 Stage 4 technology mandatory materials

The Materials Technologies context focuses on the application of specialist skills and techniques to a broad range of traditional, contemporary and advancing materials. Students develop knowledge and understanding of the characteristics and properties of a range of materials through research, experimentation and practical investigation, as well as when they make products to satisfy identified needs and opportunities. This unit of work focuses on textiles as a materials technology as well as agriculture as a contributing context area.

Farm fibres to felt

Using materials technologies (textiles), students are required to individually design, produce and evaluate a hand felted case. This case must be constructed using wet felting, needle felting and hand embroidery. This project is to be accompanied by a digitally produced design and production folio that will record their design process. Throughout this unit of work, students will develop knowledge and understanding of agriculturally produced wool fibres, the preparation of and value adding to wool fibres for end use application and the manufacturing techniques that turn wool fibres into non-woven felt fabric. This project will also provide students with an appreciation for environmentally sustainable and ethical textile practices that benefit society and suitable associated career paths.

**Extension:** felted hat, embedding other materials technologies into the project (electronics), swing tag development for marketing purposes, Wool4School design competition.

**Learning difficulties:** a flat felted wall hanging produced through collaborative group work.

Outcomes

* Design and production skills TE4-1DP, TE4-2DP, TE4-3DP
* Knowledge and understanding TE4-9MA, TE4-5AG, TE4-10TS

Related life skills outcomes: TELS-1DP, TELS-2DP, TELS-3DP, TELS-4DP, TELS-10MA, TELS-6AG, TELS-11TS

Resources

Access to:

* computer, printer, digital camera
* practical equipment:
	+ wet felting: bubble wrap, wool tops/roving, plastic resist, tulle/lace, spray bottle, wooden poles, plastic ties, soap flakes, fabric conditioner
	+ needle felting: button, felting block, needle felting needles
	+ embroidery: embroidery threads, hand sewing needles, fabric scissors
	+ project modification: [e-textiles kit](https://learn.sparkfun.com/tutorials/lilypad-basics-e-sewing) (conductive thread, hand sewing needle, cell battery and holder, lily pad/twinkle, LED flat
* Textbooks:
	+ Nelson Textiles Technology, Castle. C, Peters. L (2009), Nelson Cengage Learning Australia: Melbourne
	+ Nelson Textiles Technology Teacher Resource Pack, Castle. C, Peters. L (2010), Nelson Cengage Learning Australia: Melbourne
	+ Nelson Textiles and Design Preliminary and HSC second edition
* Websites:
	+ [Learn about wool](https://www.learnaboutwool.com/lesson-plans/fibre-production/%20%2C%20https%3A/www.learnaboutwool.com/lesson-plans/sustainable-fibre-production-y7-y8/)
	+ [Australian Wool Innovation Limited](https://www.wool.com)
	+ [Tabandy Farm](https://tabandyfarm.com/our-story)
	+ [Woolmark](https://www.woolmark.com/resources/)
	+ [Nundle Woollen Mill](https://nundle.com/)
	+ “Needle felting for beginners” [Craftsy](https://www.craftsy.com/knitting/article/needle-felting-for-beginners)
	+ “From raw fleece to carded batts of wool” [The Felting and Fiber Studio](https://feltingandfiberstudio.com/2015/02/26/from-raw-fleece-to-carded)
	+ Colouring wool - [Wool Wench](http://www.woolwench.com/fiber-dye-and-preparation-tutorials/)
	+ [Ethical Clothing Australia](http://ethicalclothingaustralia.org.au/)
	+ [Shop ethical](https://www.ethical.org.au/3.4.2/get-informed/clothing/clothing-alternatives/)
	+ [Himalayan Journey](https://www.himalayanjourney.com.au/)
	+ [Akubra](https://akubra.com.au/)
	+ ABC News article [Slow Clothing](o%09http%3A/www.abc.net.au/news/2015-09-09/slow-clothing-movement-gaining-momentum-with-jane-milburns-help/6761446)
	+ [My Future](https://myfuture.edu.au/)
	+ Collective Works by the [Gumbaynggirr Felt Artists](https://breathingacharmedlife.wordpress.com/tag/aboriginal-art/) (Indigenous textile artist)
* Videos:
	+ Materials for design: [felt](http://www.vea.com.au/secondary-school/material-for-design-felt.html)
	+ YouTube:
		- [Exploring Australian approaches to producing cotton, timber and wool](https://www.youtube.com/watch?v=g3KNu7AkaIo)
		- [Broken Hill Organic Sheep Farming Farmer Stories](https://www.youtube.com/watch?v=uifA-Hn31qY)
		- [How to shear – Shearing merino sheep (fine wool)](https://www.youtube.com/watch?v=CIRNygP6-fk) (duration 6:44)
		- [Meet the Tabandy sheep](https://www.youtube.com/watch?v=8P9e5qplvtE&feature=youtu.be)
		- [Learn how to harvest wool from a camel](https://youtu.be/S2mlSdHdMnA)
		- [How to harvest wool from an angora rabbit](https://www.youtube.com/watch?v=eNpr2yh0wIM) (duration 5:53)
		- [Wool Production Process (off the farm)](https://www.youtube.com/watch?v=yafkK0uk65U)
		- [Needle felting for beginners](https://www.youtube.com/watch?v=WWZkkSWyPPI&feature=youtu.be) (duration 31:46)
		- [Wet felting pouch tutorial](https://www.youtube.com/watch?v=wbTwCNDW4-Y&feature=youtu.be) (duration 19:19)
		- [Wet felting hat tutorial](https://www.youtube.com/channel/UCsFCmf9y5cO7I0TKvLQLVtQ) (series of four tutorials)

