DESIGNING LOCAL CURRICULUM

GUIDE
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Coherent Pathways

Guidance document

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MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

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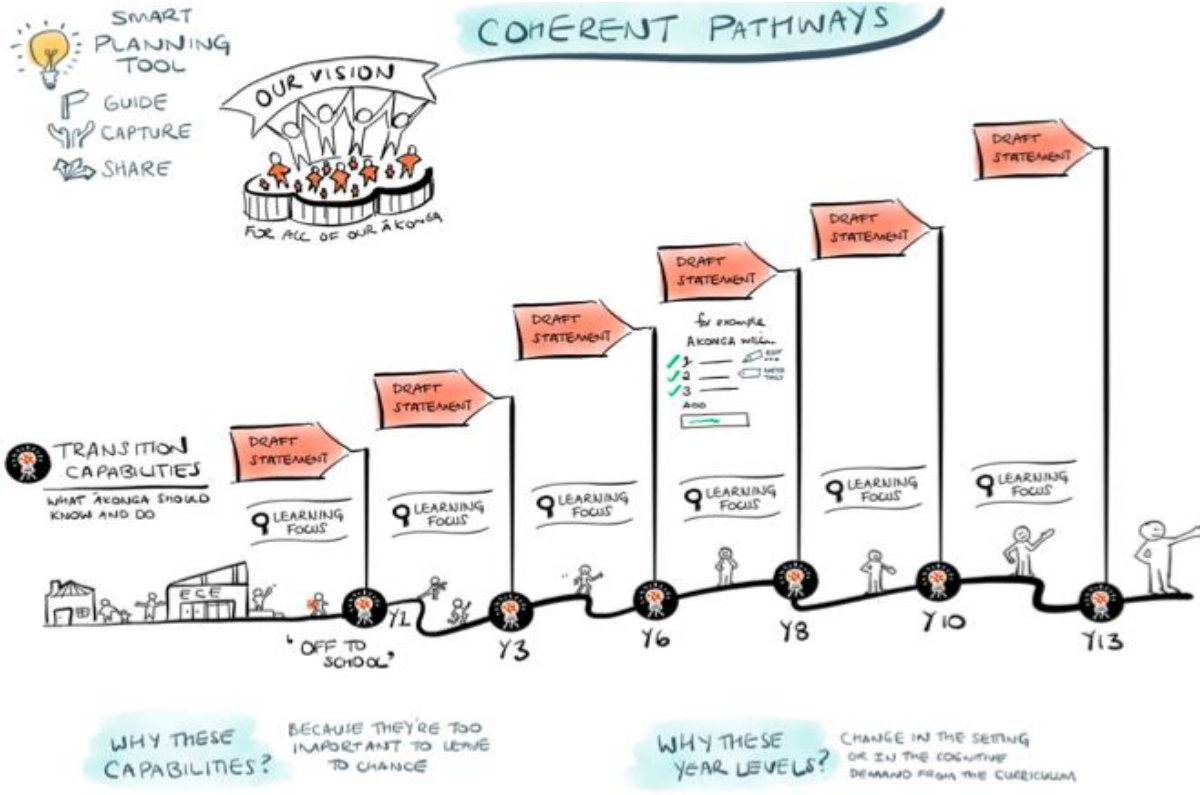
About the Coherent Pathways Tool

You can enrich learning opportunities by ensuring coherence and continuity of learning for ākonga, both over the years and across settings. You can do this in your school, kura, Kāhui Ako, cluster, or early childhood centre (your setting).

The Coherent Pathways Tool helps you think strategically about the pathways your setting offers. It is designed to help you identify the learning focuses and capabilities your community believes are too important to leave to chance. You can specify what these should look at critical transition points.

This tool provides transition vision statements that you can consider, replace and/or extend. It also provides facilitation ideas to help you discuss, capture and share the ākonga capabilities that support your setting's vision.



Why capture your vision for ākonga at key transitions?

Transition vision statements capture your vision for what ākonga should know and be able to do at key transitions in their learning. They can act as beacons, lighting up the learning path and providing a source of guidance and inspiration to all who support learning. When viewed together, these statements provide a focus on the whole child and signal the breadth, depth and complexity of the learning experiences that ākonga will engage with as they progress along their learning pathways.

Transition vision statements can:

- help shape the collaborative design and implementation of rich learning opportunities that support learning continuity for ākonga
- provide ākonga and all who support their learning — teachers, parents, whānau, the setting and the wider community — with a clear, shared view of important markers of learning progress
- help ākonga see where they have come from, where they are going to and some of the learning they can look forward to.

Transition vision statements can help settings to evaluate the pedagogical quality and richness of the learning opportunities they offer. They provide a context for setting leaders to reflect on and respond to important questions, such as:

- How rich are the learning opportunities we design?
- How effective are our collective teaching practices?
- How ambitious are our teaching practices?
- How can we work better with each other across transitions at each phase of learning?

What are capabilities?

Capabilities foreground the learning dispositions, competencies (including literacy and numeracy skills) and wider disciplinary knowledge that you consider to be critical for your learner cohorts at key points on their learning pathway. They remix aspects of all the key competencies and weave them together with the important knowledge and skills (including literacy and numeracy skills) that are articulated in each of the eight learning areas. They also help teachers to focus on ākonga dispositions to act in ways that support them to achieve success in their learning and be critical, informed and responsible citizens.

Typically, capabilities bring together:

- concepts or big ideas (from one or more learning areas)
- appropriate aspects of all the key competencies (including the specific language, symbols and texts of the learning area)
- values and learning dispositions.

The 'transition to school' statements are based on *Te Whāriki* (2017). The rest of the statements are based upon the *New Zealand Curriculum* (2007). They highlight four types of capability that ākonga develop within the context of the eight learning areas.

Beginning with the *After three years at school* transition, four types of capability are highlighted:

1. **Making meaning in discipline-specific ways (MM)**
2. **Critical inquiry (CI)**
3. **Perspective taking (PT)**
4. **Taking action (TA)**

You can find further explanation about these capabilities in: Appendix: Weaving the coherent curriculum: how the idea of 'capabilities' can help - By Rosemary Hipkins

These four types of capability have been highlighted because they are important in all learning areas. They require students to draw on clearly identifiable aspects of at least two or three key competencies. They bring the intent or purpose of each learning area to life by focusing on important learning area outcomes. The highlighted capabilities can be taught and practiced, and all students can build and strengthen them.

How many transition statements should you develop?

You will make your own decisions about the number of transition vision statements you develop and the capabilities you choose to foreground at each transition. You will foreground the capabilities that your setting believes to be *critical for ākonga success and well-being* now and in the future.

This Curriculum Tool provides scaffolds for six possible transition points:

- transition to school
- after three years at school
- the end of year 6
- the end of year 8
- the end of year 10
- the transition from school to further study, work and citizenship.

Some communities may also choose to develop statements for particular ākonga cohorts, such as English language learners.

What do 'good' transition statements look like?

'Good' transition statements provide clear and easily understood pictures of key markers of learning as ākonga make their progress through schooling.

The statements are intended to:

- describe what the setting agrees is critical at each transition
- empower ākonga by 'unlocking' the next learning phase
- focus attention on what the learner can do and their attitudes and dispositions towards using their learning
- provide a focus for developing pedagogical practices and rich learning experiences
- provide a foundation for developing of assessment for learning practices
- provide a focus for ongoing inquiry, reflection and analysis across a Kāhui Ako.

The statements are more likely to achieve these goals if they:

- weave together key conceptual understandings, key competencies and values that draw on the essence statements of the New Zealand Curriculum (pages 17–33) to describe higher-level outcomes at each transition[1]
- are based on a range of evidence
- reflect the Principles (page 9) and Values (page 10) of the New Zealand Curriculum
- are written in clear language and supported by exemplars.

[1] Note that these higher-level outcomes are not simply achievement objectives.

Wānanga

You will already have a vision for your setting, and many of you will also have graduate profiles for ākonga. You may wish to begin by gathering this information in one place.

Before using this tool, there are some key strategic questions your Kāhui Ako leadership team may wish to consider. These include:

- How will it be resourced?
- Who will lead the work? Will an across-school teacher lead it? Will a team working together lead it?
- How will teachers work? Will they initially work horizontally (for example, teachers at specific transition points working together) or vertically (for example, teachers across the whole setting working together)? When will you bring the vertical and horizontal strands together?
- How will you communicate the importance of this work to other teachers?
- What review process will you use?
- What questions are important to explore and what evidence will you look for?

The graduate profile and transition pathways team might then convene a meeting to discuss:

- similarities and differences across your early childhood/school/kura profiles and vision statements
- what these similarities and differences might mean for the pathways your Kāhui Ako offers
- the transitions you might focus on to ensure continuity of learning across your Kāhui Ako.

The overarching focus statements for years 1–3, 4–6, 7–8, 9–10 and 11–13 may be a useful resource to draw on at this early stage.

