

YEAR: 8	SUBJECT: D&T	TITLE: Mechanical Toy
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OBJECTIVE: To introduce the pupils to a limited design process, a range of mechanisms and a variety of manufacturing techniques.

STAGE	ADDITIONAL SKILLS	EXTENSION WORK	RESOURCES	H&S
<p>Stage One: The pupils will be introduced to a design problem based on the following outline; <i>'You are to design a small mechanical device composed on at least one CAM. The device must be powered by hand and consequently will need a handle. The device must provide movement to a small shape/object'</i></p> <p>The 'problem' will be discussed in detail. Pupils will write their own suitable Design Brief and present it graphically.</p>	<p>L. Pupils read the design problem / brief and discuss the major aspects. They will write a similar problem / brief in their own words.</p> <p>ICT. Pupils may use WP/DTP the problem.</p> <p>C. Pupils made aware of the importance of solving problems in the community.</p> <p>HWK. Present the problem, including graphics to a high standard.</p>	<p>Start collecting research into a range of mechanical toys using the internet, photographs, catalogues etc....</p>	<p>Drawing equipment, ICT access, Internet access.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p>Stage Two: Pupils will be shown a number of 'rich pictures' and these will be discussed. Their attention will be drawn to the words arranged round the centre theme and the use of graphics/pictures.</p> <p>Key words will be placed on the white board which will prompt pupils.</p> <p>Pupils will construct accurately a rich picture with 'Mechanical Toy' at its centre.</p>	<p>L. Keywords relating to the project. Mind mapping.</p> <p>N. The prices of existing mechanical/ electronic toys will be discussed.</p> <p>ICT. A graphics package can be used to enhance / present the rich picture.</p> <p>HWK. Complete a detailed rich picture.</p>	<p>Look at some examples of existing toys and list potential problems and possible improvements - for each toy.</p>	<p>Drawing equipment, ICT access, Internet access. Example products.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p>Stage Three: The pupils will be introduced to Cams. They will be shown a variety of animations and these will be discussed.</p> <p>The pupils will then cut out card models of a variety of cams and followers and write an explanation regarding the motion of each.</p>	<p>ICT. Pupils shown a number of animations and practical examples that relate to mechanisms</p> <p>N. With gears and cams, RPM will be discussed.</p> <p>L. Pupils view the video of mechanical devices and note useful terminology.</p> <p>HWK. Complete the toy models and annotate.</p>	<p>Collect photos/pictures of mechanical devices, parts of machines/equipment.</p>	<p>Drawing/writing equipment. ICT access. Example toys. Pictures of mechanisms. Video, Automata One.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>

STAGE	ADDITIONAL SKILLS	EXTENSION WORK	RESOURCES	H&S
<p>Stage Six: The pupils will be introduced to a number of ideas for a mechanical device. These will include mechanisms such as linkages, levers, gears and cams. Each will be discussed in detail in relation to the type of mechanism and the target market.</p> <p>The pupils will be shown how to layout the design ideas. They will produce at least four ideas one of which will be designed using CAD. Emphasis will also be placed on the use of quality notes.</p>	<p>ICT. The pupils will be shown example animations of mechanisms - discussed in detail. Some may create their own simple cam style animation.</p> <p>L. Pupils add notes to each idea. Type of notes required explained.</p> <p>N. Pupils will refer to RPM, leverage and mechanical movement.</p> <p>HWK. Complete four well annotated ideas</p>	<p>Select a device used in an industrial machine, such as a rack and pinion. Show through the use of diagrams how this mechanism could be scaled down and used as a part of a mechanical toy.</p>	<p>Drawing/writing equipment. ICT access. Example toys. Pictures of mechanisms.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p>Stage Seven: The pupils will select their best idea and develop it further. They will place the design in the centre of the page and annotate aspects of the design that could be further improved. Examples of presentation techniques will be discussed. Emphasis will be placed on the need for detailed notes which may cover - materials, shape, colour, size, safety, commercial manufacture etc.....</p>	<p>L. List improvements regarding the selected design and discuss these within groups. Detailed development notes discussed.</p> <p>C. The class votes for what they consider to be the best design</p> <p>ICT. Pupils must produce an aspect of their development using DTP,/ Graphics software.</p> <p>HWK. Complete the development section.</p>	<p>Carry out a simple survey (outside school) aimed at finding suggestions for improving your design. Produce a report based on the findings.</p>	<p>Drawing/writing equipment. ICT access. Internet access.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p>Stage Nine: Manufacturing will start. The pupils will be shown appropriate practical skills such as; Use of the fretsaw, drilling machine and a variety of hand tools.</p>	<p>L. Pupils follow instructions both written and verbal regarding safety and the use of machinery.</p> <p>N. Pupils mark out accurately components to be cut and shaped.</p> <p>ICT. Pupils to produce a sequence drawing and production flowchart using appropriate DTP/Graphics software.</p> <p>HWK. Complete a section of the sequence drawing / flowchart after each practical session.</p>	<p>List improvements to the manufacturing methods used - include reasoning for your suggestions.</p>	<p>Drawing/writing equipment. ICT access. Internet access. Graphics software.</p>	<p>CONTROL MEASURE Teacher supervision and demonstrations/instruction when required.</p> <p>CLEAPPS REF. Drill - 1.031 Fretsaw - 1.067 Polisher - 1.049 Hand Tools - 1.059 Saws - 1.066 Sander - 1.062</p> <p>RESIDUAL RISK Low</p>