

Y12 MATERIALS TECHNOLOGY

2012



Queen Margaret College

All Materials Technology courses are developed around the three learning strands of the New Zealand Technology Curriculum: Technological Knowledge and Understanding, Technological Practice; and Nature of Technology.

It is recommended that students have studied Materials Technology in Year 11.

Course Description:

Students will have the opportunity to explore a variety of materials throughout the year. Students will work on two major units of work that will take approximately 16 weeks per topic to complete. Each unit of work will require completion of investigation research, design, development work, written tasks and the construction of a practical solution. It is recommended that one of the major units of work should be developed for a client, not the student. The achievement standards are imbedded across the two major units of work.

Students will be involved in a variety of activities with given scenarios to 'problem solve', which may result in the development of a model, prototype, or final product outcome.

Course Duration:

- Materials Technology is a year-long practical based course.
- Each Materials Technology class has up to 9 lesson hours per 10 day timetable.

Something Special Topic:

- Term 1-2

Prototype Topic:

- Term 2-3-4

Achievement/Learning Objectives:

BRIEF DEVELOPMENT

Students will:

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 consideration

OUTCOME DEVELOPMENT AND EVALUATION

Students will:

Critically analyse their own and others' outcomes to inform the development of ideas for feasible outcomes (conceptual design and prototype). 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 PRODUCTS

Students will:

Understand how materials are formed, manipulated, and transformed in different ways, depending on their properties, and understand the role of material evaluation in determining suitability for use in product development.

CHARACTERISTICS OF TECHNOLOGICAL OUTCOMES

Students will:

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.

VISUAL COMMUNICATION

Students will:

Demonstrate understanding of and skills in drawing techniques to communicate complex and detailed visual information

CONSTRUCT A TEXTILES PRODUCT

Students will:

Implement advanced procedures to make a textiles product.

Topic One:

'Something Special'

Students will develop a conceptual design for a 'special features' garment for an identified client issue / situation. Students will then construct the conceptual garment, incorporating the special features designed, through testing, sampling and evaluation of techniques and materials. Students will learn how to modify patterns, how to develop a construction schedule, through testing and practical activities develop confidence and competence with practical equipment, and investigate and apply practical techniques and processes related to garment construction.

This is the major topic of the two units of work. Several assessment standards are imbedded into this unit of work. Assessments are spaced out over the topic

and will occur at appropriate times.

The design work from this unit of work is submitted for external assessment. Various design tasks will be spaced out over the project. Class time in Term 4 will be available for final completion of the design tasks.

Topic Two: 'Prototype'

Students will develop and trial a prototype outcome for an identified client situation. The physical and social environment where the prototype outcome will be developed and later situated will be critical factors to consider in its design.

Potential class client: Museum of Wellington.

In this assessment students will have the opportunity to work with the staff at the Museum of Wellington, to develop prototypes as potential souvenir items for the museum gift shop. Students will be required to: address the client brief specifications and take inspiration for their designs from the museum exhibits and artifacts, develop a potential design and then pitch their idea to the client in a formal business meeting approach.

Several assessment standards are imbedded into this unit of work. Students Assessments are spaced out over the topic and will occur at appropriate times.

The design work from this unit of work is submitted for external assessment. Various design tasks will be spaced out over the project. Class time in Term 4 will be available for final completion of the design tasks.

Something Special Topic

**Y12 Materials Technology - Unit Planner 2012
Term 1-2**

Unit Objectives / Learning outcomes – students will:

