

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



Mechanisms & Mechanical Systems – Key Stage 1

		Year 1 – Making a moving monster	Year 2 – Wheels & Axles
Skills	Design	<ul style="list-style-type: none"> ▪ Creating a class design criteria for a moving monster ▪ Designing a moving monster for a specific audience in accordance with a design criteria 	<ul style="list-style-type: none"> ▪ Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move ▪ Creating clearly labelled drawings which illustrate movement
	Make	<ul style="list-style-type: none"> ▪ Making linkages using card for levers and split pins for pivots ▪ Experimenting with linkages adjusting the widths, lengths and thicknesses of card used ▪ Cutting and assembling components neatly 	<ul style="list-style-type: none"> ▪ Adapting mechanisms
	Evaluate	<ul style="list-style-type: none"> ▪ Evaluating own designs against design criteria ▪ Using peer feedback to modify a final design 	<ul style="list-style-type: none"> ▪ Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move
Knowledge	Technical	<ul style="list-style-type: none"> ▪ 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 ▪ To know that an input is energy that is used to start something working ▪ To know that an output is the movement that happens because of input ▪ To know that a lever is something that turns on a pivot ▪ To know that a linkage mechanism is made up of a series of levers 	<ul style="list-style-type: none"> ▪ To know that wheels need to be round to rotate and move ▪ To understand that for a wheel to move it must be attached to a rotating axle ▪ To know that an axle moves within an axle holder which is fixed to the vehicle or toy ▪ To know that the frame of a vehicle (chassis) needs to be balanced
	Additional	<ul style="list-style-type: none"> ▪ To know some real-life objects that contain mechanisms 	<ul style="list-style-type: none"> ▪ To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles

Mechanisms & Mechanical Systems – Lower Key Stage 2

		Year 3 – Pneumatic toys	Year 4 – Making a slingshot car
Skills	Design	<ul style="list-style-type: none"> ▪ 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 clearly 	<ul style="list-style-type: none"> ▪ Designing a shape that reduces air resistance ▪ Drawing a net to create a structure from choosing shapes that increase or decrease speed as a result of air resistance ▪ Personalising a design
	Make	<ul style="list-style-type: none"> ▪ 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 	<ul style="list-style-type: none"> ▪ Measuring, marking, cutting and assembling with increasing accuracy ▪ Making a model based on a chosen design

		<ul style="list-style-type: none"> Selecting materials due to their functional and aesthetic characteristics Manipulating materials to create different effects by cutting, creasing, folding, weaving 	
	Evaluate	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance
Knowledge	Technical	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 the shape of a moving object will affect how it moves due to air resistance.
	Additional	<ul style="list-style-type: none"> To understand how sketches, drawings and diagrams can be used to communicate design ideas 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 	<ul style="list-style-type: none"> To understand that products change and evolve over time To know that aesthetics means how an object or product looks in design and technology To know that a template is a stencil you can use to help you draw the same shape accurately To know that a birds-eye view means a view from a high angle (as if a bird in flight) To know that graphics are images which are designed to explain or advertise something To know that it is important to assess and evaluate design ideas and models against a list of design criteria.

Mechanisms & Mechanical Systems – Upper Key Stage 2

		Year 5 – Making a pop-up book	Year 6 – Automata toys
Skills	Design	<ul style="list-style-type: none"> Designing a pop-up book which uses a mixture of structures and mechanisms Naming each mechanism, input and output accurately Storyboarding ideas for a book 	<ul style="list-style-type: none"> Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement Understanding how linkages change the direction of a force Making things move at the same time Understanding and drawing cross-sectional diagrams to show the inner-working
	Make	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Measuring, marking and checking the accuracy of the jelutong and dowel pieces required Measuring, marking and cutting components accurately using a ruler and scissors Assembling components accurately to make a stable frame

			<ul style="list-style-type: none"> ▪ Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles ▪ Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set
	Evaluate	<ul style="list-style-type: none"> ▪ Evaluating the work of others and receiving feedback on own work ▪ Suggesting points for improvement 	<ul style="list-style-type: none"> ▪ Evaluating the work of others and receiving feedback on own work ▪ Applying points of improvements ▪ Describing changes they would make/do if they were to do the project again
Knowledge	Technical	<ul style="list-style-type: none"> ▪ To know that mechanisms control movement ▪ To understand that mechanisms that can be used to change one kind of motion into another ▪ To understand how to use sliders, pivots and folds to create paper-based mechanisms 	<ul style="list-style-type: none"> ▪ To understand that the mechanism in an automata uses a system of cams, axles and followers ▪ To understand that different shaped cams produce different outputs
	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 ▪ To know that designers often want to hide mechanisms to make a product more aesthetically pleasing 	<ul style="list-style-type: none"> ▪ To know that an automata is a hand powered mechanical toy ▪ To know that a cross-sectional diagram shows the inner workings of a product ▪ To understand how to use a bench hook and saw safely ▪ To know that a set square can be used to help mark 90° angles