Metal Trophy Person

Context

☒ Digital Technologies
☐ Engineered Systems
☐ Agriculture and Food Technologies
☒ Material Technologies

Timing

10 Weeks

Indicative Hours

37.5 Hours

Classroom Resources

- Metal and notions for Trophy person construction and bending
- MIG welder and Metalwork hand tools / equipment.
- Measuring equipment and metal bending tools.

Unit Description

Students will be required to construct a metal trophy and accompanying portfolio. The design situation is as follows “My brother/sister has just become the club champion of their chosen sport. I need to give them a trophy to recognise this achievement from the family.” Students will prepare this in the workshop using a variety of metal working tools. All On-Guard safety test must be complete prior to practical lessons. They will be given the metal base from and all the required dimensions and cuts of the base trophy. They will then bend it to their chosen sport using a variety of workshop tools, following this they will have their sport welded to a metal base for finishing.

Outcomes

TELS-1DP	Communicates ideas and solutions to authentic problems or opportunities.
TELS-2DP	Participates in planning for the production of designed solutions.
TELS-3DP	Participates in the production of designed solutions.
TELS-4DP	Follows safe practices in the use of tools, materials and processes for design projects.
TELS-10MA	Selects and uses a range of tools, materials, processes and systems appropriately in the development of products.
TELS-11TS	Investigates how technology has contributed to improvements in our way of life.

Assessment Overview (40%)

Summative assessment of the Design Portfolio and Design Project will be undertaken. Opportunities for Formative assessment exist during class discussions, and production of CAD and CAM files.

Project Overview

Students will be asked to make a Metal Trophy using material and bend it to a shape they have chosen. Once the activity has been chosen, they will develop multiple designs until a final design sketch has been constructed. Students will then have their design welded by their teacher to a base plate so that it can be finished with a metallic paint of their choice.

Cross-curriculum priorities

☒ Aboriginal and Torres Strait Islander histories and cultures
☐ Asia and Australia’s engagement with Asia
☒ Sustainability

General capabilities

☒ Critical and creative thinking
☐ Ethical understanding
☒ ICT capability
☐ Intercultural understanding
☒ Literacy
☒ Numeracy
☒ Personal and social capability

Other learning across the curriculum areas

☒ Civics and citizenship
☐ Difference and diversity
☒ Work and enterprise

Content	Teaching, Learning and Assessment	Resources
Identifying and defining • investigate products and services for the individual and/or the community, considering ethical and social factors (ACTDEK029) ST • investigate a current and innovative product developed by an Aboriginal and/or Torres Strait Islander designer that is influenced by their cultural identity • investigate the role of the professional in the related technology, and their impact on the environment and society • develop criteria to evaluate design ideas, processes and solutions, the functionality, aesthetics and a range of constraints, eg accessibility, cultural, economic, resources, safety, social, sustainability, technical (ACTDEP038, ACTDIP027, ACTDIP031) DT ST	**Problem Phase** *Focus Question: What advantages and disadvantages do electronic devices bring to society?* ***Teacher*** • Teacher explains the factors affecting design of different types of structures and the advantages and disadvantages of different materials • Students form a list of steps required to complete the project successfully in the required time frame. • Exhibits a portfolio sample and explains the PRIME design process and portfolio documentation procedures required. • Class discusses criteria required for a project to be created including steps of procedure • Students identify and discuss factors affecting the design of products that are manufactured using fully automated processes and the positive and negative impact on an industry • Students design a paper prototype and have peers critically assess the effectiveness to achieve the requirements of the design brief as well as the ability for it to be manufactured successfully • Students brainstorm ideas on environmental issues by discussing how different types of structures impact on society and the environment • The class explore the impact of one specific world structure and suggest ways I which it could have impacted on the society and the local environment • Students develop ideas and identify a need or opportunity for the development of the design project. ***Students*** • Establish a design process that responds to an identified need and opportunity. • Apply a design process when developing quality solutions for each design project • Establish criteria for successful achievement of needs and opportunities consider short-term and long-term consequences of design in the design process • Evaluate design processes • Identify needs and opportunities that require solutions in the areas of study.	Portfolio Template

Researching and planning
• investigate the characteristics and properties of a range of materials and products (ACTDEK034)
• select from a range of materials, components, tools, equipment and processes to develop design solutions (ACTDEP035) ST
• experiment with a range of appropriate techniques to produce a design solution DT
• generate and communicate the development of design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques, for example: (ACTDEP036) CT DT
  ◦ sketches, drawings and computer-aided drawings (CAD)
  ◦ patterns
  ◦ models
  ◦ digital presentations
• use appropriate project management processes when working both individually and collaboratively to coordinate the production of a designed solution (ACTDEP039) CT ST
• select and justify the safe use of tools and equipment used to create a design solution
	Ideas Phase
	Focus Question: How do designers develop creative design ideas?
	