You may choose to develop transition capability statements by learning area, by key transition, and/or by your strategic focus area.

Example plan: Developing transition statements for the end of year 8

Planning template	Activities	Materials and handouts

Index of activities

1) What do we know about our ākonga?	2) and 3) What are our aspirations for our ākonga?	4) Drafting year 8 transition capability statements

Index of materials and handouts

1) Background reading: About the Coherent Pathways Tool Why capture your vision for ākonga at key transitions? What are capabilities? What do 'good' transition statements look like?	2) Summary of New Zealand Curriculum learning area essence statements pages 16–33 NZC Summary of key competencies p12-13 NZC Appendix: Weaving the coherent curriculum: how the idea of 'capabilities' can help - By Rosemary Hipkins	3) Links to future skills articles Employability skills framework Top 10 skills for the future Drivers that will re-shape the workforce

1. What do we know about our ākonga?

Pre-meeting information gathering – individual work

Preparation:	Compile a contact list of all who will participate in this process. Consider including: • some of your key collaborators • all year 8 and year 9 teachers • some year 10 and 11 students • some parent/whānau representatives.
Send participants:	The background reading, "Why develop transition statements?" Some links to research and readings about future skills.
Ask year 8 teachers:	To record three or four things they want year 9 teachers to know about their ākonga as they leave year 8.
Ask year 9 teachers:	To record three or four things they want year 8 teachers to know about what's important for ākonga when they enter year 9.
Ask all teachers:	To ask ākonga three or four things they wish teachers knew about them and record these statements.
Ask year 10 and 11 students:	To record three or four things they wish they had known or been able to do when they started year 9.
Ask parents/whānau:	To record three or four things they want their children to know and be able to do when they start secondary school.

2. What are our aspirations for our ākonga?

Meeting 1 – whole team

Preparation:	Schedule a meeting and plan the process you will use to facilitate the meeting.
Introductions:	Ask each person to introduce themselves and share something that was important to them at the end of year 8.
Ask each participant:	To reflect on the three or four statements they have brought and write them on Post-it notes, ready for sharing with the group. Have them write each statement on a separate Post-it note.
Ask each participant:	To share their statements and post them on a wall or whiteboard, one at a time. As each participant adds their statements, ask them to begin grouping like statements together.
When all have shared, ask:	What do you notice? What are the commonalities across student – parent – teacher voices? What are the differences?
Provide each participant with some red, orange and green dots and ask them to:	Post green dots on statements they strongly agree with. Post orange dots on statements they are not sure about or have a question about. Post red dots on statements they disagree with.
Discuss as a group:	What do you notice about each set of dots? What patterns can you see? What can we agree on now, and what do we need to discuss further?
Following the meeting:	Write a draft summary of the meeting. Circulate the summary to the group for feedback.

3. What are New Zealand's aspirations for our ākonga?

Meeting 2 – whole team

Preparation:	Schedule a meeting and plan the process you will use to facilitate the meeting. Provide participants with a link to summaries of the curriculum essence statements and key competencies. Ask participants to bring any statements their individual schools may have already developed for year 8 students (for example, graduate profiles).
Begin by asking each participant:	What is your view about the summary statement from the previous meeting? For example, on a scale of 1–10, how comfortable do you feel with the statements we have written so far? Why?
Consider the question: "What does the New Zealand Curriculum say our ākonga are entitled to learn?"	Hand out the summaries of the curriculum essence statements and key competencies. Ask participants to state which area they are the most passionate about and which the least. Ask them to choose their least favourite area and give one reason why it should be included in the learning opportunities provided for ākonga.
In small groups:	Using the New Zealand Curriculum and/or Te Marautanga o Aotearoa, write 7–10 statements about what ākonga should know and be able to do at the end of year 8. Write each statement on a separate piece of paper.
As a whole group:	Share your statements and put all the statements you agree upon in a circle. Put those that need more discussion in a holding place outside the circle.

4. When the tool is complete, you will be able to log in to record and share your thinking

The tables on the following pages outline some ideas about what is most important at each transition. They will become digital templates that will offer you options to:

- accept any statement
- edit any statement
- construct your own statements
- automatically group your transition statements in different ways (for example, by learning area, by year level or by capabilities).

You will be able to:

- assemble your statements in one place
- publish and share your statements in a range of formats.

Over time, it will be useful to develop and publish exemplars to support your transition statements.

Transition vision statements you can edit

Transition from ECE to school[2]

Tū mai e moko. Te whakaata o ō mātua. Te moko o ō tīpuna.

Stand strong, O moko. The reflection of your parents. The blueprint of your ancestors.

Critical for future success	**Transition statements** Over time and with guidance and encouragement, children become increasingly capable of:
Well-being **Mana atua**	• Keeping themselves healthy and caring for themselves | te oranga nui • Managing themselves and expressing their feelings and needs | te whakahua whakaaro • Keeping themselves and others safe from harm | te noho haumaru
Belonging **Mana whenua**	• Making connections between people, places and things in their world | te waihanga hononga • Taking part in caring for this place | te manaaki i te taiao • Understanding how things work here and adapting to change | te mārama ki te āhua o ngā whakahaere me te mōhio ki te panoni • Showing respect for kaupapa, rules and the rights of others | te mahi whakaute
Contribution **Mana tangata**	• Treating others fairly and including them in play | te ngākau makuru • Recognising and appreciating their own ability to learn | te rangatiratanga • Using a range of strategies and skills to play and learn with others | te ngākau aroha
Communication **Mana reo**	• Using gesture and movement to express themselves | he kōrero ā-tinana • Enjoying hearing stories and retelling and creating them | he kōrero paki • Understanding oral language and using it for a range of purposes | he kōrero ā-waha • Enjoying hearing stories and retelling and creating them | he kōrero paki • Recognising print symbols and concepts and using them with enjoyment, meaning and purpose | he kōrero tuhituhi • Recognising mathematical symbols and concepts and using them with enjoyment, meaning and purpose | he kōrero pāngarau • Expressing their feelings and ideas using a range of materials and modes | he kōrero auaha

[2] The outcome statements for the transition from ECE to School are from *Te Whariki*, 2017.

Critical for future success	Transition statements Over time and with guidance and encouragement, children become increasingly capable of:
Exploration **Mana aotūroa**	• Playing, imagining, inventing and experimenting | te whakaaro me te tūhurahura i te pūtaiao • Moving confidently and challenging themselves physically | te wero ā-tinana • Using a range of strategies for reasoning and problem solving | te hīraurau hopanga • Making sense of their worlds by generating and refining working theories | te rangahau me te mātauranga

Focus for years 1–3

Making meaning

Ākonga in years 1–3 develop strong foundations in oral language, reading, writing and mathematics, all of which are critical for learning. They use their oral language to learn to read and write, as well as to engage in their everyday worlds. Ākonga in these years build their knowledge of new words and talk about their ideas using increasingly precise language. They build their understanding that numbers are abstract units that can be treated as wholes or partitioned to solve problems. They represent their ideas in a range of text forms, and create simple representations of their ideas and talk about these representations.

Critical inquiry

Ākonga in years 1–3 build a rich library of experiences across learning area disciplines and their experiences nurture their curiosity and questioning. They explore shapes and patterns and have many opportunities to respond to and create their own texts. Ākonga gather and interpret simple sets of information, which may involve measuring things. They develop working theories about how their local man-made, natural and social worlds work.

Perspective taking

Ākonga in years 1–3 work with others to build on and improve their ideas, including within digitally mediated contexts. With guidance, they use digital tools to create, manipulate, store, retrieve and share content.

Taking action

Ākonga in years 1–3 are developing patterns of behaviour, thinking, and interaction that strengthen their conceptions of themselves as social beings, as thinkers, as learners, and as contributors to their communities.

Capabilities after three years at school

He manu hou ahau; he pī ka rere.

I am a young bird; a chick just learning to fly.