- Examine existing solutions and analyse these for function, improvement, special feature identification, meeting needs of client.
- Examine a variety of special features and identify how they could be incorporated into a garment.
- Test and sample a variety of special features construction techniques and processes and analyse these for use in a garment (eg: pin-tucking, computerized embroidery, beading...)
- Develop an understanding of the importance of functional modeling (eg: mock-ups, materials selection, testing, trialing techniques, sketching...)
- Generate design ideas through a variety of media and visual communication techniques (eg: sketching, collage, overlay, modeling, mock-ups...)
- Develop a brief and specifications for a special features garment for a specific client.
- Modify an existing commercial pattern (or create own pattern) through applying advanced pattern technique adaptations.
- Develop the conceptual design through mock-ups, fittings, refinement of a pattern, and refinement of design sketches.
- Become competent in handling patternmaking equipment.
- Select and use appropriate resources through informed testing, trialing and evaluation.
- Utilize a range of planning techniques to help manage time and resources.
- Undertake a range of self-reflection practices.
- Develop an understanding of scheduling and planning assembly instructions and apply this to own outcome development.
- Develop practical skills competency - Y12 practical skills / advanced procedures and developing skills in construction techniques and processes.
- Modify and develop own construction schedule, through informed modeling testing and in discussion with teacher.
- Produce a self-constructed final outcome.
- Implement the outcome in consultation with the client and provide photographic evidence of testing.

<ul style="list-style-type: none"> Carry out a comprehensive evaluation process. 		
Assessment Standards <ul style="list-style-type: none"> AS91356 (2.3) V1 – Develop a conceptual design for an outcome – 6 credits Level 2 Internal AS91345 (2.21) V1 – Implement advanced procedures using textile materials to make a specified product with special features – 6 credits Level 2 Internal AS91337 (2.30) V1 – Use visual communication techniques to generate design ideas – 3 credits Level 2 External 		
Competencies		Values
Thinking <ul style="list-style-type: none"> Critical and reflective, decision making with justification, originality and creativity in design, problem solving. Examining and analyzing. Using language, symbols and texts <ul style="list-style-type: none"> Following and adapting pattern instruction schedules and symbols. Measuring, following lay-plan diagrams, understanding and applying pattern symbols. Managing self <ul style="list-style-type: none"> Time management, resource preparation and purchase, meeting deadlines and milestones, following instructions. Independence, efficiency and accuracy in construction activities. Relating to others <ul style="list-style-type: none"> Sharing equipment, consultation with client and stakeholders. Listening, participating in class discussions and group work situations and sharing of ideas. Participating and contributing <ul style="list-style-type: none"> Sharing ideas and progress, participation in class testing and sample making, active work in class and practical workshops. Understanding the needs of their client and the intended situation, environment. 		Excellence – by aiming high and by persevering in the face of difficulties. <ul style="list-style-type: none"> Producing quality practical outcomes. Persevering with pattern and construction complexities. Testing and trialing to inform decision making. Innovation, inquiry and curiosity – by thinking critically, creatively and reflectively. <ul style="list-style-type: none"> Producing original design concepts, weekly reflection practice. Generating various design options through a range of visual communication techniques. Explores and examines existing outcomes. Diversity – as found in our different cultures, languages, and heritages. <ul style="list-style-type: none"> Meeting the brief specifications and needs of a client. Understanding the client situation and intended outcome environment. Being aware of client values, beliefs, and ethics as applies to the student project. Equity – through fairness and social justice. <ul style="list-style-type: none"> Respecting others – ideas, designs, skills, equipment, and physical space. Meeting the class set budget for practical work. Community and participation – for the common good. <ul style="list-style-type: none"> Participates in all set activities. Meets all set project deadlines. Complies with the class help list work queue in practical lessons. Integrity – which involves being honest, responsible, accountable and acting ethically. <ul style="list-style-type: none"> Meets the set budget, adheres to copyright law, originality in design. Acknowledges sources of information, inspiration. Ecological sustainability – which includes care for the environment. <ul style="list-style-type: none"> Not wasting materials. Efficiency.
Technology Strands – Achievement Objectives		Assessment Opportunities
		Subject Links

