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Rich Learning Opportunities

Guidance document
July 2019

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About the Rich Opportunities for Learning Tool

You can enrich learning by strategically designing opportunities for ākonga to use and develop the capabilities that their community sees as critical. You can do this in your school, kura, Kāhui Ako, cluster, or early childhood centre (your setting).

The Rich Opportunities for Learning tool can help you align your vision for ākonga with the actual learning opportunities ākonga experience. It provides a conceptual framework, planning templates and some examples to help you work with your community to design, capture and share significant opportunities to learn.

The planning template will enable you to import information from the Coherent Pathways and Relationships for Learning tools.

When you've entered information into the tool, it will include a guide to help you notice, recognise and respond to the impact of your curriculum decision-making on ākonga and the community. You will be able to use this information to further explore an issue or a success using the Collaborative Inquiry tool.

Log into and use the curriculum tools at this site:

<https://curriculumtool.education.govt.nz/>

What are rich opportunities to learn?

Rich opportunities to learn are carefully designed to increase the breadth, depth and complexity of the learning experiences with which ākonga engage as they progress along their learning pathways. They are designed to support ākonga to contribute to their communities in ways that build on and strengthen both community and ākonga capabilities.

Why design them?

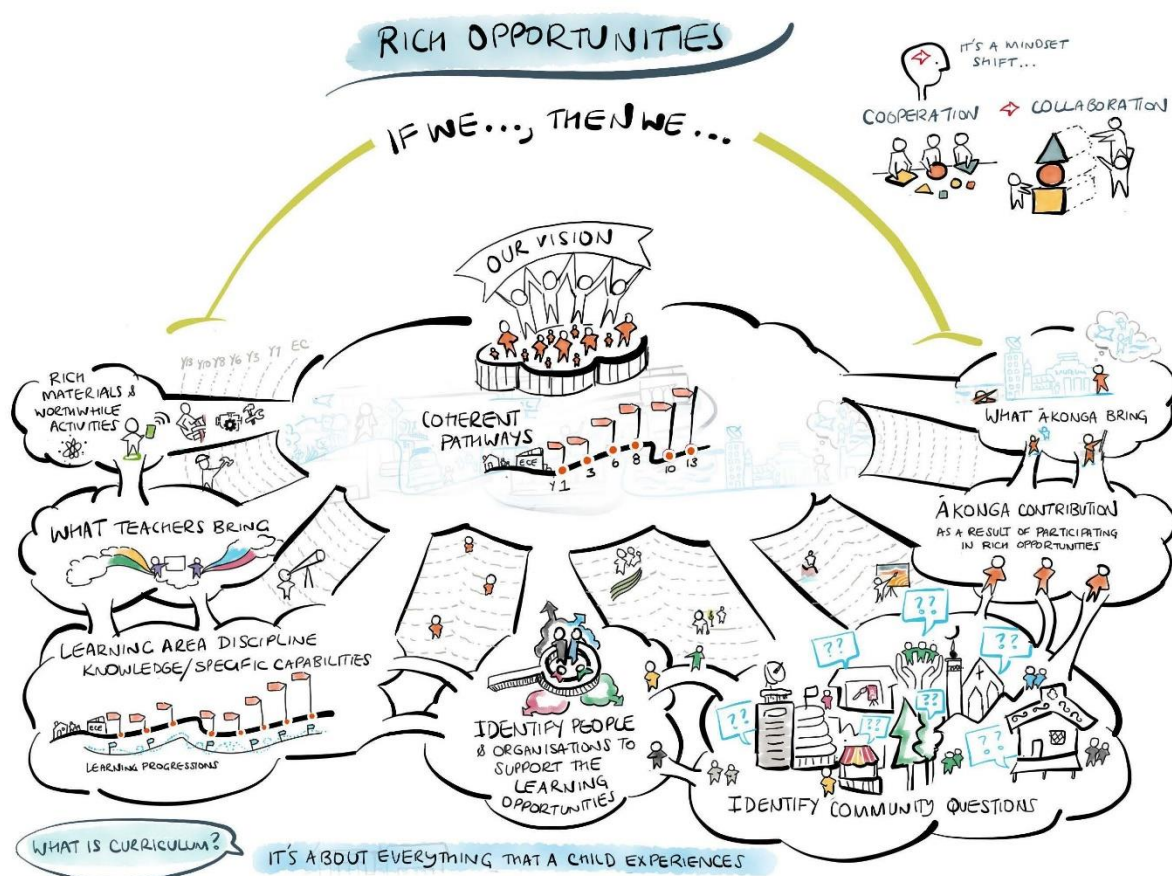
Engaging in rich opportunities to learn from and with their community supports ākonga to:

- *understand* their community as a system with social, cultural, political, and economic dimensions
- *apply* their learning in *authentic* contexts
- experience *belonging* to the wider community
- learn from and with *role models* that they can look up to and respect and who believe in them
- *be recognised for their contributions* as community members.