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
English capabilities	• Confidently uses a range of processing and comprehension strategies to make meaning and think critically about texts that have several characters and more than one storyline (MM) • Draws on their developing knowledge of how texts work to make predictions about the text (MM) • Interprets ideas and information about plot, character, and theme that are directly stated or explicit in texts appropriate for year 3 students, drawing on ideas and information from their experiences and from other texts they have engaged with (CI) • Expresses opinions about characters and events in the text (PT) and is beginning to recognise the effects of specific language choices (MM) • Uses their understanding of language to create their own texts for specific purposes and audiences (TA), organising their texts according to a basic structure that meets their purpose for writing (MM)
Arts capabilities	• Understands and experiments with simple arts elements, media, tools and processes (MM) • Uses observation and imagination to design, create, and share ideas and emotions (CI) • Uses informal language to describe different purposes and contexts of art, music, dance and drama pursuits (MM) • Actively contributes to arts and design experiences (TA)
Health and Physical education capabilities	• Uses informal language to talk about different dimensions of hauora (MM) • Participates, cooperates, and competes in a variety of simple movement contexts (TA) • Can make 'if-then' statements about how some factors influence

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
	their own and others' well-being (CI) • Demonstrates āwhina (TA), helping, assisting, befriending (PT) and providing moral support to those in need (TA)
Te reo Māori capabilities	• Understands that te reo Māori has its own ways of saying and doing things (MM) and demonstrates these differences in simple, everyday practice (TA) • Is aware of and uses appropriate tikanga as applied to the classroom (TA) (for example, tuakana – teina relationships and manaakitanga towards each other and guests)
Learning languages capabilities	• Understands and uses familiar target language expressions and everyday vocabulary in familiar contexts (MM) • Understands that different languages and cultures have their own ways of saying and doing things (PT) and demonstrates some of these differences in simple, everyday practice (TA)
Mathematics capabilities	• Uses their understanding that numbers are abstract units that can be treated as wholes or partitioned and recombined to help solve addition and subtraction problems (for example, 7 + 6 can be thought of as 7 + 3 +3) (MM). • Continues and describes growing sequential spatial and number patterns (MM). • Estimates and measures using standard metric units (cm, m, kg and litre) and whole number scales (MM) • Notices and describes, using informal language, the features of shapes and simple transformations (MM) • Conducts statistical investigations that involve the collection, display and discussion of category and whole-number data in order to answer a simple investigative question posed by their teacher (CI)
Science capabilities	• Notices interesting objects, patterns and changes (CI) in the environments they encounter and makes detailed, focused observations using informal language (MM) • Shares their ideas about experiences, drawing on previous

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
	experiences to make sense of what they see and working with others to improve their ideas (PT)
Social sciences capabilities	• Identifies and talks about some of their own values (MM) • Investigates the ways (CI) in which different groups contribute to their local community (PT) • Talks about the different customs, traditions and values of people in their community (PT) • Tells stories about things that happened in the past and knows some of the ways people record the past (MM) • Shares their ideas about the way people impact on places (MM)
Technology capabilities	• Identifies some ways technological products are designed to help people in their community (PT). • Dismantles and reassembles technological products and shares their ideas about how the product works and the function of each element (CI) • Gives and follows simple step-by-step instructions needed to complete a task, identifies errors and corrects instructions (CI) • Uses digital tools to create, manipulate, store, retrieve and share content (with guidance) (MM)

Focus for years 4–6

Making meaning in discipline-specific ways

Ākonga in these years increasingly use their reading, writing and mathematics knowledge and skills to support their learning in other learning areas. At the same time, they continue to expand their knowledge and skills. They use a wide range of discipline-specific language and simple discipline-related conventions. They make thoughtful observations in reflective conversations using different disciplines as frames of reference. They use and personalise a range of tools to shape meaning and share their learning, identity, culture and ideas.

Critical inquiry

Ākonga ask focused questions, review material to make sense of it, and offer explanations about things. By asking and exploring questions about how the world works, they continue to expand their library of experiences in learning areas, including some in less familiar contexts. Some of these experiences necessitate deeper exploration, and this supports ākonga to develop an emergent but explicit knowledge of what each curriculum learning area is about.

Perspective taking

A growing awareness of who they are and what matters to them supports ākonga to build similar awareness of te ao Maori and different cultural practices and perspectives. ‘Cultures’ include different discipline areas, as well as other social cultures and bodies of knowledge. They chose modes of communication that convey their ideas to different audiences. They work with others to improve their ideas, building on others’ ideas, and changing their views when appropriate.

Ākonga take risks by stretching their learning into new and unfamiliar areas, accepting that making mistakes is part of learning. They pursue self-selected learning goals and participate in longer-term projects where they share and apply their learning with others, ako.

Taking action

Ākonga take action to promote their own well-being and that of others. They take part in a range of activities that draw on and continue to strengthen their school learning (for example, reading for leisure, physical activity, the arts, making technological products).

Capabilities at the end of year 6

Mahia ngā mahi kei tamariki ana.

Work energetically while young.

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
English capabilities	• Engages with texts (such as junior novels, poems and plays) that are appropriate for year 4–6 students (TA) and understands how these texts work (MM) • Makes and justifies inferences using information from throughout the text (CI) and can recognise when language is used for effect (for example, for creating images, humour, and mood) (MM) • Uses their knowledge of language and of overall text structures (MM) in the texts they create for literary purposes • Identifies the perspectives from which texts are created (PT), using this understanding and their growing awareness of purpose and audience when they create their own texts (TA)
Arts capabilities	• Selects, explores and applies arts elements, media, tools and processes to (CI) express personal ideas, tell stories and create new ideas for different purposes (TA) • Appreciates and shares considered responses to art forms represented by a variety of cultures and perspectives (PT) • Begins to use the formal language of the arts disciplines to explore and express their art creations and experiences (MM). • Understands, engages in and values the intrinsic nature of dance, drama, music and visual arts (TA)
Health and physical education	• Identifies own personal strengths and perspectives of well-being and acknowledges the alternative strengths and viewpoints of others (PT) • Participates in more complex movement, sequences and strategies in a range of situations (TA) • Uses critical thinking to develop strategies and (CI) take action to promote well-being for self and others (CI) • Takes collective and critical action (TA) to enhance the well-being of others in the kura or wider community • Recognises instances of discrimination and injustice (PT) and acts to support their own rights and feelings and those of other people (TA)
Te reo Māori	• Values and practises tikanga in the classroom (for example, ako,

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
capabilities	wānanga, whanaungatanga) (MM) • Makes connections between te reo and tikanga Māori and their own language and culture (CI) • Uses and responds to te reo inside and outside of the classroom (TA)
Learning languages capabilities	• Uses cultural and linguistic knowledge to understand and communicate personal and everyday ideas, information, wants and needs in target language (MM) • Understands and can explain known written/spoken target language conventions and cultural practices (CI) in relation to other known languages • Is open to learning about other people's perspectives, languages and cultures (PT)
Mathematics and statistics capabilities	• Uses knowledge of place value and additive partitioning (MM) to flexibly solve addition and subtraction problems and knows or can derive the basic multiplication and division facts • Connects elements of sequential patterns with their ordinal positions to solve problems (CI) • Measures the attributes of objects by selecting an appropriate measuring device and standard unit (MM) • Visualises three-dimensional shapes from different angles, and can use positional language with increasing precision (MM) • Conducts their own statistical investigations by posing summary-type investigative questions, collecting and displaying whole-number data appropriately and can communicate their findings in context (CI)
Science capabilities	• Uses some scientific ideas and data to (CI) build a convincing case in relation to a real issue (TA) • Develops questions (CI) that can be investigated in science (PT) and begins to use simple investigative methodologies (CI) • Makes observations and gathers data (CI) with the aim of shaping explanations for (MM) phenomena they have experienced and explored • Uses simple science conventions (symbols and texts) (MM)

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
Social sciences capabilities	• Explains and analyses their own and other people's values and the reasons for people's responses to social issues from a variety of perspectives (PT) • Explains how cultural practices vary (MM) (for example, how early Polynesian and British migration had a significant impact on the cultural practices of tangata whenua and other groups in New Zealand society, in the past and today) (CI) • Develops questions as the basis for (CI) investigating a social (TA) issue and discusses the strengths and weakness of their inquiry (CI) • Explains how and why people and institutions form rules and laws (MM).
Technology capabilities	• Uses design concepts and technological modelling to (CI) create some simple desired, feasible outcomes that address a real-world issue (TA) • Describes potential outcomes, orally and in writing, through drawing or through models (MM) • Develops and debugs a simple program that uses input, output, sequence and loops (CI) • Uses digital tools to create, combine, manipulate, store, retrieve and share digital content (MM) • Evaluates the quality of some simple technological outcomes in terms of their design (CI), their fitness for purpose and their impact on society and the environment (PT)

Focus for years 7–8

Making meaning in discipline-specific ways

Ākonga in years 7–8 are developing a clear understanding of the essence of each learning area. They are using their foundation reading, writing and mathematical skills to further develop an understanding of the nature of the various learning areas. Ākonga in these years articulate their purposes for reading and describe what they want to find out, generating and refining questions to help their inquiry. They draw information from a range of sources and they check the reliability of their sources. They write to communicate developed, thoughtful ideas for different purposes with effect. They can apply the properties of multiplication and division to strategically solve problems involving whole numbers, common fractions, decimals and fractions and with the use of appropriate methods and tools.

Critical inquiry

Ākonga in years 7–8 use the approaches, languages and conventions of the eight learning area disciplines with purposeful deliberation. They compare and contrast different ways of representing ideas, including increasingly abstract concepts. They identify how well different texts meet the purposes for which they have been constructed. They are open to critique of their own explanations and representations.

Ākonga in these years pose questions, design their own investigations in different disciplines and critique others' designs. They draw conclusions from observations, and can differentiate between observation and inference. They consider counterarguments and justify their own position by using evidence. They are becoming more precise in their explanations of phenomena, and their explanations explicitly draw on relevant ideas in each discipline.