<p>Level 5-<u>6</u>-7</p> <p>TP – Technological Practice – <u>Outcome development and Evaluation</u> Students will be able to:</p> <ul style="list-style-type: none"> • Generate design ideas that are informed by research and the critical analysis of existing outcomes. • Undertake functional modeling to refine design ideas and enhance their ability to address the specifications. • Evaluate design ideas in terms of their ability to support the development of a conceptual design for a feasible outcome. • Evaluate the conceptual design against the specifications to determine the proposed outcomes potential fitness for purpose. • Evaluate suitability of materials based on their performance properties, to select those appropriate for use in the production of a feasible outcome. • Produce and trial a prototype of the outcome to evaluate its fitness for purpose and identify any changes that would enhance the outcome. • Use stakeholder feedback to support and justify key design decisions and evaluations of fitness for purpose. <p>TP – Technological Practice – <u>Brief development</u> Students will be able to:</p> <ul style="list-style-type: none"> • Identify a need or opportunity from the given context and issue. • Establish the specifications for an outcome as based on the nature of the outcome required to address the need or opportunity. Consideration of the environment in which the outcome will be situated and resources available. <p>TK – Technological Knowledge – <u>Technological Products</u> Students will be able to:</p> <ul style="list-style-type: none"> • Describe the role of material evaluation in determining material suitability for use in a technological product. • Discuss examples to illustrate how material evaluation informed the selection of materials in particular product development. <p>Nature of Technology – Characteristics of Technological Outcomes Students will be able to:</p> <ul style="list-style-type: none"> • Discuss the interactions between technological outcomes, people, and social and physical environments within particular 	<p>Self:</p> <ul style="list-style-type: none"> • Weekly reflection • Final evaluation <p>Formative:</p> <ul style="list-style-type: none"> • Mock-ups • Brief development • Design concepts • Research <p>Summative:</p> <ul style="list-style-type: none"> • Completed visual diary • Completed outcome • Idea generation concepts • Final design sketches • Final evaluation 	<ul style="list-style-type: none"> • Art • Graphics • Mathematics • Science <hr/> <p style="text-align: center;">Community Links</p> <ul style="list-style-type: none"> • ‘Unveiled’ – exhibition at Te Papa Term One 2012. • Te Papa online website for the ‘Unveiled’ exhibition. • Te Papa education staff. <hr/> <p style="text-align: center;">Resources</p> <ul style="list-style-type: none"> • Patternmaking equipment • Teacher topic ring-binder • Sewing equipment • Powerpoint – Communicating design ideas • Powerpoint – Previous student work photos • Examples of student design work. • Examples of visual communication techniques – design sketches, models..... • Drawing media. • Sample technique folders and instruction notes. • ‘Unveiled’ exhibition visual diary booklet.
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<p><i>socio-technological environments. (Unveiled exhibition – looking at the development of garments, materials, design practice, people and social norms through different times and in different cultures)</i></p>		
<p>Technology – Learning Objectives</p>		
<p>Construction and Mechanical Technology – Construct a Textiles Product Students will be able to:</p> <ul style="list-style-type: none"> • <i>Undertake advanced procedures to construct a product with special features that meets specifications.</i> • <i>Select and apply scheduled techniques to comply with relevant health and safety regulations.</i> • <i>Show independence and accuracy in executing the scheduled techniques and tests.</i> • <i>Undertake techniques and tests in a manner that economises time, effort and materials.</i> 		
<p>Design and Visual Communication: Visual Communication Students will be able to:</p> <ul style="list-style-type: none"> • <i>communicate their design ideas using techniques that explore both identifiable aesthetic and functional details of a design; apply techniques such as sketching, modelling, rendering, collage, overlays and digital media.</i> • <i>produce a set of instrumental or computer related 2d working drawings showing technical details that indicate shape and form – these working drawings show the important design features of the item being communicated eg, parts and how they assemble, sizes or details of hidden parts (sections).</i> • <i>use appropriate engineering and architectural conventions correctly.</i> • <i>produce perspective instrumental projection drawings (parallel and/or angular) that communicate design features and the associated details. (such as spatial drawings: window framing, door handles, and engineering: webs, holes, fasteners.</i> • <i>apply instrumental projection conventions: picture plane, station point, eye level lines, ground level lines, vanishing points, height lines.</i> • <i>select a view point that enables the design features of an item to</i> 		

be shown.

