The Trinity CE Primary Academy

Design and Technology Progression

Concept: Mechanisms / mechanical systems

Skills	YR	Y1	Y2	Y3	Y4	Y5	Y6
Design	•Begin to use the language of designing and making, e.g. join, build and shape. •Learning about planning and adapting initial ideas to make them better.	• Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement	• Selecting a suitable linkage system to produce the desired motions • Designing a wheel Selecting appropriate materials based on their properties • Creating a class design criteria for a moving monster • Designing a moving monster 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 • 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	•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	•To learn to construct with a purpose in mind. •Selects tools and techniques needed to shape, assemble and join materials.	• Following a design to create moving models that use levers and sliders • Adapting mechanisms	• Selecting materials according to their characteristics • Following a design brief • Making linkages using card for levers and split pins for pivots • Experimenting with linkages adjusting the	• 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	• 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	• Measuring, marking and checking the accuracy of the jelutong and dowel pieces required • Measuring, marking and cutting components accurately using a ruler and scissors

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			widths, lengths and thicknesses of card used • Cutting and assembling components neatly	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, weaving		• Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result	• Assembling components accurately to make a stable frame • 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
Evaluation	• Begin to talk about changes made during the making process, e.g. making a decision to use a different joining method.	• Testing a finished product, seeing whether it 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 • Testing mechanisms, identifying what stops	• Evaluating different designs • Testing and adapting a design • Evaluating different designs • Testing and adapting a 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 designer and their client	• 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	• 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

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		wheels from turning, knowing that a wheel needs an axle in order to move					

Knowledge	YR	Y1	Y2	Y3	Y4	Y5	Y6
Technical	•To learn how to use a range of tools, e.g. scissors, hole punch, stapler, woodworking tools, rolling pins, pastry cutters. •Learn how everyday objects work by dismantling things.	• 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	• To know that different materials have different properties and are therefore suitable for different uses • 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 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 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	• 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	• 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

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		movement of the slider • 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	• 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		resistance.		
Additional		• To know that in Design and technology we call a plan a 'design' • To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles	• To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder • To know that it is important to test my design as I go along so that I can solve any problems that may occur • To know some real-life objects that contain mechanisms	• 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	• 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	• 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 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

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				paper quickly	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.		