Register program in the last column.

| Sequence | Outcomes | Content | Suggested strategies and assessment | Resources | Registration |
| --- | --- | --- | --- | --- | --- |
| **Week 1** | TE4-1DP | Develop a 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  | Overview of farm fibres to felt unit and design project.Classroom organisation, behavioural and safety expectations.Introduce students to the textile classroom drawing on prior learning experiences.Complete safety testing.**Identifying and defining**Design and production ProcessTeacher:* introduce students to the design and production process as outlined in the Technology Mandatory Syllabus Years 7-8, 2017, page 22
* explain the importance of ongoing evaluation throughout all design projects.
* read design situation. Explain the project constraints. Students:
* Highlight key terms in the design situation and record on the board.
* Students form their design brief and discuss with teacher/peers.

Evaluation criteriaAs a class:* establish an evaluation criteria through brainstorming and then refining to 5 key points.

Students:record evaluation criteria on assessment task sheet | Safety test (See Equipment Safety in Schools)Design and production process diagramAssessment taskImages of existing ideas/products (Google images)Whiteboard and marker |  |
| Week 1 | TE4-5AG | Investigate how fibre production is managed in environments as a system and how sustainability can be improved (ACTDEK032) ST  | FibresTeacher:* Outlines the types of fibres, Natural vs synthetic
* Outlines types of protein fibres and animals which produce fibres
* Teacher hands out samples of synthetic fibre and various natural fibres e.g. sheep, goat, alpaca, camel for students to observe

Students:* Complete matching activity on protein fibres, name of fibre to the source e.g. wool and sheep, silk to silkworm etc.
* Students discuss differences in fibre samples and what end-use felting they would suit

Teacher:Explains how a sheep station operates.Students:* Complete series of questions on sheep farming to demonstrate their understanding.

Wool production and processingTeacher:* Explains the operations involved in the production and processing of wool, both on and off the farm

Students:* Complete flow chart diagram on the production and processing of wool to demonstrate their understanding.

SustainabilityTeacher:* Define the concept of sustainability

Students:* View video on Broken Hill Organic farming and record the key points the farmer makes in making his farm more sustainable.
 | Nelson Textiles Technology (2009) Castle & Peters, page 212Nelson Textiles and Design Preliminary and HSC second edition p76Websites:* Learn about wool
* Australian Wool Innovation Limited
* Woolmark
* Tabandy farm
* The Felting Fiber Studio
* Wool Wench
* Nundle Woollen Mill

YouTube videos:* Exploring Australian approaches to producing cotton, timber and wool
* Broken Hill Organic Sheep Farming Farmer Stories
* Meet the Tabandy sheep
* How to shear – shearing merino sheep (fine wool)
* Learn how to harvest wool from a camel
* How to harvest wool from an angora rabbit
* Wool Production Process (off the farm)
 |  |
| Week 2 | TE4-5AG | Investigate ideal conditions for growth and development of an agricultural animal (ACTDEK032) ST  | Paddock design activityAs a class:* Brainstorm the requirements for keeping sheep e.g. water, food, shelter, fences, ratio of sheep to land size etc.

Teacher:* Describes the key requirements for keeping sheep i.e. paddock size, water source, food source, gates, fence requirements, shearing facilities, wool shed etc.