- *select graphic modes and media, and apply compositional principles (eg, proximity, alignment, hierarchy, positive and negative space) that best present the design features of an item being communicated.*
- *appropriately present visual information that includes consideration of the design context (eg, spatial design, product, landscape) and presentation context (eg, location, audience).*

LEARNING ACTIVITIES

Learning Activities overview:

Initial Research Activities:

- 'Unveiled' exhibition at Te Papa. Examine development of garments, materials, design practice, people and social norms through different times and in different cultures.
- 'Paper Dresses' Project Runway group activity.
- Examine existing solutions – garments.
- Examine existing solutions – special features.
- Opinions from others.
- Special features – making samples, testing techniques and equipment, following instructions, identifying factors for a quality result.
- Materials examination. Identifying appropriate fabric properties for an identified garment type.

Brief Development Activities:

- Context and client brainstorming.
- Client and stakeholder interviews.
- Define client functional use attributes / specifications.
- Identify environmental considerations for garment intended use.
- Investigate and select materials / confirm with client fabric properties for functional intended use.
- Initial brief.
- Revise brief throughout development of garment.

Design Activities:

- Pass it on – quick idea generation theme activity.
- Identifying a theme / inspiration / idea generation starting point.
- Divergent design idea development. – mix it up, collage, overlay, photocopy, tracing, develop ideas.....
- Practice drawing sketches and using media for rendering.
- Apply techniques to conceptual design work for garment.

Prototype and Functional Modeling Development Activities:

- Concept sketches, development sketches. Select design. Client approval.
- Teach patternmaking techniques as required.
- Pattern development, mock-ups, client testing, final pattern.
- Trialing and selecting materials / techniques: Special features focus. Students test selected special features. Write up special features instructions and analysis charts. Modify garment construction schedules to suit special features inclusion in garment design. Apply conclusions to garment development construction.
- Teach a variety of special features techniques – making samples, testing techniques and equipment, following instructions, identifying factors for a quality result. Students make samples.
- Plan / modify own construction sequence schedule – discuss with teacher.
- Construction of garment.
- Client and stakeholder consultation throughout whole process.

Functional Testing of Prototype Activities:

- Test garment on client in intended environment.
- Include stakeholder consultation.
- Provide evidence photos.
- Complete final evaluation against brief specifications. Note potential areas for improvement. Refer to client and stakeholder comments on garment fitness for purpose, functionality, areas for improvement.

<p style="text-align: center;">Prototype Topic</p>	<p style="text-align: center;">Y12 Materials Technology - Unit Planner 2012 Term 2-3-4</p>
<p>Unit Objectives / Learning outcomes – students will:</p>	
<ul style="list-style-type: none"> • Develop a prototype gift souvenir that has connections to the artifacts, exhibits and themes of the Museum of Wellington. • Select and use resources through informed testing, trialing and evaluation. • Develop own / adapt / modify existing commercial pattern to meet design specifications. • Develop a brief and specifications to meet the requirements of the client. • Utilise a range of planning techniques. • Undertake a range of self-reflection practices. • Develop practical competency - Y12 practical skills / techniques, procedures. Continue developing skills in construction techniques and processes. • Carry out various functional modeling processes as appropriate to the prototype outcome. • Produce a self-constructed final prototype outcome to meet the brief specifications. • Evaluate the prototype outcome in consultation with the client through a formal business meeting format, and provide evidence. • Carry out a comprehensive evaluation process. • Justify viability of the prototype. • Continue to develop skills in freehand sketching and design idea generation. Demonstrating evidence in a variety of visual communication methods / techniques. • Follow a pattern construction sequence / schedule or adapt or create own sequence in discussion with teacher. 	
<p>Assessment Standards</p>	
<ul style="list-style-type: none"> • AS91357 (2.4) V1 – Undertake effective development to make and trial a prototype – 6 credits Level 2 Internal • AS91337 (2.30) V1 – Use visual communication techniques to generate design ideas – 3 credits Level 2 External 	
<p style="text-align: center;">Competencies</p>	<p style="text-align: center;">Values</p>
<p>Thinking</p> <ul style="list-style-type: none"> • <i>Critical and reflective, decision making with justification, originality and creativity in design, problem solving.</i> • <i>Examining and analyzing.</i> <p>Using language, symbols and texts</p> <ul style="list-style-type: none"> • <i>Following and adapting pattern instruction schedules and symbols.</i> • <i>Measuring, following lay-plan diagrams, understanding and applying pattern symbols.</i> <p>Managing self</p> <ul style="list-style-type: none"> • <i>Time management, resource preparation and purchase, meeting</i> 	<p>Excellence – by aiming high and by persevering in the face of difficulties.</p> <ul style="list-style-type: none"> • <i>Producing quality practical outcomes. Persevering with pattern and construction complexities.</i> • <i>Testing and trialing to inform decision making.</i> <p>Innovation, inquiry and curiosity – by thinking critically, creatively and reflectively.</p> <ul style="list-style-type: none"> • <i>Producing original design concepts, weekly reflection practice.</i> • <i>Generating various design options through a range of visual communication techniques.</i> • <i>Explores and examines existing outcomes.</i> <p>Diversity – as found in our different cultures, languages, and heritages.</p> <ul style="list-style-type: none"> • <i>Meeting the brief specifications and needs of a client.</i>