Perspective taking

Ākonga in years 7–8 are increasingly aware that there might not be one 'right' answer to things. They know that different disciplines support questions about the world from different perspectives. They are also increasingly aware of how languages and cultures shape meanings, and how values influence perspectives. Ākonga appreciate and celebrate multiple forms of diversity and show respect for the rights and values of others. They act appropriately in contexts where Māori protocols are important. They express their desire to engage in mahi ā-ngākau (work of the heart).

Taking action

Ākonga in years 7–8 are open and responsive to the ideas of others and collaboratively explore ideas to solve problems, understanding that more can be achieved collectively. They use their growing disciplinary knowledge to ask questions and seek answers from a range of sources to help solve real-life problems. These authentic problems require them to engage with increasingly complex frameworks, tasks and texts. They are becoming more systematic in analysing their mistakes and designing ways to fix them.

Capabilities at the end of year 8

Tama tū, tama ora

An active person will remain healthy

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
English capabilities	• Engages with age-appropriate fiction and non-fiction texts in a range of modalities (TA) • Confidently uses their skills to interpret abstract ideas, sophisticated themes and complex plots (CI) • Integrates information from different parts of a text (MM) to make inferences about plot, character and theme (PT) • Comments critically about the overall impact of the text (MM) • Identifies how language and ideas have been used to create mood or build tension, and draws on this knowledge when selecting vocabulary, visual and written language features (such as rhetorical questions and metaphors) to create their own literary texts (MM) • Chooses a clear and logical text structure (CI) to meet the requirements of their writing purpose (PT)
Arts capabilities	• Selects tools, media and processes with intent, developing their technique to express feelings, identities and artistic ideas (TA) • Uses design processes to explore, test and revisit ideas to design artistic creations and experiences (CI) • Investigates the purposes of the arts to celebrate and embody cultural expression in both the past and present (CI) • Appreciates and describes different ways in which abstract ideas and sophisticated themes can be communicated and interpreted (MM) in their own and others' works (PT)
Health and physical education capabilities	• Understands and can describe a range of strategies and actions they can draw on to (CI) promote the well-being of themselves and others (TA) • Effectively uses physical and interpersonal skills and strategies in a range of movement contexts (TA) • Questions and challenges their own and other people's decisions in a way that shows an appreciation of the factors that shape choices (PT) • Identifies specific school and community needs (CI) and describes ways to bring about change at an individual and collective level (TA)

Te reo Māori capabilities	• Understands and communicates in te reo Māori in familiar, routine situations and contexts (TA) • Uses second language learning strategies to avoid communication breakdowns (for example: embedding English words in simple Māori sentences; transliterating English words; using dictionaries and other references) (PT) • Understands and explains ways in which te reo and tikanga are organised for different purposes (MM) • Acts appropriately to show respect for Māori protocols (for example, school pōwhiri) and other cultures represented in their communities (TA)
Learning languages capabilities	• Uses knowledge of target language and culture to understand and construct simple texts that describe aspects of their own background and immediate environment (MM) • Understands, uses and explains ways in which target language and culture are organised for different purposes (MM)
Mathematics and statistics capabilities	• Applies the properties of multiplication and division to strategically solve problems involving whole numbers, common fractions, decimals and fractions (MM) • Selects appropriate methods and tools for calculation from mental computation, estimation, calculators, algorithms and pen and paper (MM) • Forms and solves simple linear equations (MM) • Estimates, accurately measures and calculates quantities (for example, angles, perimeter, surface area, volume) using measuring tools and simple formulae (TA) • Uses their knowledge of the properties and classes of shapes and transformations (CI) to solve problems • Reasons and justifies their solutions using formal geometric language in a clear and precise way (MM) • Poses appropriate questions for investigation (CI) • Collects, represents, summarises and interprets a range of types of data, including simple measures of centre and spread (CI)
Science capabilities	• Understands some of the practices that scientists use to obtain reliable and valid data (TA), including controlling variables, making careful measurements, conducting multiple trials and seeking peer review, and uses these practices to design and carry out their own investigations and to critique those of others (CI) • Constructs and interprets a range of representations of science ideas (for example, diagrams, models, tables, and graphs) (MM) • Open to critique of own explanations and representations, considers counterarguments, and justifies own position by using evidence (CI)

	• Draws on their growing science knowledge (MM), and other relevant perspectives, to engage with socio-scientific issues (TA)
Social sciences capabilities	• Uses a social inquiry framework to investigate primary and secondary sources to explore a social issue (CI) • Processes information using appropriate social science conventions (MM) showing their knowledge of a range of values and perspectives (PT) • Analyses forms of leadership in communities and how these play out in different places during challenging times (such as after a disaster) (CI) • Analyses and evaluates reasons for people's responses to social issues, exploring a variety of perspectives (PT) • Understands how producers and consumers exercise their rights, meet their responsibilities and develop innovative economic opportunities (MM) • Recognises what bicultural New Zealand means and the importance of te reo Māori as a taonga in the Treaty (MM) • Shows awareness and appreciation of ways different cultures, past and present, use a variety of tools, techniques and processes to express their culture, identity, beliefs and histories (MM) • Engages in historical inquiry by analysing culture and heritage and why societies preserve the past (CI)
Technology capabilities	• Communicates, using specialised language and drawings, and material-related details that allow others to create a product or outcome that meets both technical and acceptability specifications (MM) • Creates and systematically debugs programs that use inputs, outputs, sequencing, loops and basic selection using comparative operators (CI) • Evaluates the best tools/techniques to use to solve a problem in a digital and non-digital environment (CI) • Applies knowledge of design concepts and technological modelling to create desired, feasible outcomes that resolve current and future-focused real world issues (MM)

Focus for years 9–10

Making meaning in discipline-specific ways

Ākonga in years 9–10 show sustained engagement in the process of generating, inquiring into, testing and refining their ideas. They can access and use expanding repertoires of conceptual knowledge from the different learning areas and build connections between related concepts, both within and across the learning area disciplines.

Ākonga draw on disciplinary approaches, languages and conventions to solve a range of problems in flexible ways. They can apply specific conventions in projects and inquiries that require a multidisciplinary approach. They can adopt different social perspectives when addressing issues.

Critical inquiry

Ākonga can identify patterns and trends across their learning experiences and within and between disciplines. They are systematic and accurate in carrying out their own investigations and inquiries, drawing on the inquiry practices of the relevant discipline(s). Ākonga in these years carefully evaluate any sources of data and information they use, demonstrating their awareness of why some sources are more reliable than others. They use language (for example, ‘could be’, ‘perhaps’) to demonstrate their awareness of the tentative nature of claims, and they are willing to suspend judgment when they do not have sufficient evidence.

Perspective taking

Ākonga are willing to engage in critical dialogue with others to improve their learning. They listen respectfully to other people’s views, build on and critique their ideas, and are willing to change their ideas in the light of new evidence.

Taking action

Ākonga are increasingly active citizens (readers, creators, consumers, problem solvers and thinkers). They explore issues in ways that support them to appreciate complexity and they think about issues in systems terms, and develop strategies to synthesise information across learning areas. These experiences help them to develop an understanding of risk and how it is managed in different disciplines. They display a sense of personal and collective responsibility for taking action on issues that concern them and are able to cope with a degree of uncertainty.

Capabilities at the end of year 10

Whāia te iti kahurangi; ki te tūohu koe me he maunga teitei.

Seek what you value most dearly; if you falter, let it be to a lofty mountain.

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
English capabilities	• Reads and analyses increasingly sophisticated texts (TA), including fiction and non-fiction, poetry, film, drama and visual images, and draws out and describes thematic significances (CI) and authorial techniques and purposes • Understands that a text can be interpreted at multiple levels (MM) • Evaluates the cultural, historical or social significance of a text (CI) • Is willing and able to independently select texts and resources that are relevant to their interests and capabilities, and engages with these texts flexibly, in ways that are appropriate to their purpose (TA) • Synthesises information within and across texts and makes inferences to support their meaning-making (CI) • Understands how the language and structure of a text is used for specific purposes (MM), recognising different perspectives and differences in voice and style (PT), and uses this understanding when they create their own texts (TA) • Creates a range of texts – fiction, non-fiction, oral, visual (TA) – using the literary, oratorical and/or visual techniques appropriate to the medium (MM)
Arts capabilities	• Selectively manipulates a range of tools and techniques while developing (CI) confidence and competence in arts making (MM) • Generates and refines ideas using appropriate arts elements and conventions, recognising different perspectives and differences in voice and style in a range of art works and outcomes (PT) • Works confidently with abstract ideas and concepts to (MM) experiment and test arts ideas in new and innovative ways (CI) • Uses the language of the arts disciplines to critically explore creative ideas and are open to having their own ideas challenged (MM)
Health and physical education capabilities	• Can identify, describe and share information about how a range of interconnected factors (including whenua and the environment) impact on their own well-being and that of other people (CI) • Takes purposeful, critical action to assist others to participate in a range

