# Ashwell Primary School
# Design & Technology Curriculum
# Skills & Knowledge Organiser – Mechanisms & Mechanical Systems

| Mechanisms & Mechanical Systems – Key Stage 1 | | | | |
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| | | **Year 1 – Making a moving storybook** | **Year 2 – Fairground wheel** | **Year 2 – Making a moving monster** |
| **Skills** | **Design** | Stand alone lesson – Lesson 1 | ▪ Conducting simple surveys or discussions to gather opinions on what others need or like in a design.<br>▪ Knowing that a survey is used to find out what people like.<br>▪ Using a simple design brief that outlines the intended use, target user, and key features of the product, to create simple design criteria.<br>▪ Knowing that a design brief helps to decide what to make.<br>▪ Knowing that design criteria are the steps for making a product successful.<br>▪ Creating ideas with design criteria in mind.<br>▪ Referring to specific parts of existing products when generating ideas.<br>▪ Knowing that the design criteria help when thinking of ideas.<br>▪ Using labels to explain parts of a design, label materials, etc.<br>▪ Knowing that drawings can help explain how something works.<br>▪ Knowing that a label explains part of a drawing. | ▪ Creating a class design criteria for a moving monster.<br>▪ Designing a moving monster for a specific audience in accordance with a design criteria. |
| | **Make** | | ▪ Choosing materials, ingredients or components from a wider range of materials, ingredients or components.<br>▪ Explaining their choices based on the properties of materials and components.<br>▪ Knowing some properties of materials like hard, soft, flexible, waterproof, strong etc.<br>▪ Following and recalling simple safety instructions.<br>▪ Knowing that some tools are sharp like scissors and knives.<br>▪ Choosing known geometric shapes when making.<br>▪ Beginning to shape objects to improve how they work.<br>▪ Knowing the names of some geometric shapes: triangle, pyramid, square, cube, circle, sphere.<br>▪ Considering balance in their finishing, like evenly spaced decoration. | ▪ Making linkages using card for levers and split pins for pivots.<br>▪ Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.<br>▪ Cutting and assembling components neatly. |

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| | **Evaluate** | | ▪ Discussing a range of existing products and saying what they like and dislike about them.<br>▪ Evaluating existing products against design criteria.<br>▪ Evaluating their ideas and creations against simple design criteria.<br>▪ Knowing that design criteria help to decide if their product is a success.<br>▪ Suggesting improvements to their peers' designs and products.<br>▪ Knowing that improve means to make something better.<br>▪ Knowing that their suggestions can improve someone else's work. | ▪ Evaluating own designs against design criteria.<br>▪ Using peer feedback to modify a final design. |
| **Knowledge** | **Technical** | ▪ Stand alone lesson – lesson 1 | ▪ To know everyday objects have mechanisms.<br>▪ To know many things that move have parts inside to help them work.<br>▪ To know mechanisms usually limit unwanted movement.<br>▪ To know everyday objects utilise wheels and axles.<br>▪ To know wheels must be able to turn to work effectively.<br>▪ To know axles, allow wheels to turn without falling off. | ▪ To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.<br>▪ To know that there is always an input and output in a mechanism.<br>▪ To know that an input is the energy that is used to start something working.<br>▪ To know that an output is the movement that happens as a result of the input.<br>▪ To know that a lever is something that turns on a pivot.<br>▪ To know that a linkage mechanism is made up of a series of levers. |
| | **Additional** | | ▪ To know the features of a fairground wheel include the wheel, frame, pods, a base an axle and an axle holder. | ▪ To know some real-life objects that contain mechanisms. |
| **Key Vocabulary** | | Adapt, assemble, design, design criteria, input, mechanism, model, sliders, test | design brief, design criteria, evaluate, frame, model, opinion, rotate, survey | Axle, design criteria, input, linkage, mechanical, output, pivot, wheel |

| Mechanisms & Mechanical Systems – Lower Key Stage 2 | | | |
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| | | **Year 3 – Pneumatic toys** | **Year 4 – Making a slingshot car** |
| **Skills** | **Design** | Stand alone lesson – lesson 1 and/or 2 | ▪ Designing a toy which uses a pneumatic system.<br>▪ Developing design criteria from a design brief.<br>▪ Generating ideas using thumbnail sketches and exploded diagrams.<br>▪ Learning that different types of drawings are used in design to explain ideas clearly. |
| | **Make** | | ▪ Creating a pneumatic system to create a desired motion.<br>▪ Building secure housing for a pneumatic system.<br>▪ Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.<br>▪ Selecting materials due to their functional and aesthetic characteristics.<br>▪ Manipulating materials to create different effects by cutting, creasing, folding and weaving. |
| | **Evaluate** | | ▪ Using the views of others to improve designs.<br>▪ Testing and modifying the outcome, suggesting improvements.<br>▪ Understanding the purpose of exploded-diagrams through the eyes of a designer and their client. |
| **Knowledg** | **Technical** | Stand alone lesson – lesson 1 and/or 2 | ▪ To understand how pneumatic systems work.<br>▪ To understand that pneumatic systems can be used as part of a mechanism.<br>▪ To know that pneumatic systems operate by drawing in, releasing and compressing air. |
| | **Additional** | ▪ | ▪ To understand how sketches, drawings and diagrams can be used to communicate design ideas.<br>▪ To know that exploded-diagrams are used to show how different parts of a product fit together.<br>▪ To know that thumbnail sketches are small drawings to get ideas down on paper quickly. |
| **Key Vocabulary** | | Mechanism, lever, pivot, linkage system, pneumatic system, input, output, Component, thumbnail sketch, research, adapt, properties, reinforce, motion | Chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template |

| Mechanisms & Mechanical Systems – Upper Key Stage 2 | | | |
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| | | **Year 5 – Making a pop-up book** | **Year 6 – Not Taught** |
| **Skills** | **Design** | ▪ Designing a pop-up book which uses a mixture of structures and mechanisms.<br>▪ Naming each mechanism, input and output accurately.<br>▪ Storyboarding ideas for a book. | |
| | **Make** | ▪ Following a design brief to make a pop-up book, neatly and with focus on accuracy.<br>▪ Making mechanisms and/or structures using sliders, pivots and folds to produce movement.<br>▪ Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. | |
| | **Evaluate** | ▪ Evaluating the work of others and receiving feedback on own work.<br>▪ Suggesting points for improvement. | |

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| **Knowledg** | **Technical** | ▪ To know that mechanisms control movement.<br>▪ To understand that mechanisms can be used to change one kind of motion into another.<br>▪ To understand how to use sliders, pivots and folds to create paper-based mechanisms. | |
| | **Additional** | ▪ To know that a design brief is a description of what I am going to design and make.<br>▪ To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. | |
| **Key Vocabulary** | | Criteria, design, input, mechanism, model, motion, reinforce, research | |