

CONSTRUCTION AND MECHANICAL TECHNOLOGIES: KNOWLEDGE OF RESISTANT MATERIALS CONSTRUCTION

Resistant Materials refer to a group of materials that are grouped together because they show certain common characteristics. These characteristics include: tensile strength, compressive resistance, hardness, malleability, ductility, elasticity, grain. Such materials are broadly categorised as wood, metal, ceramics, plastics, glass and their composites. Particular resistant materials exhibit characteristics to a greater or lesser extent. Resistant materials are often sub categorised. For example hardwood and softwood; thermosetting and thermoplastics, alloys and pure metals.

Resistant materials require particular basic techniques to be used to enable materials to be measured, cut, shaped, joined and finished when making products. Advanced and complex techniques are required to craft special features of a high standard in a product and rely on the consistent application of accepted conventions to achieve a desired effect. Special features can be structural and/or aesthetic and include such things as: inlays, special fit (eg, interference, push fit), matching turned components, internal screw cutting on a lathe, compound machining, glass fusing.

Knowledge within this component includes understanding how resistant materials are characterised, and understanding techniques used to work them. Understanding of techniques would include: how it is done in a safe and effective manner, the impact of the technique on materials involved, and when the technique would be suitable to use.

Initially students learn about resistant materials per se, the basic techniques commonly used to work them, and the relationship between these. Students progress to learning about advanced techniques and conventions required for highly crafted special features and the complex concepts and processes involved in resistant materials evaluation and development.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic techniques used to make resistant materials products</i>	<i>Demonstrate understanding of advanced techniques used to make resistant materials products</i>	
TEACHER GUIDANCE	<p>To support students to develop understandings about the basic techniques used to make resistant material products at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to categorise a range of materials and identify those that display characteristics associated with the broad categories: resistant materials and textiles. Include materials that exist at the boundaries of the category such as vinyl and leather. • Provide opportunity for students to explore a range of products made from resistant materials in order to discuss the materials used, their characteristics and the techniques that would be appropriate to work them safely. • Guide students to explore how and why resistant materials and techniques are combined differently for particular situations. • Provide students with the opportunity to understand how basic techniques are undertaken in safe and effective manner, and the impact of these techniques on different materials. Examples of basic techniques include: marking and layout; sawing, filing machining, folding, sanding, planning; gluing, welding, soldering, fastening, jointing; painting, staining, bluing, polishing, machine finishing. 	<p>To support students to develop understandings about the advanced techniques used to make products from resistant or any other material type at level 7, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to explore accepted conventions used when constructing products using resistant or any other material type, and discuss how these conventions guide construction in similar and diverse contexts. Examples of accepted conventions include: drape, flush, parallel, perpendicular, offset, symmetry, array, tolerance, ease, press fit, clearances, taper, level, plumb. • Guide students to explore similarities and differences between safe practice in classroom and in industrial environments. 	<p>LEARNING OBJECTIVE COULD PROGRESS TO: <i>Implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine</i> See next page</p>
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • explain how the characteristics of resistant materials influence the selection of safe techniques • discuss why resistant materials require particular techniques for their safe handling and use • discuss why techniques and resistant materials are combined in different ways across two or more situations. 	<p>Students can:</p> <ul style="list-style-type: none"> • discuss how accepted conventions guide constructing in materials in similar contexts • explain the differences between safe practice in classroom and industrial environments • discuss how accepted conventions guide constructing with materials in diverse contexts. 	
AS	<p>AS91059 Construction and Mechanical Technologies 1.22 <i>Demonstrate understanding of basic concepts used to make products from resistant materials</i></p>	<p>AS91347 Construction and Mechanical Technologies 2.22 <i>Demonstrate understanding of advanced concepts used to make products</i></p>	
	Level 1 Construction & Mechanical standards	Level 2 Construction & Mechanical standards	