
		• Designing a moving monster for a specific audience in accordance with a design criteria.	Design: Design purposeful, functional, appealing products for themselves and other users based on design criteria.
	Make	• Making linkages using card for levers and split pins for pivots.	Make: Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining, and finishing].
		• Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.	Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
		• Cutting and assembling components neatly.	Make: Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining, and finishing].
	Evaluate	Evaluating own designs against design criteria.	Evaluate: Evaluate their ideas and products against design criteria.
		• Using peer feedback to modify a final design	Evaluate: Evaluate their ideas and products against design criteria.
	Knowledge	Technical	• To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.
• To know that there is always an input and output in a mechanism.			Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
• To know that an input is the energy that is used to start something working.			Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
• To know that an output is the movement that happens as a result of the input.			Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
• To know that a lever is something that turns on a pivot.			Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
• To know that a linkage mechanism is made up of a series of levers.			Technical knowledge: Explore and use mechanisms [for example, levers, sliders, wheels, and axles], in their products.
Additional		• To know some real-life objects that contain mechanisms.	Explore and evaluate a range of existing products.

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		Year 4 – Making a Slingshot Car	
		Kapow Skills and Knowledge Progression	National Curriculum
Skills	Design	• Designing a shape that reduces air resistance.	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
		• Drawing a net to create a structure from.	generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
		• Choosing shapes that increase or decrease speed as a result of air resistance.	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
		• Personalising a design.	use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
	Make	• Measuring, marking, cutting and assembling with increasing accuracy.	select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining, and finishing], accurately
		• Making a model based on a chosen design.	generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design
	Evaluate	• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
Knowledge	Technical	• To understand that all moving things have kinetic energy.	apply their understanding of how to strengthen, stiffen and reinforce more complex structures
		• To understand that kinetic energy is the energy that something (object/person) has by being in motion.	apply their understanding of how to strengthen, stiffen and reinforce more complex structures
		• To know that air resistance is the level of drag on an object as it is forced through the air.	apply their understanding of how to strengthen, stiffen and reinforce more complex structures
		• To understand that the shape of a moving object will affect how it moves due to air resistance	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

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	Additional	<ul style="list-style-type: none"> • To understand that products change and evolve over time. 	understand how key events and individuals in design and technology have helped shape the world
		<ul style="list-style-type: none"> • To know that aesthetics means how an object or product looks in design and technology. 	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
		<ul style="list-style-type: none"> • To know that a template is a stencil you can use to help you draw the same shape accurately. 	generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design
		<ul style="list-style-type: none"> • To know that graphics are images which are designed to explain or advertise something. 	generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design
		<ul style="list-style-type: none"> • To know that graphics are images which are designed to explain or advertise something 	generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design
		<ul style="list-style-type: none"> • To know that it is important to assess and evaluate design ideas and models against a list of design criteria.. 	evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

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		Year 5 – Making a pop-up book	
		Kapow Skills and Knowledge Progression	Kapow Skills and Knowledge Progression
Skills	Design	Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product	investigate and analyze a range of existing products
		Developing design criteria based on findings from investigating existing products	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
		Developing design criteria that clarifies the target user	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
	Make	Altering a product’s form and function by tinkering with its configuration	generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
		Making a functional series circuit, incorporating a motor	select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
		Constructing a product with consideration for the design criteria	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
		Breaking down the construction process into steps so that others can make the product	select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
	Evaluate	• Evaluating the work of others and receiving feedback on own work.	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
		• Suggesting points for improvement.	Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
	Knowledge	Technical	<ul style="list-style-type: none"> • To know that mechanisms control movement. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.

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		<ul style="list-style-type: none"> • To understand that mechanisms can be used to change one kind of motion into another. 	Understand and use mechanical systems in their products (e.g., gears, pulleys, cams, levers, and linkages)
		<ul style="list-style-type: none"> • To understand how to use sliders, pivots and folds to create paper-based mechanisms. 	<p>Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design.</p> <p>Select from and use a wider range of tools and equipment to perform practical tasks (e.g., cutting, shaping, joining, and finishing) accurately.</p>
	Additional	<ul style="list-style-type: none"> • To know that a design brief is a description of what I am going to design and make. 	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
		<ul style="list-style-type: none"> • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. 	Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design