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
	of movement contexts (TA) • Understands aspects of te ao Māori that relate to health and movement contexts (for example: ngā mahi ā-rēhia – Māori recreational and leisure activities; rongoā Māori – Māori medicine) (MM) • Investigates socio-cultural influences on the well-being of communities (PT) and takes collective action to enhance other people's well-being (TA) • Reflects on own values, attitudes, behaviours and actions in health-related and movement-related contexts, recognising different perspectives and different voices in their school, community, and around the globe (PT)
Te reo Māori capabilities	• Shows growing confidence to use te reo Māori for different purposes, audiences and contexts (TA) • Understands and uses the grammatical functions of te reo (CI)
Learning languages capabilities	• Understands the place they inhabit as language learners between known languages and cultures and the target language and culture (PT) • Uses knowledge of target language and culture to communicate (MM) beyond the immediate context, including past and future (PT) • Understands and produces a variety of texts in target language (TA)
Mathematics and statistics capabilities	For those on track for NCEA Level 3 mathematics and statistics) • Uses proportional thinking (MM) to solve real problems (TA) involving percentages, rates, and ratios and can explain the reasonableness of their solution (CI) • Uses algebraic notation and graphs to (MM) represent relationships between variables (CI) and applies these to model situations and solve problems (TA) • Understands and uses scale factors, the angle properties of polygons and trigonometric approaches (CI) to solve real-world problems (TA) • Recognises the complexity of the attribute being measured (MM) and uses correct units with appropriate levels of precision. (CI) • Solves measurement problems by applying formulae, and using measurement ratios and trigonometric approaches appropriately (CI) • Poses investigative questions about a wider population (PT). Collects samples of multivariate data and analyses these using displays to

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
	identify patterns within, between and beyond the data (CI). Generalises in context, communicates findings using appropriate displays, and acknowledges reasons for variation ● Critically examines and evaluates the process and results of others' statistical investigations (PT) and can understand and explain why statistical investigations are presented in particular ways (MM) ● Investigates chance situations by making connections between experimental results and theoretical models (CI) Numeracy (for those on track to meet the numeracy demands of NCEA in subjects excluding mathematics and statistics) ● Applies number sense (MM) to problems (TA) that involve the use of whole numbers, decimals, fractions, percentages and familiar rates and ratios (CI) ● Collects, represents, summarises and interprets a range of types of data in a variety of ways, including simple measures of centre and spread (CI) ● Estimates, accurately measures and calculates quantities using measuring instruments and simple formulae and can convert between metric units (CI)
Science capabilities	● Understands that science concepts are based on empirical evidence and can change over time (PT) ● Outlines how knowledge-building processes in science differ from those in other discipline areas (MM), and uses these differences to identify questions that science can answer and those it cannot (PT) ● Identifies when evidence supports a specific claim and is aware of the importance of disconfirming evidence and of confirmation bias (CI) ● Uses science conventions in appropriate ways and communicates science ideas and arguments using precise, unambiguous language that includes appropriate science vocabulary (MM) ● Constructs a range of text types that include representations such as models, diagrams, flow charts and tables and graphs (MM) that are organised in ways that show patterns in their data (CI) ● Investigates and responds to more complex socio-scientific issues (TA), drawing on different disciplinary perspectives as appropriate to the dimensions of the issue (PT)

Critical for future success	Capabilities **Making meaning in discipline-specific ways (MM)** **Critical inquiry (CI)** **Perspective taking (PT)** **Taking action (TA)**
Social sciences capabilities	• Independently develops a framework for a social inquiry and investigates (TA) primary and secondary sources (MM) • Investigates and explains ideas, actions and processes of decision-making – both historic and contemporary (CI) – and the impact of migration patterns and cultural interaction upon tangata whenua and others (PT) • Understands the contested nature of the concept of sustainability and how people's decision-making (MM) and innovative practices have different outcomes for people and environments (PT) • Processes information using appropriate social science conventions (MM) and evaluates the strengths, weaknesses and biases of their social inquiry (CI) • Forms generalisations about human society and analyses and evaluates a range of values and perspectives, recognising the contested nature of these (PT) • Analyses and evaluates reasons for people's responses to social issues from a range of perspectives (PT) • Understands systems of government and can evaluate differing systems by comparing them with New Zealand's, considering what this means for the human rights of individuals and groups (CI)
Technology capabilities	• Demonstrates critical, reflective and creative thinking as they evaluate and critique technological outcomes in terms of the quality of their design, the design's fitness for purpose and its potential impact on societies and the environment (CI) • Skillfully applies (TA) their growing knowledge of design concepts and technological modelling (MM) to create desired, feasible outcomes that resolve current and future-focused real world issues (TA) • Understands how people's perception of technology influences their acceptance of it and impacts on future technological development (PT) • Creates and documents programs that use inputs, outputs, sequencing, loops, variables of different data types and selection using comparative and logical operators (CI) • Uses an organised approach for testing and debugging programs (CI)

Focus for years 11–13

Ākonga in years 11–13 are focused on gaining useful qualifications. They are pursuing learning pathways that enable them to appreciate and keep open a range of options for future study and work. These include pathways available across and/or outside learning areas and pathways offered via secondary-tertiary partnerships.

Transition to adult citizenship, work and further study

Māu anō e rapu he orange.

Your livelihood is in your hands.

Critical for future success	Transition capabilities
Confident **Tū pakari**	• Adaptable and flexible in new and changing situations • Handles challenges and setbacks and does not give up • Thinks about consequences before acting • Recognises when it is necessary to seek advice • Confident, critical, well-informed citizen of their community, Aotearoa and the world • Recognises the special place of Māori language and culture in Aotearoa and firm in their own identity, language and culture • Positive 'can do' attitude and confident to embark on a journey to become the best person they are capable of being
Connected **Whanaungatanga**	• Willing to work hard towards goals and rewarding to work with • Socially and emotionally resilient, with a hopeful outlook • Understands aspects of the world of work • Supports and is supported by a range of networks • Understands and reflects on the way they communicate and how it affects others • Shows understanding of and empathy towards diverse people, languages and cultural practices and works well with people of different genders, cultures or beliefs • Shares ideas appropriately and asks questions when unclear • Able to seek support and help when needed • Recognises, accepts and learns from mistakes
Actively involved **Hauora**	• Works sequentially, using effective strategies to research and problem solve ideas, both independently and collaboratively • Recognises problems and uses initiative to find solutions • Identifies and assesses options before making a decision • Contributes to developing new ideas or approaches • Proactive in building their future and that of others • Acts on new learning

Critical for future success	Transition capabilities
	• Takes critical action, both independently and collectively • Addresses issues of inequity
Lifelong learner **Ākonga taumano**	• Knows self as a learner and has a deep understanding of personal strengths and capabilities to learn • Literate, numerate, creative and empathic • Broad and deep knowledge base • Critically evaluates opportunities • Looks for opportunities to work more effectively to make things better • Accepts advice and learns from feedback • Autonomous in their decisions and actions • Appreciates creative and cultural expressions of self and others • Confident to actively participate in and contribute to diverse opportunities in the community • Has a growing vision for their further learning and development • Interested in caring for the environment

Appendix: Weaving the coherent curriculum: how the idea of 'capabilities' can help - By Rosemary Hipkins

New Zealand Council for Educational Research

The big-picture vision of the New Zealand Curriculum says it is important to foster *students' dispositions to learn* and to contribute as *active members of society*. The key competencies directly support this vision. NZC describes them as "capabilities for living and lifelong learning" (p.12). Key competencies direct attention to students' ability to *do something* with the concepts they learn (from across all the learning areas). They help teachers think about *purposes for learning* – what it is important the students are *able to do* as a result of their learning.

The essence of each learning area (NZC, p.17) is a succinct statement to guide thinking about purposes for learning. In turn, this thinking should influence the way key competencies are woven together with curriculum content. The design of rich tasks allows this weaving to occur. When teachers design rich tasks, they bring together:

- concepts or big ideas (from one or more learning areas)
- appropriate aspects of all the key competencies (including the specific language, symbols and texts of the learning area).

Rich tasks include a conceptual focus and a 'doing' focus that draws on aspects of *all* the key competencies. However, it is hard to focus the intended learning if we just say every key competency is in play. This is where the idea of capabilities can help. A 'capability' is demonstrated in action. It is what the student shows they can do – and is willing to do – as a result of their learning. Capabilities *remix* aspects of all the key competencies and weave them together with important knowledge and skills.

