



HNHS Technology Vision Statement

To provide individual students with the opportunity to achieve to their highest abilities, effectively communicate knowledge and skills and be adaptable to different contexts and environments through engagement in technology education

Curriculum Area: Technology Course












Title: Compact Audio Design

Year Level 11

Curriculum Level: 6

Course Description: This course provides students with an opportunity to learn about amplification in audio devices and to develop skills in designing and manufacturing a prototype sound system. It requires students to: assemble a kitset amplifier circuit and contain it in a case which has prescribed specifications; and to design a prototype sound projection system that incorporates the amplifier and speaker(s) for use in a specific location.

Course structure: One year duration (4x1 hour lessons per 7 days).

Aspects of Encompass highlighted in this unit	Key competencies highlighted in this unit
Preparing responsible citizens 	Managing self – self-motivation, personal goals, appropriate behaviour, resourcefulness, sense of self and importance of heritage. 
Developing active learners 	Relating to others – listen actively, recognise different points of view, negotiate, share ideas. 
Connecting with our community 	Participating and contributing balancing rights, roles and responsibilities, and responding appropriately as a group member. 
Encouraging innovation and responsiveness 	Thinking – using creative, critical, meta-cognitive and reflective processes, drawing on personal knowledge and intuitions. 
Promoting excellence 	Using language, symbols, and texts – interpreting language and symbols, using ICT, recognising how choices of language and symbol affect people's understanding. 
Providing a positive and enabling environment 	

Curriculum Strands	Year 11		Year 12		Year 13	
	Teaching and Learning	Assessed	Teaching and Learning	Assessed	Teaching and Learning	Assessed
Brief Development	*	*				
Planning for Practice	*					
Outcome Development and Evaluation	*	*				
Technological Modelling	*	*				
Technological Products	*					
Technological Systems						
Characteristics of Technology						
Characteristics of technological outcomes	*					
Subject Specific	*	*				

Assessment focus for year 11 Technology Programmes 2011

Context

Focus Strands and *Components* and Achievement Objectives

Technological Practice

Brief Development

Justify the nature of an intended outcome in relation to the need or opportunity and justify specifications in terms of key stakeholder feedback and wider community considerations.

Planning for Practice

Critically analyse their own and others' past and current planning practices in order to make informed selection and effective use of planning tools. Use these to support and justify ongoing planning that will see the development of an outcome through to completion.

Outcome Development and Evaluation

Critically analyse their own and others' outcomes to inform the development of ideas for feasible outcomes. Undertake ongoing experimentation and functional modelling, taking account of stakeholder feedback and trialling in the physical and social environments. Use the information gained to select, justify, and develop a final outcome. Evaluate this outcome's fitness for purpose against the brief and justify the evaluation using feedback from stakeholders.

Technological Knowledge

Technological Modelling

Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes.

Technological Products Understand that technological products are made from materials that have performance properties.

Nature of Technology

Characteristics of technological outcomes

Understand that some technological outcomes can be perceived as both product and system. Understand how these outcomes impact on other outcomes and practices and on people's views of themselves and possible futures.

Component: Achievement/Learning Objectives:

- *Brief Development*: Justify the nature of an intended outcome in relation to the need or opportunity and justify specifications in terms of key stakeholder feedback and wider community considerations
- *Planning for Practice*: Critically analyse their own and others' past and current planning practices in order to make informed selection and effective use of planning tools. Use these to support and justify ongoing planning that will see the development of an outcome through to completion.
- *Knowledge of Design*: Demonstrate understanding of basic concepts in design
- *Outcome Development and Evaluation*: Critically analyse their own and others' outcomes to inform the development of ideas for feasible outcomes. Undertake ongoing experimentation and functional modelling, taking account of stakeholder feedback and trialling in the physical and social environments. Use the information gained to select, justify, and develop a final outcome. Evaluate this outcome's fitness for purpose against the brief and justify the evaluation using feedback from stakeholders.
- *Technological Modelling*: Understand the role and nature of evidence and reasoning when managing risk through technological modelling.

Learning Outcomes:

Students will:

- Follow a construction schedule/plan to skilfully and efficiently make a container for the electronic circuit to an agreed set of specifications.
- Demonstrate understanding of how the social and physical environment and the physical and functional attributes of an outcome are considered in the development of a brief to address a need or opportunity.
- Demonstrate understanding that functional models are used to represent reality and test design concepts and prototypes used to test technological outcomes.
- Make informed selections of materials, tools, equipment and techniques to develop and trial a prototype of a speaker designed to meet a brief

Introduction to the Course

How the year will be organised, year plan, and course outline issued. Relationship between innovation and technological outcomes - stress the importance of being innovative when students developing own technological outcomes.

Technological Practice:

What is it? Link to Year 9 and 10 Technology Cycle - start with glossary of terms.