Learning is not only about what happens within early childhood, school or kura settings to prepare ākonga for the future; it is also about ākonga being actively involved in the community they live in right now.

Wānanga

This tool will include a smart planning template. It will contain ten elements that you will be able to use flexibly to meet your requirements. The elements are illustrated in the diagram below.



Rich opportunities support a curriculum vision with cooperation and collaboration

Key questions

Before using this tool, there are some key questions your leadership team may wish to consider.

Resourcing

- Who will lead this work stream?
- Who will be invited to participate in the leadership of this work?
- How will the team work together?

Communication

- How will the importance of this work be communicated to other teachers?

Review

- What review process will you use?
- What questions will be important to explore and what evidence will you look for?

During the review, you may find it helpful to consider whether your rich opportunity for learning supports:

- growing the effectiveness of your collective teaching practices
- collaboration within your setting and with your wider community.

Initial thinking about how each element might support your planning

The elements below are numbered for ease of reference, but planning is not a linear process. You can begin your thinking with any of the elements and move fluidly between them. All ten elements provide teachers with a framework to work within. The first four elements are the strategic components and the following six are for teachers to use when developing rich opportunities for learning that are responsive to the aspirations, interests and strengths of particular ākonga.

This framework can be used for developing curriculum around:

- global, national and local issues such as sustainability of resources (you may find the [Singularity University global challenges](#) useful)
- national and local creative endeavours in the arts and storytelling.

1. Identify your vision for ākonga in relation to this learning opportunity

Write a statement that explains how this rich learning opportunity will help realise your vision for ākonga, linking it to a specific aspect of your strategic plan. Make your commitment, assumptions, actions and intended outcomes clear by writing a statement that links teacher actions with student outcomes. Consider the following construction: *If we [do this as teachers...], then we [will improve students']* For example: *“If we provide opportunities for engagement with authentic sustainability issues, then we will improve students’ science capabilities.”*

2. Select the capabilities you wish to focus on for this rich learning opportunity

Clarify the outcomes you want your ākonga to achieve through this rich learning opportunity. Do this by either:

- writing some transition statements you will work towards; or
- selecting from the transition statements you have created in the Coherent Pathways tool.

3. Learning area specific capabilities

Describe the learning outcomes you want from this learning opportunity and the progressions between them in more detail. You can select these from the specific learning area capabilities found in the Coherent Pathways tool. Where appropriate, draw on learning progressions such as those in the [Learning Progressions Framework](#). You may find these statements may inform or test your transition statements.

4. Identify important community questions

- i. Engage with your wider community to seek out authentic questions, issues and opportunities that matter to them.
- ii. Identify some age-appropriate, open, rich questions based on important local themes and wicked problems.

iii. Check that your questions provide authentic learning for students. Learning is likely to be authentic if answers to the questions cannot be found on the Internet and the solutions require ākongā to work together with members of their wider community.

iv. It is important to think about how you will support teachers to develop rich opportunities within this framework. You may want to provide teachers with guidance for the following elements (for example, recommending particular tools or ways of working that sit across your setting, as in

[Rich Opportunities for Learning: Example 1](#)). Alternatively, you may choose to leave the tool open and see how teachers use the framework to come up with the rich learning (as in [Rich Opportunities for Learning: Example 2](#).)

5. Identify what ākongā will contribute to their community by participating in this rich learning opportunity

Describe in concrete and observable ways what ākongā will be contributing to community opportunities and issues.

6. Identify people and community organisations that will support this learning opportunity

Identify the people and groups in the community that can be used to help make this learning rich and authentic for each year group.

Selecting people and groups from the relationships database that you have created in the Relationships for Learning Tool will enable you to be strategic about which relationships you draw from in which years. You will be able to avoid using particular community resources too much or too little and focus on developing ākongā capability over time.

7. What ākongā bring

- i. Seek a broad range of information about students' diverse strengths, learning needs, interests, aspirations and preferred ways of working.
- ii. Ensure you select tools or methods to capture the voices of ākongā in relation to the intended learning.

8. What teachers bring

Identify the [Practicing Teacher Criteria](#) that link to this particular learning opportunity. Use the criteria to explicitly connect teachers' learning to ākongā learning.

9. Rich materials and worthwhile activities

Identify and describe rich content, rich materials and worthwhile activities that best suit your chosen context.

When complete, this tool will enable you to curate and store selected activities and experiences so that teachers from across early childhood, school and kura settings can re-use or modify them in the future. It will also enable you to organise your materials around key themes and tag them with comments about their usefulness.