<p><i>deadlines and milestones, following instructions.</i></p> <ul style="list-style-type: none"> • <i>Independence, efficiency and accuracy in construction activities.</i> <p>Relating to others</p> <ul style="list-style-type: none"> • <i>Sharing equipment, consultation with client and stakeholders.</i> • <i>Listening, participating in class discussions and group work situations and sharing of ideas.</i> <p>Participating and contributing</p> <ul style="list-style-type: none"> • <i>Sharing ideas and progress, participation in class testing and sample making, active work in class and practical workshops.</i> • <i>Understanding the needs of their client and the intended situation, environment.</i> 	<ul style="list-style-type: none"> • <i>Understanding the client situation and intended outcome environment.</i> • <i>Being aware of client values, beliefs, and ethics as applies to the student project.</i> <p>Equity – through fairness and social justice.</p> <ul style="list-style-type: none"> • <i>Respecting others – ideas, designs, skills, equipment, and physical space.</i> • <i>Meeting the class set budget for practical work.</i> <p>Community and participation – for the common good.</p> <ul style="list-style-type: none"> • <i>Participates in all set activities.</i> • <i>Meets all set project deadlines.</i> • <i>Complies with the class help list work queue in practical lessons.</i> <p>Integrity – which involves being honest, responsible, accountable and acting ethically.</p> <ul style="list-style-type: none"> • <i>Meets the set budget, adheres to copyright law, originality in design.</i> • <i>Acknowledges sources of information, inspiration.</i> <p>Ecological sustainability – which includes care for the environment.</p> <ul style="list-style-type: none"> • <i>Not wasting materials. Efficiency.</i> 	
Technology Strands – Achievement Objectives	Assessment Opportunities	Subject Links
<p>Level 5-<u>6</u>-7</p> <p>TP – Technological Practice – <u>Outcome development and Evaluation</u> Students will be able to:</p> <ul style="list-style-type: none"> • <i>Evaluate the conceptual design against the specifications to determine the proposed outcome’s fitness for purpose.</i> • <i>Use stakeholder feedback to support and justify key design decisions and evaluations of fitness for purpose.</i> • <i>Generate design ideas that are informed by research and the critical analysis of existing outcomes.</i> <p>TP – Technological Practice – <u>Brief development</u> Students will be able to:</p> <ul style="list-style-type: none"> • <i>Identify a need or opportunity from the given context and issue.</i> • <i>Establish the specifications for an outcome as based on the nature of the outcome required to address the need or opportunity, consideration of the environment in which the outcome will be situated and resources available.</i> • <i>Justify the specifications in terms of key and wider community stakeholder considerations.</i> 	<p>Self:</p> <ul style="list-style-type: none"> • Weekly reflection • Final evaluation <p>Formative:</p> <ul style="list-style-type: none"> • Brief development • Design concepts • Functional modelling • Research <p>Summative:</p> <ul style="list-style-type: none"> • Completed visual diary • Completed outcome • Final evaluation • Client feedback 	<ul style="list-style-type: none"> • Art • Graphics • Mathematics • Science • History • Social Sciences <p style="text-align: center;">Community Links</p> <ul style="list-style-type: none"> • Museum of Wellington – museum visit • Education officers – Rachel Ingram and Shelly Gardner • Gift shop manager – Lindsay McPherson • Class trip and ‘prototype brief’ parameters discussed with museum staff prior to starting topic. <p style="text-align: center;">Resources</p>