Students:* design a paddock layout to scale to keep 50 sheep to demonstrate their understanding
* write a paragraph outlining their paddock design’s sustainable design features
 | Websites:* Learn about Wool
 |  |
| Week 3 | TE4-9MATE4-10TS | Investigate products and services for the individual and/or the community, considering ethical and social factors (ACTDEK029) ST  | Value-addingAs a class:* Brainstorm on the board the products/items created from wool fibre

Students:* Create a digital collage of images of products made from Australian wool
* Research areas in the nearby area and online that:
* Farm sheep i.e. where is the closet sheep station?
* Process wool fibre, spin yarn and knit/weave/felt fabric
* Run felting classes

Buy custom felt products e.g. marketplace opportunity: Etsy, Pinterest | Whiteboard and markerComputers and Internet accessWebsites:* Etsy
* Pinterest
 |  |
| Weeks 1-2 | TE4-9MATE4-10TS | Investigate products and services for the individual and/or the community, considering ethical and social factors (ACTDEK029) ST  | Ethical factorsTeacher:* defines ‘ethical’ branding. Discuss ethical fibre and clothing production as a class.

Students: * Research the company ‘Himalayan Journey’ and describe the ethical and social impacts of the company

Social factorsAs a class:* Brainstorm social factors which need to be considered when developing textile products e.g. location, age, cost, gender, cultural background etc.

Case study: AkubraStudents:* Visit the Akubra website and record the historical developments and social impacts on Australian society
* Investigate the past, present and future developments of the company
 | Websites:* Ethical Clothing Australia
* Shop ethical
* Himalayan Journey
* Akubra
 |  |
| Week 3 | TE4-9MA | Investigate the characteristics and properties of a range of materials and products (ACTDEK034) | Research and planningProperties/characteristics of WoolTeacher:* Defines the terms ‘properties’ and characteristics’ in relation to talking about textile fibres

Students:* Use the Internet to research the properties of wool.

FlowchartTeacher:* Sketches diagram on the board on how fibres are made into yarns and fabrics, highlighting the three main fabric structures (woven, non-woven and knitted)

Links to end-use items* Create an A4 poster about wool including, textile properties, FYF flowchart and images of end-use items.
 | Websites:* Woolmark
* Learn about wool

Computers and Internet accessWhiteboard and markerSamples of wool fibre, woollen yarn and woollen fabrics.Pre-made acrylic felt. |  |
| Week 4 | TE4-3DPTE4-9MA | Select and justify the safe use of the tools and equipment used to create a design solution | Needle feltingTeacher: * Demonstrate how to needle felt.
* Explain safety considerations throughout
 | YouTube:* Needle felting for beginners

Websites:* “Needle felting for beginners” Craftsy

Needle felting equipment |  |
| Week 4 | TE4-3DPTE4-9MA | Experiment with a range of appropriate techniques to produce a design solution DT  | Needle feltingStudents experiment with needle felting by:* Designing and needle-felting a small animal

Teacher:* Provides feedback on student achievement
 | Google image search “needle felted animals”Needle felting equipmentPaper, pencil and eraser |  |
| Week 4 | TE4-10TS | Investigate the role of the professional in the related technology, and their impact on the environment and society  | Role of the professionalCase study: Tabandy Farm OR AkubraStudents:* Research the role of a professional in the textile industry and investigate their impact on the environment and society.
* Investigate a possible career in the industry and the requirements of this vocation.
* Note: this can be an in-class activity or a take-home task or assessment task.
* Read article and discuss the impact of the ‘Slow clothing movement’ in Australia
* Discuss possible future careers in the industry
 | Websites:* Tabandy farm
* Akubra
* Learn about wool
* My Future
* Abc (article ‘Slow Clothing’)
 |  |
| Week 5 | TE4-10TS | Investigate current and innovative product developed by an Aboriginal and/or Torres Strait Islander designer that is influences by their cultural identity  | Internet research task – Aboriginal textile artistStudents:* Investigate Indigenous Textile artists and outline the design inspiration and aesthetic design features of two items.
 |  Website:* Collective works by the Gumbaynggirr Felt Artists (Indigenous textile artist)

Computers and Internet access |  |
| Week 5 | TE4-3DPTE4-9MA | Select and justify the safe use of the tools and equipment used to create a design solution | Wet feltingTeacher: * Demonstrate how to wet felt.
* Explain safety considerations throughout
 | Nelson Textiles Technology (2009) Castle & Peters page 83Suggested video:* Materials for design: Felt (VEA)
 |  |
| Week 5 | TE4-3DPTE4-9MA | Experiment with a range of appropriate techniques to produce a design solution DT  | Wet feltingStudents experiment with wet felting by:* Flat-felting a small shape by hand