10. Review

Gather *student voices* to find out the extent to which students better:

- *understand* their community as a system with social, cultural, political, and economic dimensions
- *apply* their learning in *authentic* contexts
- experience *belonging* to the wider community
- learn from and with *role models* that they can look up to and respect and who believe in them
- find *recognition* for their contributions as community members.

Rich Opportunities for Learning: Example 1

Designing opportunities for ākonga to increase their agency and improve their writing outcomes

Most settings will be working together on several rich opportunities at any one time. This example provides an insight into how one setting used the Rich Opportunities to Learn Tool to plan a learning opportunity focused on writing and learner agency. The example foregrounds years 4–6, but similar opportunities were designed for ākonga at other levels, with the aim of ensuring coherent ākonga learning over the years.

Introduction

Background

Our setting is a network of state schools situated in Tāmaki Makaurau. Our roopu consists of four full primary schools and one secondary school. Four of our five schools are well established, and one was recently established.

Our stage of development

We used the [Community of Learning Development Map](#) to understand where we are now as a Kāhui Ako and where we want to go. We recognised the need to prioritise four domains:

- Domain 1: Teaching collaboratively for the best learning outcomes for every child
- Domain 4: Pathways developing and connecting along the whole educational journey for every child
- Domain 5: Partnering with families, employers, iwi and community
- Domain 6: Building a thriving Community of Learning | Kāhui Ako

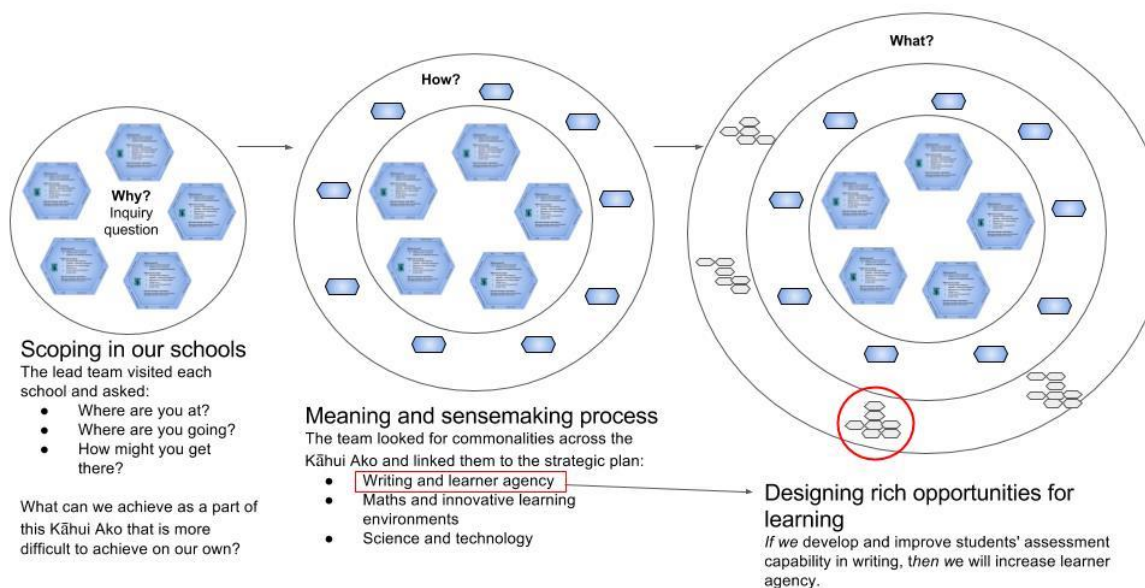
Our achievement challenges

We are challenging ourselves to lift achievement in years 1–8 writing to 90% (1625/1806). This requires a 9% improvement by the end of 2019 and means accelerating the achievement outcomes of 162 learners.

Our approach

Our leadership team gathered information about each school's context through a series of structured conversations, as outlined in Figure 1. These conversations provided an opportunity for us to re-focus on what we hope to do together, and the process created clarity for us.

Figure 1. The stages of gathering information



Our strategy

Our roopu believes that through fostering learner agency, our ākonga will understand where they are at in their learning, what they need to do next and how they might achieve this. We also believe that ākonga need to think of themselves as writers. This means that they need to have something to say and they need to know that their writing will be read. That is, they need to be aware of purpose and audience and writing should not be taught and learned in isolation.

We will be guided by this quote from [Lucy Calkins](#):

If I can think it, I can say it.

If I can say it, I can write it.

If I can write it, I can read it and so can others.

Leadership actions: creating a framework

1. Identify your vision for ākonga in relation to this learning opportunity

If we develop and improve ākonga assessment capability in writing, **then we** will increase learner agency and we will improve ākonga writing outcomes.

