



Stage 5 Industrial Technology		Focus area: Metal	Core module: General Metal 1
Unit 3: Fishing rod holder      Suggested unit length: 6 weeks		Outcomes	
<p><b>Description:</b> This fabrication project combines skills learnt in previous projects and introduces students to welding techniques and associated materials, techniques and processes. Students will also be introduced to standards and production techniques used in industry.</p> <p>This project will include a folio that will incorporate the following aspects:</p> <ul style="list-style-type: none"> <li>• work method statements (WMS)</li> <li>• selection and use of resources</li> <li>• industry related terminology</li> <li>• OHS regulations</li> <li>• societal and environmental implications</li> <li>• design processes.</li> </ul> <p>The folio will be developed using appropriate workplace communication skills.</p>		<p>A student:</p> <ul style="list-style-type: none"> <li>5.1.1 identifies, assesses and manages the risks and OHS issues associated with the use of a range of materials, hand tools, machine tools and processes</li> <li>5.1.2 applies OHS practices to hand tools, machine tools, equipment and processes</li> <li>5.2.1 applies design principles in the modification, development and production of projects</li> <li>5.2.2 identifies, selects and competently uses a range of hand and machine tools, equipment and processes to produce quality practical projects</li> <li>5.3.1 justifies the use of a range of relevant and associated materials</li> <li>5.3.2 selects and uses appropriate materials for specific applications</li> <li>5.4.1 selects, applies and interprets a range of suitable communication techniques in the development, planning, production and presentation of ideas and projects</li> <li>5.4.2 works cooperatively with others in the achievement of common goals</li> <li>5.5.1 applies and transfers acquired knowledge and skills to subsequent learning experiences in a variety of contexts and projects</li> <li>5.6.1 evaluates products in terms of functional, economic, aesthetic and environmental qualities and quality of construction</li> <li>5.7.1 describes, analyses and uses a range of current, new and emerging technologies and their various applications.</li> <li>5.7.2 describes, analyses and evaluates the impact of technology on society, the environment and cultural issues locally and globally</li> </ul>	
<p><b>Resources</b></p> <p>Metal workshop</p> <p>Hand and power tools</p> <p>Burns photos</p> <p>Ambulance service</p> <p>Internet and other computer resources</p> <p>Metalwork textbooks</p>		<p>Safe operating procedures (SOP) for MIG welder</p> <p>Video: <i>Bikes: Materials and technologies</i>, Classroom Video.</p> <p>Material as per cutting list</p> <p>CAD/ Drawing equipment</p> <p>Project drawing</p>	



## Industrial Technology: General Metal 1

## Unit 3: Fishing rod holder

Students learn about:	Students learn to:	Teaching strategies and tasks
<b>OHS and risk management</b> <ul style="list-style-type: none"><li>the safe use and handling of hand, power and machine tools</li><li>the use of personal protective equipment in the workshop</li><li>elementary first aid procedures</li></ul>	<ul style="list-style-type: none"><li>safely use tools, materials and equipment</li><li>use personal protective equipment when working with materials, tools and machines</li></ul>	<ul style="list-style-type: none"><li>Demonstrations.</li><li>Discuss and use safe operating procedure (SOP) for MIG welding.</li><li>Discuss first aid requirements for burns. Use photos of burns available from the Internet.</li><li>Guest speaker: Ambulance officer.</li></ul>
<b>Materials</b> <ul style="list-style-type: none"><li>the properties and applications of a range of metals including:<ul style="list-style-type: none"><li>solid stock</li><li>sheet metals</li><li>tube</li><li>ferrous and non-ferrous metals</li></ul></li></ul>	<ul style="list-style-type: none"><li>use a range of metals in the production of practical projects</li><li>list the basic properties and common applications of metals</li></ul>	<ul style="list-style-type: none"><li>Production of practical projects.</li><li>Discuss the range of materials that will be used in the fishing rod holder.</li></ul>
<b>Equipment, tools and machines</b> <ul style="list-style-type: none"><li>a range of hand tools used for:<ul style="list-style-type: none"><li>marking out</li><li>cutting and shaping</li><li>drilling</li><li>holding</li><li>joining</li></ul></li><li>portable power tools and machines used for:<ul style="list-style-type: none"><li>drilling</li><li>polishing</li><li>cutting</li></ul></li></ul>	<ul style="list-style-type: none"><li>adjust and use hand tools in the production of practical projects</li><li>use portable power tools and machines in the production of practical projects</li></ul>	<ul style="list-style-type: none"><li>Demonstrations.</li><li>Production of practical projects.</li><li>Use safe operating procedures (SOP) for MIG welding.</li><li>Use <i>180° strategy</i> (state, present point-of-view and then argue from the opposite point of view).</li></ul>



