Wentworth Primary School
Key Skills & Knowledge Progression Map
'Striving for Excellence'
Design and Technology: Mechanisms

For EYFS please see EYFS Progression of Skills Knowledge map

	Foundation	Year 1 Matching slider game	Year 2 Making a moving alien ship	Year 3 Pneumatic Toys	Year 4 Slingshot cars	Year 5 Making a pop up book	Year 6
Planning & Designing		Thinking about what others might want from a design. Beginning to recognise how products and designs in the world around us solve certain needs. Considering who they are designing for – by identifying the user. Stating what they intend to make and why – by identifying the purpose. Talking about ideas with purpose and user in mind. Talking about existing products	Creating a class design criteria for a moving alien ship. Designing a moving alien ship for a specific audience in accordance with a design criteria.	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.	Designing a shape that reduces air resistance. Developing drawing and sketching skills with a focus on clarity and simplicity. Developing designs by adding detail and justifications about materials, tools, methods. Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design.	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.	

		when generating ideas. Creating mock-ups to communicate designs.					
<u>Working with tools</u>		Planning more than one step ahead. Choosing between a small number of materials, ingredients or components. Explaining their choices based on personal experiences. Requesting equipment appropriate to the purpose. (e.g. scissors for cutting, glue for joining). Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Beginning to use objects with a fixed width or length to create even spacing of markings or cuts. (e.g. a lolly stick).	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.	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.	Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.	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.	

		Refining their grip to cut competently and confidently. Cutting straight lines and evenly spaced lines. Beginning to cut large shapes and thicker materials like card. Puncturing holes. Applying masking tape to fix something in place or join to edges. Using tools, like scissors, to create shapes. Beginning to cut large shapes and thicker materials like card.					
<u>Evaluating</u>		Discussing existing products, saying what they like about them. Discussing how their products could be improved based on personal preferences. Saying what they like about their	Evaluating own designs against design criteria. Using peer feedback to modify a final design.	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	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement.	

		peers' designs and products. Accepting feedback and understanding it is meant to improve their work.		designer and their client.			
Technical Knowledge		Recognising and exploring everyday objects that have mechanisms. Recognising everyday objects that use a slider mechanism (e.g. drawers, sliding doors, paper trimmer). To know that the 'user' is the person who will use the product. To know that different users may want different things from a design. To know that designers usually design and make something to solve a problem. To know that who they are designing for makes a difference to what they design.	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 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 lever is something that turns on a pivot. To know that a linkage mechanism is made up of a series of levers. To know some real-life objects that contain mechanisms.	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 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 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. 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	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 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 that the purpose is what something is for. To know that a mock-up is a model of how something works. To know that choosing different materials or components will have an effect on what their product does or looks like. To know that different equipment does different things. To know the names of common pieces of equipment. To know that following instructions helps with safety.			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.		
Key Vocabulary		• Better • Compare • Cut • Design • Dislike • Explain • Join • Like • Mechanism • Mock-up • Movement • Product • Slider	• Evaluation • Input • Lever • Linear motion • Linkage • Mechanical • Mechanism • Motion • Oscillating motion • Output • Pivot • Reciprocating motion	• Exploded-diagram • Function • Input • Lever • Linkage • Mechanism • Motion • Net • Output • Pivot • Pneumatic system • Thumbnail sketch	• Aesthetic • Air resistance • Chassis • Design • Design criteria • Function • Graphics • Kinetic energy • Mechanism • Net • Structure	• Aesthetic • Caption • Design • Design brief • Design criteria • Exploded-diagram • Function • Input • Linkage • Mechanism • Motion • Output • Pivot	

		• Straight line • Tools • User • Worse	• Rotary motion • Survey			• Prototype • Slider • Structure • Template	