- Introduce context of **Compact Audio Design**
- Show examples on existing speaker solutions (power point presentation)
Class discuss:
 - who were these designed for
 - identify design features
 - function(s) - where are they designed to be used?
- Explore needs and opportunities associated with the issue – **a need to project sound**.
Understanding the issue:
 - How is sound projected?
 - Where does the sound need to be generated/ its intended location?
 - What needs to be considered due to the location where the sound will be generated?

Class brainstorm:

- Devices that could use sound projection (e.g. Ipod, MP3 players, phone)
- Potential stakeholders
 - indirect stakeholder – those who will use a sound projection system and/or its manufacture may impact on including
 - direct stakeholders - potential users
- Locations where the sound projection may be used and therefore the aesthetics ,ergonomic and functional qualities it would need to possess

Planning

- Review planning practices used in year 10.
- Issue planning template for GANTT chart and establish the need for key milestone stages and progress review points.

Research

- Class discussion on the protocols of research
- The need to respect the *Copyright Act* and *Intellectual Property*; and understand what constitutes plagiarism.
- Identify key features of existing sound projection solutions and their acoustics qualities
- Exploration of context and the given issue.
- Establish for students the social and physical environment where they will design and manufacture their prototype sound projection system - school, home, access to specialist support etc.
- Identify 'key' considerations for the design and manufacture of a prototype sound projection system as a result of exploration
- Establish a conceptual statement.

Skill Development

- How to read and test electronic components
- How components combine to form a circuit that provides a desired outcome
- Students construct own kitset speaker circuit ready for encasing

Brief Development

- Discuss brief development - use examples of existing briefs and unpack with discussion to emphasise:
 - the conceptual statement (statement of the need or opportunity)
 - specifications that describe:
 - ▮ constraints which need to be met
 - ▮ performance (function) and aesthetic qualities
 - ▮ a products physical and functional attributes
 - how the success of a solution can be evaluated against the specifications
- Students write own initial brief and those attributes/specifications identified from research to date for their sound projection system.

Skill Development:

- 2D/3D graphic presentation and layout - freehand drawing methods that represent containers (cubes, prisms, cones etc), working drawings, use of rendering, page presentation and layout
- Using sketches as a functional modelling tool to explore and test design ideas that consider the social and physical environment, and physical and functional attributes required in a technological outcome
- Stakeholder feedback gained as design ideas are established

Functional Modelling

Introduce students to the idea of functional modelling and link it to industry practice e.g. Furnware Storage Unit, past students evidence.

Key ideas - 'how to make it happen' and 'managing risk'.

- Functional modelling used to 'test' design ideas; prototyping use to test a realised design
- Interpreting a 2D design ideas accurately into 3D mock-ups and models
- Testing functionality and aesthetic appeal (testing design principles)
- Feasibility of design interpretation

Concept development including:

- Ongoing functional modelling to test design ideas for a *sound projection system* – use of mockups (2 and 3D)
- Ongoing planning, knowledge development and materials properties and uses.
- Sketching to communicate ideas to indirect and direct stakeholders (and teacher)
- Trialling and testing techniques and processes
- Ongoing communication with stakeholders
- Ongoing brief refinement as design ideas are confirmed
- Assessment activity to provide evidence for **AS91048 (1.5)**

Knowledge and Skill Development

- Follow a construction flow chart and cutting list to construct a casing that meets stated specifications to house an electronic circuit (amplifier)
- Skills building on techniques to finish materials
- Students encase amplifier circuit using basic procedures (skill demonstrated include: measuring, marking out, shaping, joining and finishing procedures to stated specifications)
- Test finished case to confirm it meets specifications.
- Assessment against **AS91057 (1.20)**

Manufacture and trialling of the Prototype

- Students plan construction flow chart
- Techniques associated with the construction of the sound projection system and/or the materials selected are trialled and tested prior to manufacture as per brief and specifications
- Photographic evidence and annotations collected throughout manufacture
- Stakeholders consulted where key decisions are needed to ensure the prototype sound projection systems fitness for purpose
- Completed prototype is evaluated to determine that it is fit for its intended purpose within the intended environment
- Assessment against **AS91044 (1.1)** and **AS91047 (1.4)**

Course structure:

Level 6, 1 year duration (4x1 hour lessons per 7 days)

Links to standards:

AS91044 (1.1) Undertake brief development to address a need or opportunity – 4 credits: Internal

AS91047 (1.4) Undertake development to make a prototype to address a brief - 6 credits: Internal.

AS91048 (1.5) Demonstrate understanding of how technological modelling supports decision-making – 4 credit: External

AS91058 (1.21) Implement basic procedures using resistant material to make a specified product – 6 credits: Internal

Case Studies from Techlink used for Technological Modelling:

- Furnware: <http://www.techlink.org.nz/Case-studies/Technological-practice/Materials/Side-Storage-Unit/index.htm>