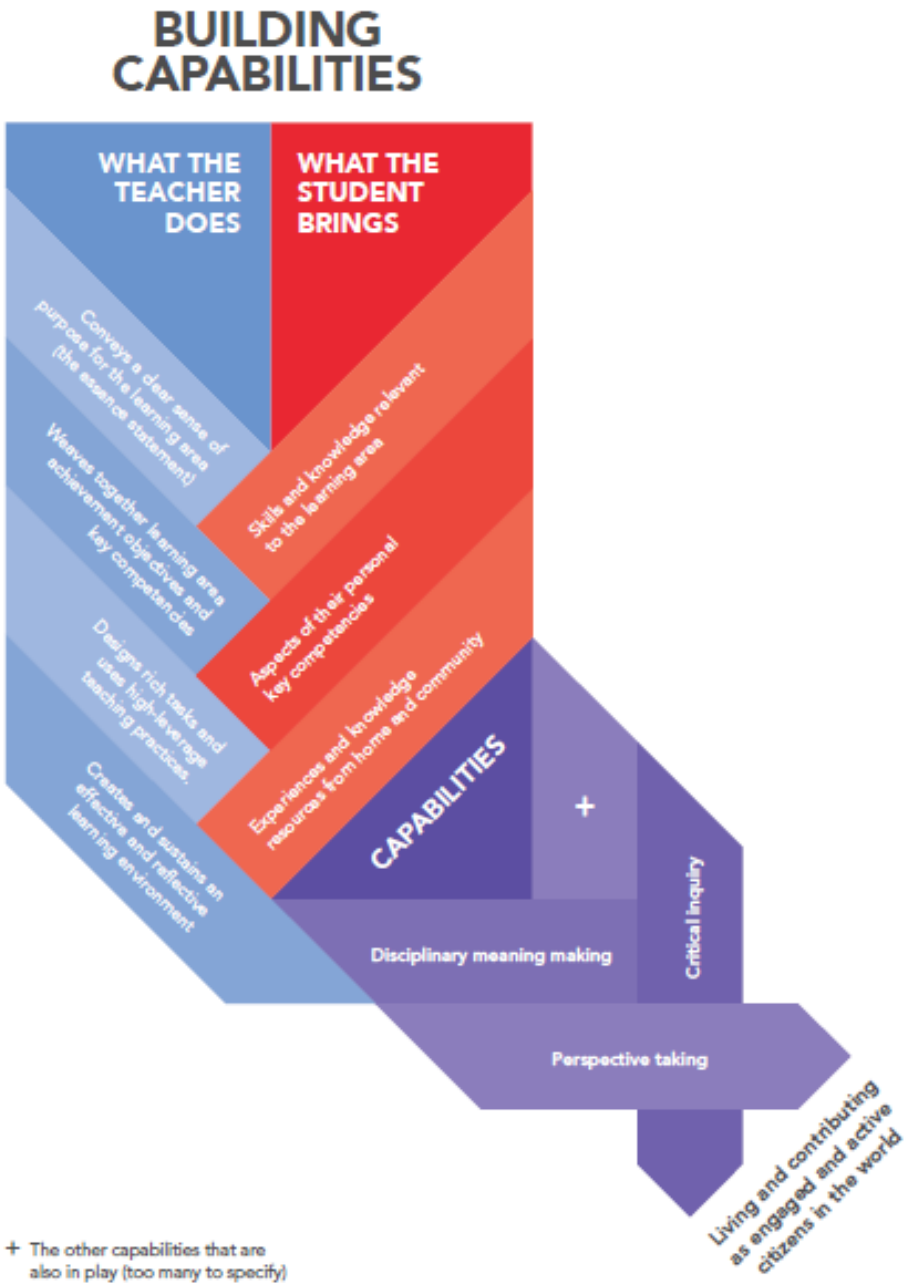
Our aim is for learners to become capable in many different areas of their lives and their learning. There are so many important capabilities that we could never name and explicitly develop them all. Again, some focus is needed. A small number of really important capabilities is more likely to be kept 'in teachers' heads' as a guide for classroom actions and pedagogical choices.

The three types of capabilities shown in the diagram below and outlined in this paper have been chosen because they:

- are important in all the learning areas
- require students to draw on clearly identifiable aspects of at least two or three key competencies
- bring the intent or purpose of the learning area to life by focusing on important learning area outcomes
- help teachers to focus on students' dispositions to act in ways that allow them achieve success in their learning and that support students to be critical, informed and responsible citizens

- can be taught and practised (all students can build and strengthen them).

When rich tasks are designed in ways that support the development of one or more capabilities, teachers and students understand why this learning is important right now, as well as for the future. In this way, students can extract dual value from their learning experiences (that is, learning for now and learning for the future). The Building Capabilities diagram below summarises how capabilities can help to support the weaving of key competencies into the enacted curriculum.



Building capabilities: weaving what the teacher does and what the student brings

The capability of perspective-taking

'Perspective-taking' refers to the ability to 'see' an idea, action or challenge from the perspective of one or more other people. It links most directly to the New Zealand Curriculum key competency of relating to others. However, it also has strong links to critical thinking and critical literacy. In an earlier project called Key Competencies and Effective Pedagogy, this emerged as an important component of many rich learning tasks.[3]

Capable perspective-takers can put their own thoughts and feelings to one side, so that they can consider a challenge, situation, or action sequence from a different point of view. In this way, perspective-taking requires self-discipline (an aspect of managing self) and awareness of one's own thinking (that is, metacognitive reflection). If the perspective in question is that of another person or group, it also requires the ability and willingness to put yourself in another's shoes (an aspect of relating to others).

Our perspectives are culturally framed and grounded in our shared values. This is one reason that different people might interpret the same situation in different ways. Awareness that values or cultural perspectives can differ, or that there are discipline-specific ways of making knowledge claims, are just some of the ways students might draw on their own and other's funds of knowledge for critical and considered perspective-taking.

Effective collaboration also requires individuals to contribute in considered ways. Each person needs to be able to take the perspective of others in a group when shaping their responses. They need to think critically about which aspects of their own knowledge and skills will contribute productively to the group's agenda. In this way, perspective-taking brings together aspects of managing self, relating to others and participating and contributing.

Perspective-taking has been shown to be essential to understanding complex issues in our world. Again, doing so contributes to building and strengthening the key competency of participating and contributing. It supports the New Zealand Curriculum vision of educating our young people to be and become actively engaged members of society.

The scope of perspective-taking

Empathy and perspective-taking are closely related concepts. Some people see perspective-taking as a sub-set of empathy. Others see them as overlapping concepts, with both similarities and differences. The most important thing to note is the *emotional* dimension that empathy brings to perspective-taking. Perspective-taking

[3] http://nzcurriculum.tki.org.nz/Key-competencies/Key-competencies-and-effective-pedagogy/Insights-into-the-key-competencies. Note that here the term used is "the challenge of walking in others' shoes."

requires critical thinking, but to this it adds awareness of *feelings*. This is one reason to focus on it as a capability in its own right.[4]

Perspective-taking across the curriculum

It is obvious that perspective-taking is an important *social* capability (for example, for making and keeping friends, or working within different groups). However, it is also integral to a range of *learning* challenges. The following examples are just a few of the many ways in which perspective-taking underpins successful learning:

- writing for a specific audience and/or purpose
- exploring an author's ideas and agenda in a literary text (and understanding why different readers might infer different things from this text)
- appreciating differences in how people understand the world (for example, people in the past; people in different societies and cultures today; scientific versus everyday ways of explaining events)
- employing design processes to achieve a product or technological solution that meets a specific user's need
- understanding why people might hold different points of view on an issue (or place, event, activity, way of communicating.)
- considering what has been included and what has been overlooked when an inquiry was designed (for example, a social inquiry, or a statistical inquiry).

Developing perspective taking

The research literature provides some guidance about the stages young learners go through as they get better at perspective-taking:[5]

- Very young children are not able to clearly differentiate between social (intentional) perspectives of self and others.
- As they develop, children come to understand that other people have their own subjective thoughts and feelings. However, they think that different perspectives come from different information.
- During middle childhood, most children learn to reflect on how another person might see them. By now, they can take another person's point of view.
- It's a step up again for the student to be able to reflect on how a third person might view them and, at the same time, how that third person might view another person different from them. This stage is associated with preadolescence.

[4] This short discussion explains why perspective-taking is an essential capability for every child, and provides some simple tips for supporting its development: https://www.psychologytoday.com/blog/the-parents-we-mean-be/201007/how-do-we-help-children-take-other-perspectives-conversation

[5] The following article provides a useful short overview of perspective-taking, its relationship to empathy, and its developmental stages: http://www.education.com/reference/article/learning-perspective-taking/

- As they mature, many students develop the ability to reflect on ways society might influence individuals' perspectives. While this stage is associated with adolescence, some adults cannot do this.[6]

These broad developmental stages interact with conceptual growth in the learning areas. Some research has recently begun to describe patterns of progress in a specific perspective-taking context. One example is social inquiry, where conceptual understanding of how and why people hold differing values is integral to developing more nuanced and insightful perspective-taking.