Students:* Design a possible motif inspired by Indigenous textile artists previously researched in class
* Needle-felt motif onto above dried flat-felt
* Embellish motif using hand embroidery

Teacher:* Provides feedback on student achievement
 | Nelson Textiles Technology (2009) Castle & Peters page 83Wet felting equipmentNeedle felting equipmentHand embroidery equipment |  |
| Week 6 | TE4-9MATE4-5AGTE4-3DP | Select from a range of materials, components, tools, equipment and processes to develop solutions (ACTDEP035) ST Design and plan a product associated with agricultural production (ACTDEP036)DT ST  | Students:* review the design situation i.e. felted case
* consider the components required for their project
* brainstorm possible design solutions

Project options:* Extension: felted hat, embedding other materials technologies into the project (electronics), swing tag development for marketing purposes, Wool4School design competition.
* Life Skills: a flat felted wall hanging produced through collaborative group work
 | YouTube:* Wet felting pouch tutorial
* Wet felting hat tutorial
 |  |
| Week 6 | TE4-1DP | Generate and communicate the development of design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques (ACTDEP036) CT DT  | Design projectTeacher:* explain that students will need to develop a series of possible designs

Students:* brainstorm possible ideas
* generate possible designs from their brainstorm and label features
* can use their class work as stimulus and research other possible ideas on the Internet.
 | Google image searchPaper, pens, pencils and eraser |  |
| Week 6 | TE4-1DP | Evaluate the effectiveness and suitability of choices made during the development and production of the solution | Ongoing evaluation of ideasStudents:* evaluate each design idea using Plus, Minus and Interesting (PMI)
 | None listed |  |
| Week 6 | TE4-2DP | Use appropriate project management processes when working both individually and collaboratively to coordinate the production of a designed solution (ACTDEP039) CT ST  | Producing and implementingStudents complete:* time/action plans by identifying the action/activity, time of expected completion and ongoing evaluation
* finance planning to determine project costs
* list possible websites to source project components
 | Computer access |  |
| Weeks 6-10 | TE4-1DPTE4-9MA | Consider innovative applications of advancing technologies to increase efficiency of time and/or materials in the production of models and products DT  | Students:* examine industrial practices used in sheep farming
* examine industrial practices used in wool processing

As a class:* discuss Mass vs Niche markets of felted products

Students:* read and summarise the process of making an Akubra hat
 | Websites:* Nundle Woollen Mill
* Akubra
 |  |
| Weeks 6-10 | TE4-1DP | Evaluate the effectiveness and suitability of choices made during the development and production of the solution | Ongoing evaluation of ideasStudents:* evaluate their production throughout the production process.

Teacher:* provides ongoing feedback throughout the production process.
 | None listed |  |
| Weeks 6-10 | TE4-3DPTE4-9MA | Select and justify the safe use of the tools and equipment used to create a design solution | Teacher:* Demonstrates the correct and safe use of equipment

Students:* Demonstrate skills using equipment safely.

Teacher:* Provides feedback on student use of equipment
 | None listed |  |
| Weeks 6-10 | TE4-3DPTE4-9MA | Demonstrate safe, independent and collaborative work practices in the production of designed solutions (ACTDEP037)  | Students:* Construct their felt case
* Support peers, if required
 | Wet felting equipmentNeedle felting equipmentEmbroidery equipment |  |
| Weeks 6-10 | TE4-3DPTE4-9MA | Apply appropriate tools, equipment, materials, techniques and processes in the production of a design project (ACTDEP034) ST  | Students:* Follow the design and production process
* Apply their knowledge and skills of felting in the construction of a hand-felted case.
 | Design and productions process diagram |  |
| Weeks 6-10 | TE4-1DP | Evaluate the effectiveness and suitability of choices made during the development and production of the solution | Ongoing evaluation of ideasStudents:* evaluate their production throughout the production process.

Teacher:* provides ongoing feedback throughout the production process.
 | None listed |  |
| Week 10 | TE4-1DP | Assess the solution against predetermined criteria  | Testing and evaluatingFinal evaluationUsing Blooms Taxonomy to reflect on their learning process by completing the final evaluation.Students submit hand felted case and design and production folio | Blooms Taxonomy evaluation table |  |

All outcomes referred to in this unit come from [Technology Mandatory Years 7-8 Syllabus 2017](http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/technologies/technology-mandatory-7-8-new-syllabus)
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