Year 9 Mechanical Toy
Unit Outline

Teaching Sequence	Resources	Learning Intentions
Introduction to the course • Talk about the unit and how it fits into the Technological Cycle • Stationery requirements • Revise Technology Cycle linked to previous term's work. • Recap on stages. • Introduce topic and video on Automata – Discuss after.	• Students provide 20 leaf clear file • A3 poster of the Technology cycle • Video 'Automata" • Student booklet • Mechanical toy solutions	• Understand the aims of the course • History and development of mechanics through the ages
Introduce Issue and Class Brief • Explain expectations of presenting work in the student booklets • Show practical examples of previous class solutions and booklets. • Explain function/features of existing class examples.	• A3 poster of the • Technology cycle Booklet	• Allocate and reflect on time • Plan the key stages to complete class brief to final solution.
Brief Development (Term 2) **Introduce Planning and Managing Your Time (Term 3 and 4)** • As a class, list the stages of the Technology Cycle • Draw a chart to show these stages • Complete a class discussion on how long each stage of the cycle might take. • Complete a proposed timeline with the stages included. • Students have to complete an actual timeline as the term progresses.		be able to plan a cutting list
Codes of Practice. • Rules and routines within the room	• 600 x 67 mm length of pine, 12mm thickness • Sanding m/c • Tenon saw • Try square • Pencil • Rule (steel) • Chisel • Mallet • Marking Gauge	• Develop skills with hand tools and machinery • Use machinery correctly and safely • Construct a stable structure.
Skill Development –Mechanical toy (wood based) • Plan out framework measurements for assembly – refer to booklet for framework sizes. • Demonstrate correct working practices for marking out timber, cutting with a tenon saw and using a vertical sanding machine. Class to be issued with material and work through demonstration procedure above and complete top, base and two sides. • Teach importance of accuracy to within 1% • Demonstrate how to manufacture a lap joint for top piece. • Class to complete two lap joints either end of the top piece. • Demonstrate housing joint for base • Class to complete the housing joints in the base. • Assemble framework square, glue and allow to dry in woodwork vice.	• Booklet	

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ü Introduce working with a stakeholder • Stakeholder profile and the importance of a stakeholder • Homework to complete profile sheet with stakeholder comments.		
Knowledge of motion • Introduce the four basic types of motion –linear, reciprocating, rotary and oscillating. • Explain each one clearly and show the four motions through an existing mechanical toy • As a class, complete four everyday examples of each motion on the worksheet in the booklet. Each student in the class to give one answer for the rest of the class.	• Whiteboard • Examples of each type of motion • Student task sheets within booklet	• Understand that mechanical systems can be categorized into a type of motion for its input/output.
Knowledge of systems. • Introduce input/output functions in a system. • Complete individually the second worksheet stating the input and output as one of the four motions. • Relate how you can use the four types of motion through cams and axles in the framework they have made.		
Introduce Concepts • Evaluation of stakeholder profile (to link to concepts) • Evaluation of new knowledge. • Write an initial brief to reflect the interests of their stakeholders. • Class to brainstorm some initial ideas (group work) • Clarify and explain that more than one movement can interact with another to provide a solution • Sketch in 2D and 3D three different ideas • Use annotation to explain function, parts and stakeholder's interests • Evaluate ideas with the stakeholder.	• Stakeholder • A3 paper • Whiteboard Coloured pencils	• Write an initial brief to guide their practice. • Develop presentation skills and written communication to others • Realise that it's for the stakeholder's interests and not their own • Can use appropriate terminology • Evaluate and agree the chosen concept will meet the stakeholder's requirements.
Introduce Final Development Develop one or combine concepts into one final solution. Make changes where required to make the solution function • Show clearly detail between input (handle) and output/movement • Evaluate with stakeholder • List the resources required for manufacture • Annotate all diagrams.	• Examples of completed solutions.	• Can develop through drawing. • Can reflects needs of stakeholder • Can plan resources
Working Drawing Demonstrate using instruments, draw a plan view and front elevation full scale showing the detail of the framework, cams, axle and moving mechanical toy. A template drawing of the framework is provided in the booklet to complete the detail.	• Drawing boards.	• Learn orthographic drawing • Can develop presentation skills.

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Final Brief and Specification • Formulate a final brief and list of specifications of their developed solution • Final brief will include what the solution is, the purpose, who it is for, and where it will be located. • Final specification will list the details of the toy, type of movement, special features, size, colours weight, form, materials and finish to be used. • Provide an example before class completes exercise.	• Whiteboard • Examples of a final brief	• Can formulate a final brief and specifications that can accurately describe the finished solution, its purpose and who it is for.

Manufacture
• Individual skill development required to manufacture the solution through demonstration.
  • Mark out
  • Cutting and forming
  • Use vertical drill
  • Sanding machine
  • Scroll saw
  • Band saw
• Discuss with students quality control measures.
• Evaluate their proposed timeline with actual time of how long stages have taken to complete.
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	• Workshop tools and machinery
	• 12mm pine
	• 3mm, 6mm MDF
	• 6mm, 8mm dowel
	• Acrylic paints
	• PVA glue
	• 35mm, 50mm dowel for cams.
		• Can develop skills in manufacture of a wood based products.
		• Identify quality control checks.
		• Learn to plan your time in class and at home.
		•

Evaluation (Focus Term 4) Discuss with students the key points of evaluation: • Evaluating final solution against your brief and intended specification. • Evaluating the solution against the needs of the stakeholder • Evaluating the success or not of the solution. • Evaluating students own practice.	Student folders and completed solution Stakeholder	• Can evaluate the success or otherwise of the solution against the brief and specifications.