Making-meaning in discipline-specific ways

Making meaning in discipline-specific ways requires students to take the 'perspective' of the discipline (for example, to think like a scientist, mathematician or literary critic). This is a complex and multifaceted type of capability. It is most closely related to the key competency of using languages, symbols and texts. Students also need to think critically as they work with the various texts of a specific discipline area. This type of capability is essential for accessing the ideas of others, as well as expressing understanding and ideas, and creating ideas.

Each discipline area has its own specific ways of conveying meanings. These are sometimes called its 'discourses'. The New Zealand Curriculum specifically mentions the key role these play in learning:

> *Each learning area has its own language or languages. As students discover how to use them, they find they are able to think in different ways, access new areas of knowledge, and see their world from new perspectives. (Ministry of Education, 2007a, p. 16)*

As students learn to use these languages (or discourses) teachers might encourage them by saying they are 'reasoning like statisticians', 'thinking like historians', 'investigating like scientists', and so on.

There are close links between discipline-specific meaning-making and critical thinking. For example, drawing inferences from different types of texts requires an understanding of the disciplinary practices used to create the texts. Another example might entail understanding the types of claims that can count as evidence in different learning areas.

The scope of disciplinary meaning-making

Many people think of using language, symbols and texts as the 'literacy and numeracy' key competency. These are important foundational areas of the curriculum but there is much more to this key competency than simply building the basics of literacy and numeracy:

[6] For more detail see Kahn, S. & Zeidler, D. (2016). Using our heads and HARTSS: Developing perspective-taking skills for socioscientific reasoning. *Journal of Science Teacher Education, 27*: 261. doi:10.1007/s10972-016-9458-3. (Note: HARTSS stands for Humanities, Arts and Social Sciences.)

- *Literacy across the curriculum* is about the ways we make sense of texts that convey information about knowledge generated by the various disciplines. In other words, literacy across the curriculum focuses on supporting students to unpack and understand written texts that convey information and ideas.
- *Disciplinary literacy* is the term used when we talk about the specific types of meaning–making in a discipline area. Different disciplines have their own specialist vocabulary and sometimes common words have a different (usually more precise) meaning when they are used in a specific disciplinary context. 'Theory' is such a word. In everyday life, we say, "I have a theory" when we mean a guess or ad hoc working hypothesis. For a scientist, a theory is the best explanation for a specific phenomenon, supported by a body of evidence, and true for all the contexts in which it has been applied. Such a theory will only change if a whole new way of understanding the phenomenon being investigated opens up.

There is also much more to disciplinary meaning-making than the words used or the way they are assembled (that is, the grammar of the written texts of a discipline). All the following aspects of meaning-making can have discipline-specific differences:

- conventions for organising data (for example, graphs and tables)
- how 'models' of reality are created and used as thinking supports (for example, actual models, diagrams, maps, plans, metaphors)
- how visual images are constructed (for example, how colour, perspective and symbolism are used to convey meaning in literary texts)
- what symbols convey, and who says so. (For example, the ways arrows are used can have very different meanings in different disciplinary contexts, and even sometimes within the same broad discipline area. An arrow on a food chain means something quite different to an arrow on a light ray diagram, but both come under the science umbrella.)

In some discipline areas, body language is important for communicating meaning – dance and drama are obvious examples. Sometimes conventions for how gestures are used convey specific meanings non-verbally. As well as in the arts, control of games and physical activities often involve this sort of meaning-making.

Simulations, 3D visualisations and other types of multimodal texts are further examples of texts that require complex meaning-making capabilities.

Developing disciplinary meaning-making

A retrospective analysis of students' meaning-making capabilities was recently carried out, drawing on selected National Monitoring Study of Student Achievement (NMSSA) assessments in mathematics, science, and English: Viewing.[7] The analysis made it evident that each of these disciplines has its own epistemic practices.[8] (The term 'epistemic practices' refers to how practitioners in a discipline build and justify new knowledge and shape and convey their ideas).

Because each of the three inquiries has its own distinct mix of practices, it is difficult to draw broad generalisations about students' meaning-making capabilities across the learning areas. However, despite this limitation, it is possible to make an important generic statement about how students make progress between year 4 and year 8. At year 4, they are still mainly drawing on everyday practices for meaning-making. By year 8, they are expected to be able to use an expanding repertoire of specific meaning-making practices relevant to each discipline. Students who have not demonstrated expected progress against the levels in the New Zealand Curriculum are less likely to have a grasp of these meaning-making practices than those who have made expected progress.

One implication that might be drawn from this pattern is that some students are not explicitly learning about specific meaning-making practices and have not successfully picked these up by indirect signals (for example, through observing how other people use these types of practices). Not knowing how to use disciplinary meaning-making practices appears to hamper students' overall achievement. Yet the actual practices outlined in reports of these analyses are not especially difficult. They could be readily learned if more teachers were more aware of their scope and importance.

[7] The reports are pending and will be released as a set.

[8] The term 'epistemic practices' refers to how practitioners in a discipline build and justify new knowledge and shape and convey their ideas.

Capabilities for critical inquiry

Critical inquiry demands both critical and creative thinking. It includes activities such as gathering and interpreting data; using evidence to support ideas; and critiquing evidence.[9] Critical inquiry helps build students' awareness of how new knowledge claims are made and justified. Different discipline areas have their own specific inquiry practices so it is important that students experience critical inquiry in a range of learning areas. Inquiry capabilities are cross-cutting with perspective-taking and disciplinary meaning-making. Any rich inquiry will require students to draw on their capabilities in these aspects, and hence on all their key competencies.

Inquiry capabilities support students to learn how knowledge is made in different learning areas. For example, when students gather and interpret data like an historian, they learn about the important practices of *historical thinking*. When working with historical sources, historians think critically about *when* a source was produced, *who* wrote it, and for *what* purpose.[10] By contrast, when students gather and interpret data in a science investigation, they learn about the importance of carefully controlling variables, so that a convincing explanation can be made. They also learn how core concepts and theories of science guide the investigation plan and the way data are interpreted.[11]

Supporting their ideas with evidence is another aspect of critical inquiry that plays out somewhat differently according to the 'rules' about what counts as evidence in a specific discipline area. When students are asked to think like literary critics in English, they look for specific passages of text that support their interpretation and justify their argument by drawing on established literary conventions.[12] When they are working like statisticians, they carefully gather and organise quantitative data following established statistical processes (such as those that account for variability in sampling), then use this data to make claims that they can support with evidence.[13]

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[9] These are the titles given to the first three of the science capabilities that were developed to help weave the parts of the science curriculum together with the key competencies: http://scienceonline.tki.org.nz/Science-capabilities-for-citizenship/Introducing-five-science-capabilities

[10] For an example of a New Zealand secondary teachers' curriculum design work, see http://historicalthinking.ca/blog/558
Many inquiry examples can be found at https://beyondthebubble.stanford.edu/our-approach The sources here are all American but the ideas could be readily adapted.

[11] A set of eight *science practices* was recently developed for the Common Core Standards in the USA. In this short article, well-known science educator Rodger Bybee compares and contrasts science and engineering practices. The engineering versions are similar to what we might call a technological inquiry in New Zealand: http://nstahosted.org/pdfs/ngss/resources/201112_framework-bybee.pdf

[12] At the primary school level, this report gives something of the flavour of this type of activity. Note that this research was carried out before the development of the idea of capabilities: http://www.nzcer.org.nz/research/publications/lifelong-literacy-integration-key-competencies-and-reading

[13] This website outlines progression in statistical thinking from Level 1 to level 8 of the New Zealand Curriculum. Explicitly supporting claims with evidence first appears in the description for level 3: http://new.censusatschool.org.nz/key-ideas/statistical-investigations/

The research literature suggests that critiquing evidence is the hardest aspect of critical inquiry to develop. With practice and support, students learn to keep an open mind as they set aside their own ideas to consider other possible explanations. Doing this requires both critical thinking and perspective-taking, which takes self-discipline and self-awareness (both aspects of managing self). In learning areas like health and physical education and the social sciences, critique could involve students identifying their own assumptions and values and then comparing them with those of others.

Sometimes the 'evidence' to be critiqued is the student's own work. This is centrally important in the production of original work (for example, in the arts[14]) but is an important part of self-assessment in any subject. Again, this sort of critique demands self-awareness and self-discipline.

Perhaps the most common form of classroom-based inquiry is informational. Rather than directly learning about how knowledge is created in a discipline area, students use aspects of their inquiry capabilities to learn to be more discerning about knowledge sources. They gain practice in challenges like dealing with conflicting evidence (which is about both interpretation and critique). In this way, the inquiry capabilities can also help build information literacy.

Relationships between critical inquiry and the key competency of thinking

The key competency 'thinking' is so broad that it risks being everywhere and nowhere. Of course, students need to think of they are to learn! Critical thinking (sometimes called 'higher order thinking' or 'HOT') is a centrally important component of critical inquiry. In contrast to everyday thinking, effort and deliberate attention are required. Some people define critical thinking quite narrowly and restrict it to very 'academic' contexts. Others perceive a much broader nature for critical thinking and apply this to a wide range of contexts. When it is broadly defined, critical thinking has the potential to work with and support other types of thinking. It is also an essential component of critical reflection on how all the key competencies are being developed.

