Design & Technology (Mechanisms), Progression of Skills: Hockering Primary Academy

Discoverers: Year R/1/2

		2024/2025	2025/2026
		Making a Moving Storybook	**Making a Moving Monster**
Skills	Design	• Selecting stories which suit these mechanisms • Explaining how to adapt mechanisms, using bridges or guides to control the movement. • Designing a moving story book for a given audience in accordance with a design criteria.	• Design features of a moving monster design. • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria.
	Make	• Creating moving models that use levers and sliders. • Following a design • Experimenting with adjusting the widths, lengths and thicknesses of card used.	• Cutting and assembling components neatly. • Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.
	Evaluate	• Testing a finished product • Seeing whether a finished product moves as planned and if not, explaining why and how it can be fixed. • Reviewing the success of a product by testing it with its intended audience. • Using peer feedback to modify a final design. • Evaluating own designs against design criteria.	• Testing a finished product • Seeing whether a finished product moves as planned and if not, explaining why and how it can be fixed. • Reviewing the success of a product by testing it with its intended audience. • Using peer feedback to modify a final design. • Evaluating own designs against design criteria.
Knowledge		• To know that a mechanism is the parts of an object that move together. • To know that a slider mechanism moves an object from side to side. • To know that a slider mechanism has a slider, slots, guides and an object. • To know that bridges and guides are bits of card that purposefully restrict the movement of the slider. • To know that in Design and technology we call a plan a 'design'. • To know some real-life objects that contain mechanisms. • To know that a lever is something that turns on a pivot.	• To know that a mechanism is the parts of an object that move together. • To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that a lever is something that turns on a pivot. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a linkage mechanism is made up of a series of levers. • To know some real-life objects that contain mechanisms.

*Year 1 and 2 only *Year 2 only

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Pioneers: Year 3/4/5/6

		2027/2028	2024/2025
		Pneumatic toys	**Making a slingshot car**
Skills	Design	• Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas. • Choosing shapes in the toy that assist the pneumatic mechanism. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.	• Designing a shape that reduces air resistance. • Drawing a net to create a structure from. • Personalising a design. • Choosing shapes that increase or decrease speed as a result of air resistance. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
	Make	• Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving with increasing accuracy. • Producing lists of equipment, materials and tools that they need for a task. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research.	• Selecting materials due to their functional and aesthetic characteristics. • Making a model based on a chosen design. • Measuring, marking, cutting and assembling with increasing accuracy. • Producing lists of equipment, materials and tools that they need for a task. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research.
	Evaluate	• Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client. • Evaluating the effectiveness of the pneumatic design and how to improve it. • Providing feedback that is helpful, specific and encouraging. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	• Evaluating the speed of a final product based on: the accuracy of workmanship on performance and the effect of shape on speed. • Providing feedback that is helpful, specific and encouraging. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.
Knowledge		• To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air. • To understand how sketches, drawings and diagrams can be used to communicate design ideas.	• To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that products change and evolve over time.

	• To know that exploded-diagrams are used to show how different parts of a product fit together. • To know that thumbnail sketches are small drawings to get ideas down on paper quickly. • To know that a birds-eye view means a view from a high angle (as if a bird in flight). • To know that it is important to assess and evaluate design ideas and models against a list of design criteria. • To know that aesthetics means how an object or product looks in design and technology. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.	• To know that a template is a stencil you can use to help you draw the same shape accurately. • To know that graphics are images which are designed to explain or advertise something. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that the shape of a moving object will affect how it moves due to air resistance. • To know that a birds-eye view means a view from a high angle (as if a bird in flight). • To know that it is important to assess and evaluate design ideas and models against a list of design criteria. • To know that aesthetics means how an object or product looks in design and technology. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.

*Year 4/5/6 only *Year 5/6 only *Year 6 only

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		2025/2026	2026/2027
		Making a pop up book	**Steady hand game**
Skills	Design	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Storyboarding ideas for a book. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Naming each mechanism, input and output accurately. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.	• Designing a steady hand game - identifying and naming the components required. • Generating ideas through sketching and discussion. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Drawing a design from three different perspectives. • Modelling ideas through prototypes. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.
	Make	• Following a design brief to make a pop-up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. • Producing lists of equipment, materials and tools that they need for a task. • Selecting materials/ components based on research or user needs. • Explaining their choices, referring to their research.	• Constructing a stable base for a game (either with assistance or independently). • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high-quality finish. • Making and testing a circuit (either with assistance or independently). • Incorporating a circuit into a base (either with assistance or independently). • Explaining their choices, referring to their research.
	Evaluate	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement. • Providing feedback that is helpful, specific and encouraging. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	• Testing own and others finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.
Knowledge		• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds altogether to create paper-based mechanisms. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.	• To know the names of the components in a basic series circuit, including a buzzer. • To know that batteries contain acid, which can be dangerous if they leak. • To know that 'form' means the shape and appearance of an object. • To know the difference between 'form' and 'function'. • To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To understand the diagram perspectives 'top view', 'side view' and 'back'. • To know that form over purpose means that a product looks good but does not work very well. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.

*Year 4/5/6 only *Year 5/6 only *Year 6 only