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Students learn about:	Students learn to:	Teaching strategies and tasks
<b>Techniques</b> <ul style="list-style-type: none"><li>• measurement and sizing</li><li>• a range of processes and techniques for preparing, cutting, joining and finishing metals</li></ul>	<ul style="list-style-type: none"><li>• measure and mark out materials from a project drawing</li><li>• shape metals by cutting, filing and bending</li><li>• use a variety of joining methods including:<ul style="list-style-type: none"><li>– fasteners, rivets and soft soldering</li></ul></li><li>• prepare and finish surfaces by polishing, buffing and/or painting</li></ul>	<ul style="list-style-type: none"><li>• Demonstrations.</li><li>• Production of practical projects.</li></ul>
<b>Links to industry</b> <ul style="list-style-type: none"><li>• industrial processes and production techniques</li><li>• a range of career paths in the metal industries</li></ul>	<ul style="list-style-type: none"><li>• relate elementary industrial production techniques to work in the classroom</li><li>• list career paths in the metal industries</li></ul>	<ul style="list-style-type: none"><li>• Discuss during demonstrations how processes would be undertaken in industry, i.e. automated welding in manufacturing.</li><li>• Use video: <i>Bikes: Materials and technologies</i>, Classroom Video.</li></ul>
<b>Design</b> <ul style="list-style-type: none"><li>• functional and aesthetic aspects of design</li><li>• design principles and processes</li><li>• material lists</li><li>• project costing</li></ul>	<ul style="list-style-type: none"><li>• identify the functional and aesthetic aspects of design in metal, including material selection, edge treatments and service requirements</li><li>• apply principles of design in the modification of projects</li><li>• evaluate work practices and practical projects in terms of quality</li><li>• read and interpret material lists</li><li>• estimate quantities of materials to be used in practical projects</li></ul>	<ul style="list-style-type: none"><li>• Production of folio.</li><li>• Development of cutting lists, etc in folio.</li><li>• Introduce the development of criteria to evaluate success for evaluating projects or systems of work.</li></ul>



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Students learn about:	Students learn to:	Teaching strategies and tasks
<b>Workplace communication skills</b> <ul style="list-style-type: none"><li>workplace signage</li><li>pictorial and working drawings</li><li>industry terminology</li><li>text types to support the documentation of practical projects and processes including:<ul style="list-style-type: none"><li>procedure</li><li>factual recount</li></ul></li><li>a range of computer software applications to assist in the planning, production and reporting of practical projects</li></ul>	<ul style="list-style-type: none"><li>respond to OHS signage</li><li>read and interpret simple workshop and pictorial drawings</li><li>make freehand sketches of workshop items and/or projects</li><li>produce a glossary of specialist terms</li><li>prepare reports to describe processes undertaken in the development and production of practical projects</li><li>prepare reports using appropriate software and hardware, e.g. word processing</li></ul>	<ul style="list-style-type: none"><li>Generation of folio.</li><li>Compile a list of industry terminology related to the project and create a glossary.</li><li>Use <i>PMI</i> to evaluate project.</li></ul>
<b>Societal and environmental impact</b> <ul style="list-style-type: none"><li>issues relating to the sustainability of resources in metal industries</li></ul>	<ul style="list-style-type: none"><li>identify and distinguish between renewable and non-renewable resources in metal industries</li><li>appreciate the importance of recycling to metal industries</li></ul>	<ul style="list-style-type: none"><li>Use the <i>Prediction strategy</i> (opposite point of view) for example to predict the impact on people employed in repetitive work such as loading billets of steel into a press.</li></ul>
<b>Additional content</b> <ul style="list-style-type: none"><li>techniques and skills to enhance the appearance and/or function of practical projects</li><li>the production of iron and steel</li></ul>	<ul style="list-style-type: none"><li>add features to projects to enhance appearance and/or function</li><li>use surface finishes such as plastic coating, enamelling or a variety of painting techniques</li><li>describe materials and processes used in the production of steel</li></ul>	