	Teacher
	• Class to view video showing different designers and their approach to problem solving
	• Students to form groups and discuss the design process used by the designers
	• Students to give feedback of their findings in a class discussion
	• Teacher facilitates a discussion as the class works through the design process using a completed project, listing the stages and reasons for each step in the design process
	• Students work through the design process with their Trophy concepts
	• Students discuss with peers their justifications for design choices
	• Class discusses the appropriateness of individual designs if they were introduced into a range of cultures and societies, including Aboriginal and Torres Strait Islanders and other Indigenous peoples
	• Students experiment with a range of design ideas and document the results of research in the folio for the Trophy
	• Students judge the proposed ideas in terms of the criteria for success, eg aesthetics, usefulness, suitability, ease of production using results from experiments.
	• Students use the internet to research and investigate environmental issues associated with a selected human structure
	• Students present research findings to the class
	• Students complete a PMI of existing Trophy designs
	• Teacher explains differences in material types, qualities and discusses alternative metals
	• Students investigate the environmental impact of different metal production methods
	• Class discusses the advantages of protective finishes for outdoor applications
	• Students justify the chosen materials and finishes for their design
	
	Students
	• examine factors affecting design in the areas of study of Built Environments
	• describe the factors affecting design in the development of each design project
	• evaluate the appropriateness of specific design solutions for different cultural groups including Aboriginal and Torres Strait Islanders and other Indigenous peoples
	• apply the results of experimentation to designing and making when developing each design project
	• identify, interpret and evaluate data from a variety of sources
	• use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project
	• identify solutions to other similar needs and opportunities
	• use the internet when researching
	• select and use metals in the development of a design project
	• investigate and use accessories where appropriate for a design project
		Caravan – Oz First – Powerhouse website
		Portfolio Template

Producing and implementing • demonstrate safe, independent and collaborative work practices in the production of designed solutions (ACTDEP037) • apply appropriate tools, equipment, materials, techniques and processes in the production of a design project, for example: (ACTDEP034) **ST** – contemporary, traditional and/or advancing manufacturing techniques – surface preparation techniques, finishes, embellishments and/or decorations – materials to meet a specific need • consider innovative applications of advancing technologies to increase efficiency of time and/or materials in the production of models or products **DT**	**Manufacturing Phase** *Focus Question: How do industrial processes enhance the success of my design?* ***Teacher*** • consideration of tools required and safety precautions necessary. • Teacher demonstrates the measuring & cutting metal • Teacher uses appropriate tools to demonstrate how to bend and shape metal • Students in groups to evaluate sample Trophy's noting * Shaping techniques * Joining techniques * Structural design elements • Teacher explains the reasons for different shaping techniques • Teacher demonstrates a range of joining techniques that may be suitable for design projects and appropriate for student construction • Class discusses ways to finish a Trophy to maximise durability and aesthetic qualities • Students practice new techniques on their project prototype • Teacher identifies hazards with equipment, materials, and processes • Teacher reviews acceptable behaviour standards • Class identify WHS principles • Students to complete relevant safety worksheets and tests • Students discuss alternatives and possible risk reduction strategies to ensure safety within the class environment • Students discuss potential hazards in the classroom, including equipment and machines not specifically demonstrated for the current project • Students are shown a range of suitable and unsuitable materials for the design task at hand. Students evaluate and justify their selection of materials for each element of their design project • Students construct their design project **Students** • Analyse and identify their chosen tools, materials and techniques for the development of their project idea through the development of a Manufacturing Plan within the folio document. • select and correctly use appropriate hand and machine tools for a design project • cut, shape and finish metals • select and use appropriate techniques for the purpose of a design project • manage risk when developing design projects • use tools, materials and techniques in a responsible and safe manner in each design project. • maintain tools and equipment including computer equipment • identify suitable materials, tools and techniques for each design project	Portfolio Template

Testing and evaluating • evaluate the effectiveness and suitability of choices made during the development and production of the solution • assess the solution against the predetermined criteria	**Evaluation Phase** *Focus Question: How do I ensure my finished product functions as desired?* **Teacher** • Describes the evaluation process – as established in the criteria to evaluate success – used within the folio document. • Facilitates peer evaluation of student design solutions. • Facilitates student testing and troubleshooting of their project • Provides a scaffold for the development of an reflective writing piece. **Students** • Undertake an evaluation of their project by completing the evaluation table within the folio document. • Compare their personal evaluation with that provided by their peers and write a reflection piece to suggest improvements to their design or design approach.	Portfolio Template

UNIT EVALUATION

Class	Teacher Code	Start Date	End Date	Were all outcomes, content & skills taught? *(if no, please specify)*	Evaluation *Were any significant changes made to the planned teaching and learning program, such as a change to the scope and sequence or parts of the program not covered?*