

Supporting NCEA Literacy in Materials and Processing Technology



This resource is aligned to the New Zealand Curriculum (2007) and provides support for the teaching and learning of literacy and numeracy in preparation for the NCEA Co-requisite. It aims to support those students who are using the NCEA qualification pathway.

Materials and Processing Technology (MPT), with its large body of specialist language and foundation of creative, authentic learning has many opportunities to develop the literacy skills of ākonga.

The 2007 New Zealand Curriculum specifically acknowledges the importance of literacy in the key competencies related to language, symbol and text. Through MPT, ākonga can learn to:

- » learn and use specialist knowledge with confidence
- » use discipline-specific terminology for clear communication during the development of an outcome
- » use appropriate symbols and text when working with a variety of materials and developing outcome specifications
- » communicate thoughts and ideas in a clear way for others to understand, be that through text, image, orally, or in other ways that are appropriate to the ākonga.

Key competencies about thinking, relating to others and participating and contributing which have a focus on literacy include the need to:

- » communicate and collaborate with others around the development of an outcome
- » draw upon personal, whānau, and community prior knowledge where appropriate and apply this knowledge to their work
- » share knowledge and practices with their peers, for collaborative benefit
- » critically investigate existing technological outcomes

- » gather and provide feedback throughout design, development, and testing to improve designs and technological outcomes

The [Literacy standards](#) are composed of a reading and writing strand, each of which has its own Big Ideas. These are unpacked further by the Significant Learning statements, which in themselves connect with the literacy focused key competencies listed above. They share, for example, the view that ākonga need to communicate ideas in a clear way for an audience and write with a clear structure – and in a way that meets conventions of a text type.

The Literacy Pedagogy Guide (LPG) below for MPT takes the Big Ideas and Significant Learning and poses two questions:

- » *What does literacy look like in Materials Technology and Processing?*
- » *What can I do as a kaiako of Materials Technology and Processing?*

The LPG is not exhaustive, but illustrative of small but effective steps that any kaiako of Materials Technology can target, trial and ultimately embed in their teaching practice.



Reading

	Significant Learning	What can this look like in MPT?	What can I do as a kaiako of MPT?
Big Idea 1: Ākonga make sense of written texts.	Ākonga use: » a processing system to decode and comprehend text. Readers develop expertise in using sources of information and comprehension strategies to make sense of text. » knowledge of text structures and features. Readers develop their knowledge of text features and use this to navigate and understand texts. » vocabulary knowledge. Successful comprehension depends on understanding most of the meanings of the words in the text.	Sources of information include written texts, visual texts and multimodal texts (e.g. an annotated diagram or a pattern). Readers need to build knowledge of how text types common in MPT are structured. These include but are not limited to: » Procedural texts which are instructional; they provide a set of actions and a sequence e.g. recipes, methods, pattern instructions » Informative texts which provide information; they include descriptions and explanation » Persuasive texts which present a point of view or justification, as in an argument text. Texts types can be in different forms e.g. a design brief is a form of explanation. Information needs to be synthesised across a range of sources, including material attributes or ingredient qualities, product research, stakeholder perspectives and feedback. Subheadings are important signposts of content. Understanding vocabulary means ākonga need to distinguish between everyday meanings and technical or discipline specific meanings of words e.g. plane. There are three tiers of vocabulary to focus on: » Everyday words which ākonga must have a knowledge of. These make up the majority of texts. » Words that appear or are useful across curriculum areas. » Discipline-specific vocabulary (or technical words) which are less frequent, though essential to a topic within a curriculum area.	» Unpack infographics with ākonga, analyse their purpose and evaluate their effectiveness. (See How to read infographics). “Reading” visual warnings is a good way to discuss effective visual signs. » Share and analyse examples of common text types or forms with ākonga. For example, elements of a design brief include: a conceptual statement, specifications, and attributes. » Model how to skim a text quickly to get an idea of what it is about. Support learners’ skimming strategies by posing questions such as: such as: › What is this text about? › What does the heading say? › What do the diagrams show? › Designers use visual and text hierarchy to communicate ideas – e.g. heading, subheading, body text. Model how to scan text to locate specific information, and support ākonga to use scanning strategies by providing questions as cues and analysing subheadings. Explore how these can be actively disrupted for visual effects (e.g. typographer/designer Neville Brody’s use of illegible text). » Use graphic organisers (a framework of the structure and content) to support ākonga to predict text structure and content, to make notes, to summarise information, and as a guide to writing a text, e.g. › Main Idea/Supporting Ideas can be a useful template to use › Flow charts are useful for describing a procedure (how something is done) or a process (how something occurs) » Thinking tools are a form of graphic organiser. There are a variety of maps that suit particular purposes: Thinking Maps and Processes » Provide ākonga who are conducting a research project into e.g. a particular style, or designer philosophy with a KWL organiser. » To support ākonga to build their vocabulary, they can: › circle the words they don’t know › underline the words they have some understanding of › predict/identify which words are necessary for the topic › predict/identify which words are useful for this and across subjects. » Use concept frames to develop understanding of the technical meaning of a word. › Design tasks which make use of the Technology Online Glossary e.g by asking ākonga to select which definitions relate to the topic they are studying.