References

These are some examples of the research we drew on to underpin our vision.

- [Booth, B., Dixon, H., & Hill, M. \(2016\). Assessment capability for New Zealand teachers and students: Challenging but possible. Teachers as Communities of Learning professionals, set, 2, 28–35.](#)
- [Ministry of Education \(2011\). Position Paper: Assessment \(Schooling Sector\). Author: Wellington.](#)
- [The assessment-capable teacher: Are we all on the same page?](#)

2. Select the capabilities you wish to focus on for this rich learning opportunity

Focus years 4–6

Ākongā in these years increasingly use their reading and writing knowledge and skills to support their learning in other learning areas. 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.

Ākongā 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.

Ākongā choose 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.

Ākongā 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.

3. Learning area specific capabilities

Learning Progression Framework

Using writing to think and organise for learning

Students use their reading and writing to organise their ideas and information for different learning purposes. They develop their ability to use their writing to clarify and develop their ideas as well as to reflect on their learning. They develop their expertise in selecting, noting down, and organising ideas and information, using appropriate formats. They collate, analyse, and classify the content they need for a variety of curriculum tasks.

Creating texts to influence others

Even when they are novice writers, students create texts in order to challenge their audience to do something or think about something differently. They write to argue a point or persuade someone to change their mind.

Expert writers know how to effectively achieve these purposes. They choose appropriate structures and features, and control the language they use in order to make the maximum impact on their audience.

4. Identify important community questions

Often rich learning opportunities will result in identifying important community questions. This learning opportunity is all about identifying community questions, issues and opportunities.

We will provide opportunities for ākongā and community members to identify important community questions, develop shared goals, and work in an active and organised way towards achieving these.

We will design campaigns to address authentic problems and challenges that are important to our community.

Some campaigns seek possible solutions to shared issues (for example, pollution, traffic dangers or cyber safety). Others use and extend ākonga passions by giving them an opportunity to do something new (for example, design a video game, build a low-tech robot or put on a show).

Our first campaign is *What's Outside My Window?* Its purpose is to find out our community's views about the questions and issues and opportunities that are important to the community *and* provide opportunities for rich learning. We will seek diverse perspectives, including from ākonga, teachers, leaders, whānau, iwi and local businesses/employers.

We chose this as our first campaign because our application of the Community of Learning Development Map had revealed the need to pay greater attention to the domain, Partnering with families, employers, iwi and community.

Teaching actions: implementing the framework

5. Identify what ākonga will contribute to their community by participating in this rich learning opportunity

The *What's Outside My Window?* campaign will provide ākonga with opportunities to share their thinking and develop their ideas with their wider community. They will write for real audiences and for a real purpose.

The campaign will take an open-ended format that will prompt the generation of new ideas and interpretations. To facilitate this, we will design a website to crowdsource ideas for real learning from and with the community.

As they collaborate with local people and community organisations, ākonga will offer their own perspectives on the issues that matter to our community. Likewise, our ākonga will receive community feedback on their ideas and perspectives. This will enable authentic conversations and connections throughout our Kāhui Ako. We hope that when ākonga receive feedback from external sources, rather than just their class teacher, they will feel that their views and ideas matter.

6. Identify people and community organisations that will support this learning opportunity

Ākonga, teachers, and community members will all be able to suggest potential campaigns. We will engage with:

- a local company with expertise in web development (to mentor ākonga in the design process)
- our iwi
- our local council and residents' association
- people and organisations for specific campaigns (for example, our local police, transport authority, museum, media company, arts collective, cultural groups, or service organisations).

7. What ākonga bring to this plan

We will establish learning ambassadors from each school and collect student voice through recording critical conversations with individuals and focus groups.

We will use Google Forms to collect a wider range of views and quantitative data across our five schools to highlight the diverse needs of our learning environments.

8. What teachers bring to this plan

Not all PTC will necessarily be illustrated within each rich learning opportunity. You will see that PTC 1, 2, 5 and 6 have been foregrounded in this example.

Practicing Teacher Criteria

1) Treaty citizenship

Demonstrate commitment to tangata whenuatanga and bicultural partnership and practice in Aotearoa New Zealand.

- Acknowledge iwi history, heritage, language and culture and design campaigns that align with and support iwi strategic plans.
- Sit with iwi to co-construct pathways to enable Māori to achieve success as Māori and all ākonga to thrive as learners within each campaign.
- Invite iwi and whānau to evaluate the effectiveness of each campaign.

2) Professional learning

Improve professional capability to positively impact on the learning and achievement of all learners.