<p>TK – Technological Knowledge – <u>Technological Modelling</u> Students will be able to:</p> <ul style="list-style-type: none"> • Discuss examples to illustrate how evidence and reasoning is used during functional modeling to identify risk and make informed and justifiable design decisions. <p>TK – Technological Knowledge – <u>Technological Products</u> Students will be able to:</p> <ul style="list-style-type: none"> • Describe the role of material evaluation in determining material suitability for use in a technological product. 		<ul style="list-style-type: none"> • Pattern-making equipment • Teacher topic ring-binder • Sewing equipment • Display images – past student examples • Previous year - exemplar visual diary • Existing souvenirs
<p>Technology – Learning Objectives</p>		
<p>Design and Visual Communication: Visual Communication Students will be able to:</p> <ul style="list-style-type: none"> • communicate their design ideas using techniques that explore both identifiable aesthetic and functional details of a design; apply techniques such as sketching, modelling, rendering, collage, overlays and digital media. • produce a set of instrumental or computer related 2d working drawings showing technical details that indicate shape and form – these working drawings show the important design features of the item being communicated eg, parts and how they assemble, sizes or details of hidden parts (sections). • use appropriate engineering and architectural conventions correctly. • produce perspective instrumental projection drawings (parallel and/or angular) that communicate design features and the associated details. (such as spatial drawings: window framing, door handles, and engineering: webs, holes, fasteners. • apply instrumental projection conventions: picture plane, station point, eye level lines, ground level lines, vanishing points, height lines. • select a view point that enables the design features of an item to be shown. • select graphic modes and media, and apply compositional principles (eg, proximity, alignment, hierarchy, positive and negative space) that best present the design features of an item being communicated. • appropriately present visual information that includes consideration of the design context (eg, spatial design, product, 		

LEARNING ACTIVITIES

Learning Activities overview:

Initial Research Activities:

- Pre-visit research – Museum of Wellington website. Students to familiarise self with museum holdings, mission, purpose, location...
- Class visit to Museum of Wellington. Guided visit by museum education staff.
- Examine museum exhibits, artefacts, building and location surroundings, gift shop and existing souvenirs.
- Examine existing souvenirs in critical detail.
- Discussion with museum staff – museum values, ethics, integrity, demographic groups, souvenir requirements, brief specifications.....
- Opinions from others.
- Materials investigation. Identifying appropriate fabric properties for an identified souvenir type.

Brief Development Activities:

- Context and theme brainstorming.
- Client and stakeholder interviews.
- Define client functional use attributes / specifications.
- Identify specific environmental considerations for prototype intended use (gift shop / end-user purchase intention).
- Investigate and select materials.
- Initial brief.
- Revise brief throughout development of prototype.

Design Activities:

- Pass it on – quick idea generation theme activity.
- Identifying a theme / inspiration / idea generation starting point.
- Divergent design idea development. – mix it up, collage, overlay, photocopy, tracing, develop ideas.....
- Practice drawing sketches and using media for rendering.
- Apply techniques to conceptual design work for prototype.

Prototype and Functional Modeling Development Activities:

- Concept sketches, development sketches. Select design. Client approval. Demographic stakeholder group feedback.
- Teach patternmaking techniques as required.
- Pattern development, mock-ups, client / demographic stakeholder group testing, final pattern.
- Trialing and selecting materials / techniques: Apply conclusions to prototype development construction.
- Plan / modify own construction sequence schedule – discuss with teacher.
- Construction of prototype.
- Client and demographic stakeholder group consultation throughout whole process.

Functional Testing of Prototype Activities:

- Test prototype in actual / simulated intended environment. (eg: Display cabinets at school. Surveys....)
- Final business meeting with clients to discuss final prototype presentation.
- Include demographic stakeholder group consultation.
- Provide evidence photos.
- Complete final evaluation against brief specifications. Note potential areas for improvement. Refer to client and stakeholder comments on souvenir prototype's fitness for purpose, functionality, areas for improvement.