Big Idea 2: Ākonga read critically	Ākonga: » develop a critical awareness that enables them to consider who wrote a text, for whom, why, and whether it may have purposes that are not immediately apparent.	Authors have different purposes. Texts that require ākonga to read critically are largely those that present or argue a point of view. The text type is argument or persuasive text. In Materials Technology this might be in the form of texts that present a product and make claims about it.	» Support ākonga to scan the written and visual texts for clues as to author, text type, purpose, and intended audience e.g. use specific questions about purpose and audience. » Use a thinking tool like de Bono's OPV (Other People's Views) to consider a writer's point of view, and others' points of view. » For persuasive texts, use a ākonga checklist¹ with questions such as: › What are the features of the product? › What claims are made about the product? › What evidence supports the claims? › Have you been persuaded? » Support ākonga to read text closely by: › identifying argument indicators: e.g. thus, hence, and so › recognising any emotive vocabulary › identifying and evaluating the validity of claims and evidence › analysing reader-oriented features e.g. you, we.
Big Idea 3: Ākonga read for different purposes	Ākonga: » are clear about their purpose for reading and have appropriate strategies to meet that purpose » understand and use ideas in texts » locate and evaluate the ideas and information within and across a range of print and digital texts to meet their purpose.	Ākonga need to know when to skim, scan or read text more closely. Not all texts are equal in terms of information. Visual texts have varying relationships to written texts: they can be parallel, they can add new information, they can be only loosely linked, or present different information from the written text.	» Discuss reading strategies² with ākonga and model how you read texts, and how you compare them. » Support ākonga to predict content from titles and draw on prior knowledge e.g. predict the steps in a set of instructions to complete a component of a product. » Evaluate the effectiveness of diagrammatic instructions on equipment use vs. written instructions. Use a ākonga checklist for elements of an instruction text e.g. › What is the goal or purpose - clearly stated and often in the heading. › What materials or equipment is used? - listed in order of use. › What are the steps? › (See the features of instruction texts for more detail) » Develop ākonga strategies for “reading” visual texts e.g. when analysing a visual text, ask: › What can you see? › How does it make you feel? › What is the image trying to tell us? » Use an Inquiry Chart (I-Chart) to find key information in different texts, to compare information and synthesise across different texts. » Use elements of the Rauru Whakarare Evaluation Framework (Feekery & Jeffrey, 2019) which examines a text in terms of its mana (authority), its māramatanga (content), its whakapapa (background), and its aronga (lens or perspective).

¹ (Rowlands, 2007). <https://www.jstor.org/stable/30046754>

² (Dymock & Nicholson, 2010).