- Inquire into and reflect on the effectiveness of practice in writing, using evidence from a range of sources.
- Critically examine how own assumptions and beliefs, including cultural beliefs and beliefs about learner agency, impact on own practice and the achievement of learners with different abilities and needs, backgrounds, genders, identities, languages and cultures.
- Engage in professional learning and adaptively apply this learning in practice.

3) Professional relationships

Establish and maintain professional relationships and behaviours focused on the learning and well-being of each learner. (Not a foregrounded focus in this learning opportunity.)

4) Learning-focused culture

Develop a culture which is focused on learning, and is characterised by respect, inclusion, empathy, collaboration and safety. (Not a foregrounded focus in this learning opportunity.)

5) Design for learning

Design for learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner.

Use the [Writing Hub](#) and other resources to strengthen their knowledge and skills for teaching writing across the curriculum and increase students' rate of progress.

6) Teaching

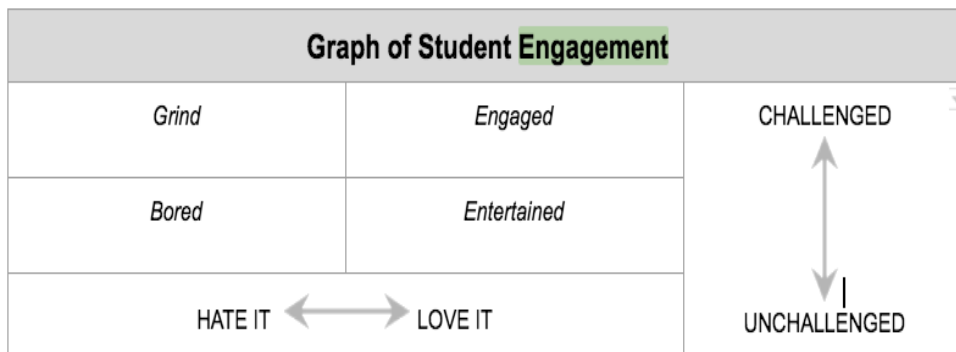
Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace.

Teach in ways that ensure target learners are making accelerated progress in writing and monitor the extent and pace of their learning.

Regularly discuss assessment information with target students, and provide opportunities for these ākonga to share their thinking and writing with a wider audience.

Monitor the engagement of target learners.

Figure 2: Graph of Student Engagement



See [The Formative Five - Thomas Hoerr](#).

We will use the gifts and passions of each teacher as they apply to each campaign. This information will be sourced from our relationships database.

Figure 3: Purpose, Passion, and Gifts



Reference

Pollard, D. (2008). *Finding the sweet spot: the natural entrepreneur's guide to responsible, sustainable, joyful work*. Chelsea Green Publishing

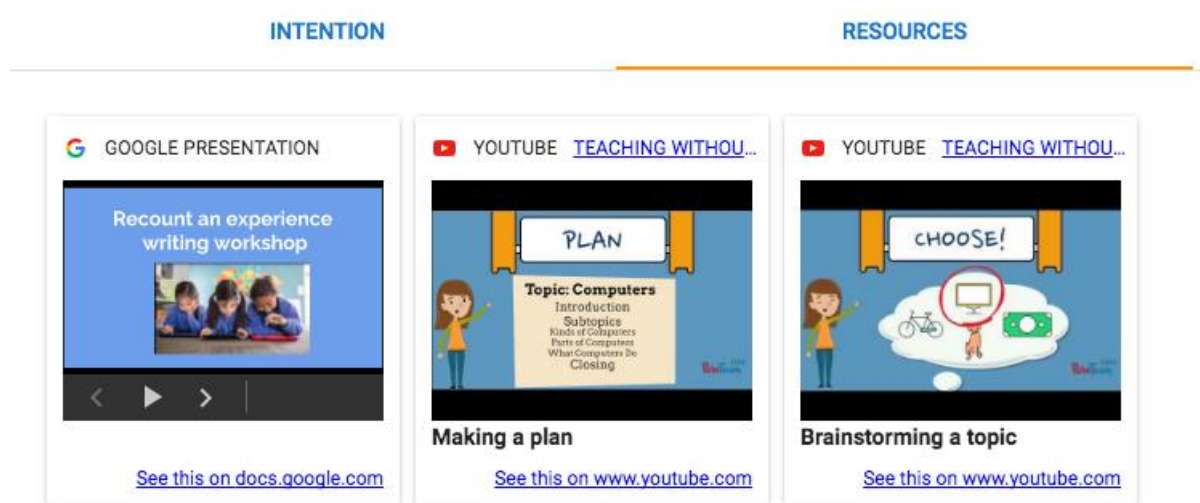
9. Rich materials and worthwhile activities

Teachers will be invited to contribute rich material and activities once the questions and campaigns have been determined. Initial digital learning tool recommendations are identified below.