Considerable creativity is also likely to be involved in critical inquiry, and this is another aspect of the key competency of thinking. Other aspects of thinking needed for inquiry might include caring and ethical thinking, systems thinking, and metacognitive reflection – to name just three possibilities.[15]

Many different frameworks for critical thinking can be found on the Internet. The appendix to this paper groups content from different frameworks, using names that support the vision of the New Zealand Curriculum – the vision that it is important to foster *students' dispositions to learn* and to *contribute as active members of society*.

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[14] See for example http://nzcurriculum.tki.org.nz/Curriculum-stories/Media-gallery/Learning-to-learn/Feedback-and-critique-in-art

[15] Other possibilities can be found at: http://nzcurriculum.tki.org.nz/Key-competencies/Key-competencies-and-effective-pedagogy/Insights-into-the-key-competencies

Making progress in aspects of critical inquiry

The table on the next page synthesises ideas from several sources (see box below) to create four broad sets of indicators of progress. There are two important caveats to this work:

- Each band on the table has a coarse grain size. These are indications that *illustrate* what aspects of capability might look like. They are not detailed progressions, but could be used as a framework when building specific progressions from evidence of what students can actually do.[16]
- The demands of a task will influence students' ability to demonstrate their capabilities. This table is just one face of the coin. It is also important to gather information about the learning context and/or assessment task(s) used to generate achievement data.

Sources used for this synthesis

- Recent research on making progress in argumentation.[17]
- Recent research on students' demonstrations of their science capabilities in several New Zealand schools.[18]
- 'Progress maps' from resource materials that support the national curriculum in Northern Ireland (which is not dissimilar to the New Zealand Curriculum).[19]
- A NEMP probe study that included a literature review of how children's investigative skills in science develop.[20]

[16] See the short report 'What does making progress mean?' Hyperlink when published
[17] http://scientificargumentation.stanford.edu/project/
[18] http://www.nzcer.org.nz/research/publications/capabilities-living-and-lifelong-learning-whats-science-got-do-it
[19] http://www.nicurriculum.org.uk/curriculum_microsite/TSPC/what_are_tspc/progress_maps/index.asp
[20] http://www.nzcer.org.nz/research/publications/using-nemp-inform-teaching-science-skills

Broad indicators of progress in building critical inquiry capabilities

NZ Curriculum level	Some indicative critical inquiry behaviours
Level 1 (Years 1–2)	**Look and know** Students are just beginning to realise that what they think is different from why they think it. They can give their opinions and reasons. They can describe what they observe (parts/whole; same/different/ groups). They make simple predictions, ask different types of questions and actively search for answers.
Level 2 Years 3–4	**Thinking and explaining** Students look for evidence to test simple predictions. They can devise and explain simple inquiry methods and marshal evidence to support a case. They can sequence, order and rank on different dimensions, identify similarities and differences and make simple comparisons. They can suggest more than one cause for an event and/or possible solutions to problems. They can shape their opinions, and give their reasons for choices and actions.
Levels 3–4 Years 5–7	**Knowledge testing** Students can use different types of questions systematically and with purpose. They identify and order patterns and relationships in a range of ways. They recognise that more than one explanation could be plausible, which means that alternatives should be tested against the available evidence. They are willing to try alternative problem-solving solutions and approaches. They think more critically about their own ideas and understand there might be more than one point of view. They examine options and weigh up pros and cons. They discriminate between fact and opinion and question the reliability of evidence.
Level 5 Years 8–10	**Open-minded reasoning** One key development is that students now recognise and address *disconfirming* evidence. They consider and eliminate alternative explanations more systematically, and they are beginning to identify bias and errors in arguments. They engage with a range of problem-solving methods and evaluate solutions. They are beginning to understand that interactions between variables can make deciding and/or explaining more complex. They examine pros and cons of a decision, predict likely consequences and evaluate outcomes from a range of perspectives.

Living and contributing as active engaged citizens in the world

Look back at Building capabilities: weaving what the teacher does and what the student brings and notice the position of the words "living and contributing as active engaged citizens in the world." This phrase represents the overarching aim for learning that provides students with opportunities to develop and stretch their capabilities. Different aspects of the three sets of capabilities outlined in this report– and many more – come together when students take their learning out into the world beyond school.

The New Zealand Curriculum strongly signals that participatory experiences are important for every student. It is clear in the vision for "confident, connected, actively engaged lifelong learners" (p.8). Participation is implied in the exploration and modelling of values (p.10). It is apparent in a deep reading of the key competency, participating and contributing (p.12). Ways in which subject-specific learning supports participation in the world are either explicit or implied in the essence statements for each learning area (p.17). In most learning areas, these high-level signals are also supported by some of the achievement objectives.

This report has shown how weaving all these pieces together is one way to plan for and actively support capability development. The ideas below are just some of the ways that the New Zealand Curriculum signals how we would know that the pieces have indeed come together. When we see these sorts of participation, we will know that our young people are successfully taking their learning into the world.

Personal choices and actions

Key competencies and capabilities have strong dispositional components. It is not enough to know why certain actions are seen as desirable, or even how to do them – you also have to *want* to do these sorts of things:

- Sustaining and extending capabilities built in school. Examples could include: reading an increasingly demanding range of texts for pleasure and leisure; practising and extending specific techniques such as those learned in the arts, technology, or physical education; using growing communication skills in another language; and finding out more about questions and issues of personal interest.
- Taking personal action for well-being. Examples could include: regularly undertaking some form of exercise; choosing foods that are healthier options; and enjoying a rich range of leisure activities, including using the arts to express personal feelings and values.
- Demonstrating personal responsibility where there is a choice of ways to act: making more sustainable choices; exercising safe and ethical digital practices; and being respectful of appropriate practice in a different cultural context.

Looking beyond the self

Other actions involve students in social contexts where they choose to use their growing capabilities (including in all the ways outlined above) to respond to matters that concern them, or where they see a chance to make a difference in the world and to be good citizens. Aspects of different learning areas are likely to come together here because real-world issues typically transcend curriculum divisions.

Appendix: Aspects of critical thinking summarised from a range of frameworks

This appendix summarises each aspect of critical thinking to reflect content from different frameworks on the Internet. The aspects are grouped to show relationships to the science capabilities that were developed before this current work was undertaken.

Aspects of critical inquiry related to gathering and interpreting data

Seeking information/asking questions

Students might be using their knowledge and skills to:

- shape critical questions pertinent to an issue or puzzle

Find information and justify the selection of the source

- identify information that is relevant to the question or argument (and recognise instances when information is deliberately distracting or biased)
- compare similarities and differences in ideas
- understand information and convey that understanding to others in their own words
- look beyond the face value of a situation or argument to ask critical questions about the stated argument or position being taken
- ask questions to check the accuracy of claims.

Making and justifying inferences

Knowledge and skills from the various learning areas are integral to making and justifying inferences. Students show they can make and justify inferences when they:

- distinguish between an observation and an inference (what they observe and what they think these observations mean)
- combine previous experience and new observations to explain inferences
- connect different representations to arrive at the key idea being conveyed
- describe how existing ideas influence new observations and inferences
- outline how inferences can be tested via ongoing inquiries.

Aspects of critical inquiry related to using evidence to support ideas

Evidence-based reasoning

Learning to justify arguments with recourse to evidence has now become a common focus for learning in a range of learning areas. Critical thinking frameworks that emphasise disciplinary processes for knowledge building, or those that address 'citizenship' skills (such as those needed for thinking through controversial issues) tend to emphasise the aspects listed here:

- describe the evidence that supports a case
- look for counterevidence with an open mind
- identify when evidence is missing, incomplete, or inconclusive

- distinguish between evidence and conclusions
- weigh conflicting evidence to justify a conclusion
- change views when evidence points to the need to do so (again, being open-minded).

Being logical

Working with evidence demands logical reasoning, which is variously described as encompassing being able to:

- break an argument into parts
- draw logical conclusions from those parts
- recognise fallacious reasoning (for example, noticing that the argument is not logically developed or the person putting the argument has jumped to a conclusion based on too small a sample)
- identify 'gaps' where part of an argument has been left out
- avoid tautologies (circular arguments)
- recognise logical inconsistencies (for example, when reasoning points in different directions).

Aspects of critical inquiry related to critique of evidence

In addition to the need for critique implied in some of the above aspects, we found another cluster with a distinct set of metacognitive characteristics (that is, they demand critical thinking about thinking).

Identifying assumptions

Students who can name and explain assumptions might show they can do one or more of the following:

- detect vagueness or ambiguity in an argument
- recognise instances when bias or personal prejudice (their own or other people's) influence thinking
- be aware of the thinking they are doing (including their own assumptions)
- evaluate strengths and shortcomings of their own thinking
- clarify the values that underpin different positions.