Writing

	Significant Learning	What can this look like in MPT?	What can I do as a kaiako of MPT?
Big Idea 1: Ākonga write meaningful texts for different purposes and audiences.	Ākonga: › use strategies within a writing process to plan and create texts. › select content, text structure and language choices appropriate to purpose and audience. › select and use vocabulary that is specific to their topic, purpose and audience. › revise and edit their work.	The writing process involves the recursive use of strategies of planning, composing and reviewing. As writing unfolds, good writers review how their text (at the level of language choice, content, and organisation) addresses audience and purpose. This guides further planning and composing. Text types that ākonga need to write include, but are not limited to: » Instructional texts which provide a process or method to reach a final product » Explanatory texts which detail a design context or provide detail of a self-constructed brief » Persuasive texts such as justifications for decisions on particular design in a brief. Vocabulary knowledge involves the demonstration of: › the understanding of abstract nouns that may arise in the stakeholder engagement process. › an understanding of discipline specific terminology to describe features or process › an understanding of how word choice is impacted by the text type and its purpose and the audience	» With ākonga, identify the audience and purpose for each piece of writing. Use some of these questions on Purpose and Audience. The audience could be, for example: › the stakeholder with the purpose being providing clear, open questions to extract the required information › the kaiako who will be assessing the fitness-for-purpose of a design, based on the final report. » Encourage ākonga to create written records of ideas, notes, discussion points and questions follow conversation in the classroom. They may want to call on this thinking for later use. Model this behaviour in the classroom. » Provide opportunities to discuss and rehearse ideas in pairs or in small groups before writing. » Use a thinking tool like de Bono's OPV (Other People's Views) to consider how different stakeholders might respond to a product brief. » Provide ākonga with opportunities to plan their writing with templates that match the text type or text form, e.g for a design brief: 1. What is the purpose of the product? 2. What dimensions are suitable? 3. What design features are preferred? These feedback questions would then be considered in the final report as rationales for decision making and determining whether the product is fit-for-purpose. » Provide guidance for structuring paragraphs, for example TEXAS (developed for History but useful for some writing in other learning areas). » Expand ākonga knowledge of word families e.g. product, production, productive, productively so that the correct form is available for the grammatical context. » Provide or co-construct ākonga checklists to revise and edit their work. For example this checklist for writing an argument can provide help prepare ākonga to write the justification of design decisions » Model annotation of a concept or design and encourage ākonga to do this on a regular basis. See: Producing annotated concept sketches and drawings.

Big Idea 2: Ākonga use written language conventions appropriately to support communication.	Ākonga: » develop their expertise in sentence construction, grammar, punctuation, spelling, word choice.	Sentence structures, including: » Simple sentences » Compound sentences that use coordinating conjunctions e.g. “but”, “as”, “yet” which allow the reader to unify two related points often for greater detail. » Complex sentences e.g. those that use “because”, “while” to combine two different but connected ideas Challenges related to grammatical structure include: » Nouniness, which refers to the number of elements that precede and follow a noun. These elements provide specificity. This is a factor in lexical density. » High lexical density, which refers to the high ratio of content words (nouns, adjectives, verbs, adverbs) to function words (pronouns, prepositions, conjunctions etc). » Modal verbs, which are important ways to signal: › Possibility e.g. “could impact” › Deduction e.g. “may mean” › Expectation e.g. “will mean that” » Other features: › Punctuation marks are meaning-making devices. › Spelling has impact on a reader.	» Deconstruct and reconstruct sentences so ākonga can see what complex sentences and their parts do. » Remind ākonga that some adjectives need verbs or further unpacking. For example, it’s not enough to say that something is ‘effective’ (“The designer used effective colours”) without saying what effect was achieved. » Draw the attention of ākonga to the function of different punctuation marks with, for example, a fill in the blanks activity. Or create a punctuation worksheet of your own to illustrate its importance. » Encourage ākonga to mark words for later checking. » Introduce ākonga to academic word lists to support their writing. A place to start is Sublists of the Academic Word List. Formal writing is required for final reports where academic language is appropriate. » Support ākonga in forming questions through the identification of key words e.g. for constructing stakeholder questions. » Plot modal verbs on clines (highly likely to unlikely, etc). Create your own within the classroom for use in reports or reflections. » With ākonga, identify chains of verbs through a text and unpack these verbs alongside them. » Expand ākonga knowledge of understanding word families for general academic words e.g. demonstrate, demonstrates, demonstrated. » Generate or co-construct lists of topic specific vocabulary, particularly those that are difficult to spell. Provide ākonga with a focused glossary of terms. » With ākonga, evaluate the usefulness of words for present or future learning. Consider words for use, across learning areas.
---	---	---	--

References and sources of further information

Dymock, S. & Nicholson, T. (2010). "High 5!" Strategies to enhance comprehension of expository text. *The Reading Kaiako*, 64(3), 166-178. <https://doi.org/10.1598/RT.64.3.2>

Feekery, & Jeffrey, C. (2019). A uniquely Aotearoa-informed approach to evaluating information using the Rauru Whakarare Evaluation Framework. *Set: Research Information for Kaiako* (Wellington), 2, 3-10. https://www.nzcer.org.nz/system/files/journals/set/downloads/Set%202019_2_003_0.pdf

Rowlands, K.D. (2007). Check it out! Using checklists to support student learning. *The English Kaiako*, 96(6), 61-66. <https://www.jstor.org/stable/30046754>

Te Kete Ipurangi. (n.d.). *Technological literacy*. TKI: Technology Online. <https://technology.tki.org.nz/Glossary/Technological-literacy>