Materials

Digital modelling books will provide templates that can be adapted for each campaign. They will follow a 'typical' learning process and be illustrated to support ākonga learning progressions.

Figure 4: Digital learning example



Teachers will create or recommend YouTube clips. The clips will be filtered to support the learning intentions and movement through the learning progressions.

Levelled cross-curricular writing resources are available on [The Writing Hub](#).

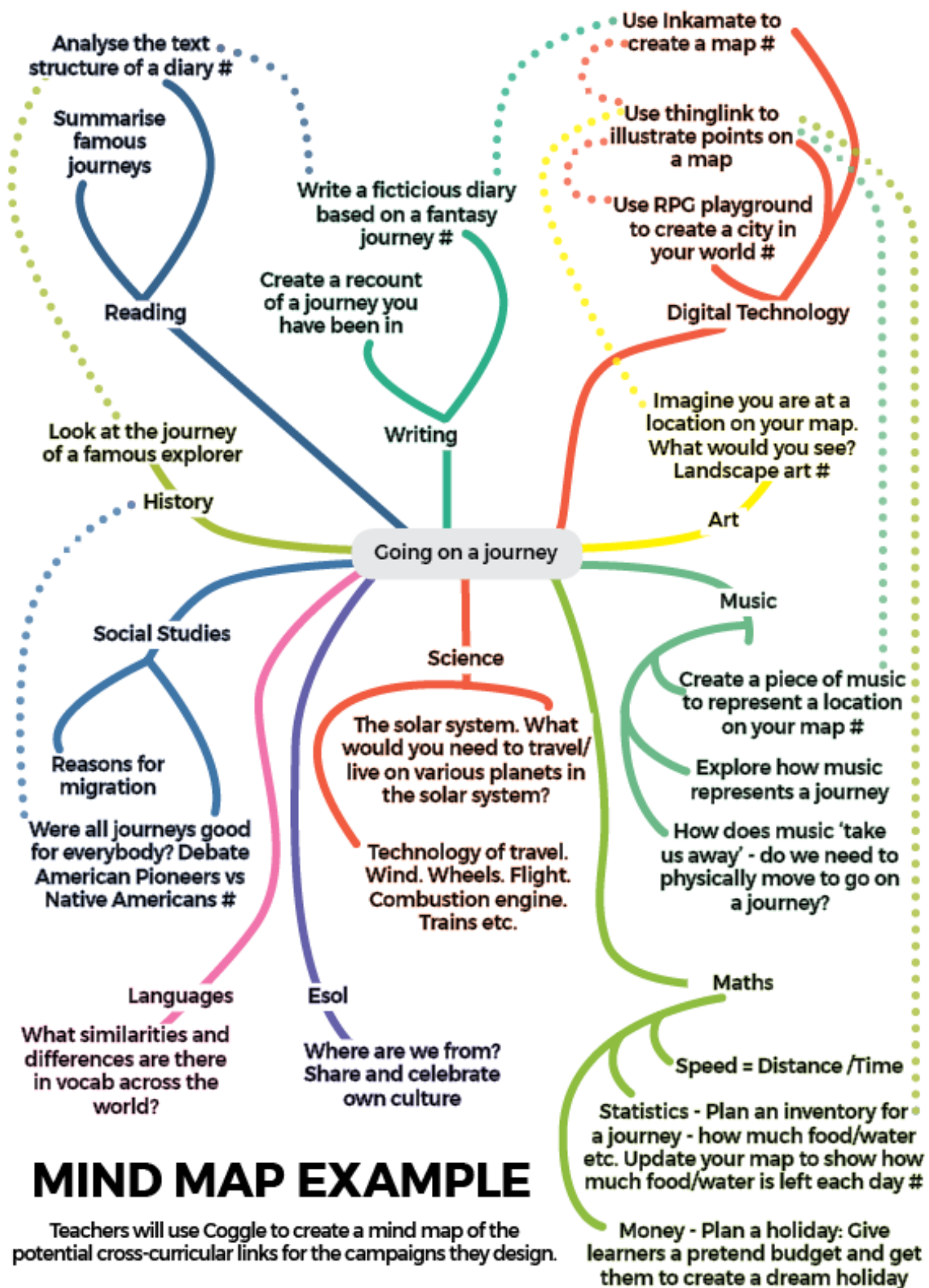
[Story Starters](#) is a video resource aimed at engaging boys and inspiring them to write. It has been developed for boys in years 5 to 8, using boys of that age to help create the material.

The What's Outside My Window? campaign will be structured around the following instructions to ākonga:

Most people in the world have a window, but the world outside that window varies dramatically. Even the view from two different windows in the same street can be completely different. Whatever you can see, explore it in more detail. Really look, listen, feel, analyse and wonder. Then create and share your own particular view!