**Industrial Technology: General Metal 1****Unit 3: Fishing rod holder**

Timing	Practical lessons	Theory lessons	Evidence
<b>Week 1</b>	<b>Commence step</b> <ul style="list-style-type: none"> <li>Issue pre-cut length of angle.</li> <li>Demonstrate marking out.</li> <li>Demonstrate cutting into blind corners.</li> </ul>	<ul style="list-style-type: none"> <li>Introduce unit to students and discuss outcomes and objectives.</li> <li>Commence folio work including free hand sketching of a model and separate parts.</li> <li>Create a cutting list using a spreadsheet.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>
<b>Week 2</b>	<ul style="list-style-type: none"> <li>Introduce different files and filing techniques relevant to job.</li> </ul>	<ul style="list-style-type: none"> <li>Introduce correct terminology for materials used in projects and relate to industry use using structural sections diagram from Technical Studies Committee – Education Department of South Australia (1981) <i>Metalwork for Schools</i>, Cassell, p. 285. Present all information in a table.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>
<b>Week 3</b>	<ul style="list-style-type: none"> <li>Demonstrate drilling using pedestal drill including holding work safely in a vice, and using pilot holes.</li> </ul>	<ul style="list-style-type: none"> <li>Introduce and use safe operation procedure (SOP) for drill press.</li> <li>Discuss possible hazards with the drill press and show coloured pictures of injuries that have resulted.</li> <li>Identify PPE, appropriate clothing, and precautions with hair etc. when using drill press then use <i>180 degree strategy</i> (opposite point of view) for inappropriate operation.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>
<b>Week 4</b>	<b>Commence stake</b> <ul style="list-style-type: none"> <li>Issue pre-cut length of round.</li> <li>Demonstrate correct and safe use of lathe, introducing correct terminology for all parts.</li> <li>Highlight work place safety signage.</li> <li>Demonstrate facing off and taper turning.</li> </ul>	<ul style="list-style-type: none"> <li>Label the parts on a blank diagram of a lathe.</li> <li>Complete a work method statement for the lathe work on the stake (including risk identification, reduction and elimination.</li> <li>Show coloured pictures of injuries that have resulted from lathes.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>
<b>Week 5</b>	<ul style="list-style-type: none"> <li>Guest speaker from the Ambulance Service to demonstrate and discuss first aid requirements for burns and show pictures of different types of burns.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and review OHS signage using overheads sourced from safety product catalogues, local businesses, the Internet etc.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>
<b>Week 6</b>	<ul style="list-style-type: none"> <li>Demonstrate forging (relate to industry).</li> <li>Review drilling techniques and apply to stake.</li> </ul>	<ul style="list-style-type: none"> <li>Factual recount of stake construction.</li> </ul>	<ul style="list-style-type: none"> <li>Project development.</li> <li>Folio.</li> </ul>

**Industrial Technology: General Metal 1****Unit 3: Fishing rod holder**

Timing	Practical lessons	Theory lessons	Evidence
<b>Week 7</b>	<b>Commence rod tube</b> <ul style="list-style-type: none"><li>• Issue pre-cut length of tube.</li><li>• Demonstrate checking for squareness.</li><li>• Demonstrate de-burring of edge and internal removal of seam.</li></ul>	<ul style="list-style-type: none"><li>• Complete the <i>Possible risks</i> and <i>Methods for controlling/eliminating risks</i> sections of a work method statement which outlines the steps for construction of the entire rod holder.</li></ul>	<ul style="list-style-type: none"><li>• Project development.</li><li>• Folio.</li></ul>
<b>Week 8</b>	<ul style="list-style-type: none"><li>• Demonstrate cutting, marking out using witness marking, shaping and drilling of tab.</li></ul>	<ul style="list-style-type: none"><li>• Watch video: <i>Bikes: Materials and technologies</i>, Classroom Video.</li><li>• Create a production flow chart for the production of the fishing rod holder.</li></ul>	<ul style="list-style-type: none"><li>• Project development.</li><li>• Folio.</li></ul>
<b>Week 9</b>	<b>Assemble project</b> <ul style="list-style-type: none"><li>• Discuss MIG welding safety including demonstration of correct PPE.</li><li>• Demonstrate MIG welder function.</li><li>• Demonstrate MIG welding techniques to attach tab to tube, and step to stake.</li></ul>	<ul style="list-style-type: none"><li>• Complete the meanings in a glossary of terms which lists terminology given in this unit.</li></ul>	<ul style="list-style-type: none"><li>• Project development.</li><li>• Folio.</li></ul>
<b>Week 10</b>	<b>Apply finish</b> <ul style="list-style-type: none"><li>• Paint job using an appropriate metal finish.</li></ul>	<ul style="list-style-type: none"><li>• <i>PMI</i> of the finished fishing rod holder design.</li><li>• Fill in a self-assessment sheet on own project.</li></ul>	<ul style="list-style-type: none"><li>• Project development.</li><li>• Folio.</li><li>• Self-assessment sheet.</li></ul>