Teachers will use Coggle to create a mind map of the potential cross-curricular links for the campaigns they design. See the sample mind map in Figure 5.

Figure 5: Sample mind map



Activities

The brief for this activity is open-ended, enabling ākonga and teachers to interpret and present their diverse perspectives. The following are some examples of the approaches teachers at one school have developed to help their year 4–6 students respond with their diverse perspectives.

Learn: Use your senses

- Where is your window?
- What does your world look like when you peer outside your window?
- How does this place make you feel?
- What life can you see?
- What wonderings do you have?
- Do you have plans for this view?
- What makes your view special?
- How does this view compare to others you have seen?
- Why is your view the way it is? How did it get this way?
- What vocabulary / colours/ digital tools would you need to share this view with others?

Connect: Choose a way to share your view. Some ideas:

- Paint a picture
- Use 3D modelling software or build a simulation of it
- Create a 'day in the life' of a creature from your garden
- Write a poem full of exciting descriptions
- Create fictional writing about some fantastical adventure connected to what is outside your window
- Write a science report about the biodiversity in your garden.

10. Review

We will gather ākonga voice on the impact of this learning on agency through inviting ākonga to respond to these three strategic questions?

- Where are they at in their learning?
- What do they need to do next?
- How might they achieve this?

We will gather data on the impact of this learning on the 162 priority ākonga by using the PACT tool to evaluate samples of their writing. We will focus on two aspects: Using writing to think and organise for learning and Creating texts to influence others.

We will find out the extent to which this learning opportunity helped ākonga to learn with and from their community by gathering voices from a sample of ākonga who are at risk of not engaging and/or achieving. We will seek to discover the extent to which they:

- can apply their learning in authentic contexts
- experience belonging to the wider community
- are learning from and with role models that they can look up to and respect and who believe in them
- are recognised for their contributions as community members.

Rich Opportunities for Learning: Example 2

Designing opportunities for ākonga to use their science capabilities to engage with sustainability issues

This example provides an insight into how a setting used the Rich Opportunities to Learn Tool to plan a learning opportunity focused on science and sustainability. The example below describes how the leadership team used the tool to create an overall framework to ensure coherent ākonga learning over the years.

Introduction

Background

Our Kāhui Ako is a network of state schools situated in Ōtaki. Our roopu consists five schools: a years 7–13 school; two full primary schools; and two contributing schools.

Several years ago, a teacher at the secondary school (who is now the science head of faculty) participated in the [Royal Society Science Teaching Leadership Programme](#). Since then, two primary teachers have also participated. This has strengthened the network of local teachers interested in science.

Over the same period, our town has developed an organisation to promote its vision *to become a sustainable net exporter of clean energy through community action, projects large and small, and alliances with key partners within the town and the surrounding rural areas*. Our setting wanted to be part of this.

Our achievement challenges

Science is an achievement challenge for our setting. We would like more students to participate and succeed in science from years 11–13. The science head of faculty is the across-school teacher working with a team of in-school teachers to support this challenge.

Our approach

We wanted to develop a cohesive plan that would help all teachers know what science ideas ākonga had explored in previous years, what they were going to explore in the future and how we would engage with organisations in the community. We wanted to support teachers to focus on the nature of science and science capabilities and to engage in the community's vision of energy sustainability.

We used the Rich Opportunities to Learn Tool to develop our plan. We spent quite a bit of time working with the district council and [Energise Ōtaki](#) to identify community questions, organisations we could collaborate with, and possible rich learning opportunities. The result is the framework you see below.

Our framework is helping us support all teachers with:

- accessing and using the technical resources at our secondary school
- extending our understanding about sustainability issues and the nature of science
- working with local community organisations that support sustainability.

Our strategy

We decided to use the first four elements of the Rich Opportunities to Learn Tool to develop a Year 0–13 Framework. Populating these elements provided guidance to enable teachers to develop the rest of the Framework over time.

Leadership actions: creating a framework

1. Identify your vision for ākonga in relation to this learning opportunity

If we develop opportunities for students to use their science capabilities to engage with school and community sustainability issues, *then we* will enable more year 11–13 students to participate and succeed in science.

2. Select the capabilities you wish to focus on for this rich learning opportunity

Overall

- Making meaning in discipline-specific ways
- Critical inquiry
- Perspective taking
- Taking action

ECE to school

Exploration | Mana Aotūroa

Belonging | Mana whenua

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.

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 Māori 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).

Years 7–10

We decided to treat years 7–10 as one cohort.

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 enough 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.

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.

3. Learning area specific capabilities

Overall, there are science-specific foci for each level.

ECE to school

Belonging | Mana whenua

- Taking part in caring for this place | te manaaki i te taiao

Exploration | Mana aotūroa

- 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

Years 1–3

- Notices interesting objects, patterns and changes in the environments they encounter and makes detailed, focused observations using informal language
- Shares their ideas about experiences, drawing on previous experiences to make sense of what they see and working with others to improve their ideas

Years 4–6

- Uses some scientific ideas and data to build a convincing case in relation to a real issue
- Develops questions that can be investigated in science and begins to use simple investigative methodologies
- Makes observations and gathers data with the aim of shaping explanations for phenomena they have experienced and explored
- Uses simple science conventions (symbols and texts)

Years 7–10

- Understands that science concepts are based on empirical evidence and can change over time
- Outlines how knowledge-building processes in science differ from those in other discipline areas, and uses these differences to identify questions that science can answer and those it cannot
- Identifies when evidence supports a specific claim and is aware of the importance of disconfirming evidence and of confirmation bias
- Uses science conventions in appropriate ways and communicates science ideas and arguments using precise, unambiguous language that includes appropriate science vocabulary
- Constructs a range of text types that include representations such as models, diagrams, flow charts and tables and graphs that are organised in ways that show patterns in their data
- Investigates and responds to more complex socio-scientific issues, drawing on different disciplinary perspectives as appropriate to the dimensions

Years 11–13

- Uses complex scientific processes, science concepts and disciplinary perspectives to investigate and respond to complex socio-scientific issues.

4. Identify important community questions

Often rich learning opportunities will result in identifying important community questions. This learning opportunity is all about identifying community questions, issues and opportunities.

Level	Activity
Overall	How can our community be a sustainable net exporter of clean energy?
ECE to school	What do we throw away? What can we re-use?
Years 1–3	How do we refuse, reduce, reuse and recycle at school?
Years 4–6	How can we get the best from our land so there is food for all?
Years 7–10	How can we get the best from clean energy?
Years 11–13	How can schools lower our fuel emissions and costs?

5. Identify what ākonga will contribute to their community by participating in this rich learning opportunity

Level	Activity
Overall	Supporting families, learning centre and community
ECE to school	Sustainability: <ul style="list-style-type: none"> • Develop a compost system for the centre
Years 1–3	Sustainability: <ul style="list-style-type: none"> • Develop and review plan for the school. • Develop a plan for home.
Years 4–6	Equity: <ul style="list-style-type: none"> • Community gardens • Provide food to organisations that support families • Support others in our families to grow food
Years 7–10	Sustainability Develop school plans that make the most of such things as: <ul style="list-style-type: none"> • Solar energy • Insulation • Technology • To reduces energy use Develop home plans that make the most of such things as: <ul style="list-style-type: none"> • Solar energy

Level	Activity
	<ul style="list-style-type: none"> • Insulation • Technology • To reduces energy use <p>Provide advice to the district council and community groups about how we can collectively make the most of such things as:</p> <ul style="list-style-type: none"> • Solar energy • Insulation • Technology • To reduce our energy use
Years 11–13	<p>Sustainability:</p> <p>Schools have:</p> <ul style="list-style-type: none"> • Lower emission vehicles • Lower use of fuel for heating <p>Advice and audit tools for other community organisations.</p> <p>Equity: The money saved can be used as scholarships for young people.</p>

Teaching actions: implementing the framework

Having developed our framework, we are now working with groups of teachers to see what rich opportunities exist that can fit into it and where we need to develop new or richer opportunities.

6. Identify people and community organisations that will support this learning opportunity

Teachers will use our list of community organisations and people to identify those involved with work on sustainability.

Level	Activity
ECE to school	District Council Recycling
Years 1–3	District Council Recycling
Years 4–6	District Council Green team Community Gardens Food bank
Years 7–10	Energise Ōtaki
Years 11-13	Blended fuels solution NZ

7. What ākonga bring to this plan

We will find out about ākonga knowledge, experiences and perspectives by:

- conducting a survey questions about how ākonga view science and sustainability exploring diverse views and what kids care about
- using our student sustainability ambassadors and asking them to talk with ākonga.

8. What teachers bring to this plan

Not all PTC will necessarily be illustrated within each rich learning opportunity. You will see that PTC 1, 2, 5 and 6 have been foregrounded in this example.

Practicing Teacher Criteria

1) Treaty citizenship

- Demonstrate commitment to tangata whenuatanga and bicultural partnership and practice in Aotearoa New Zealand.
- Demonstrate commitment to tangata whenuatanga and bicultural partnership and practice in Aotearoa New Zealand.

2) Professional learning

Improve professional capability to positively impact on the learning and achievement of all learners. (Not a foregrounded focus in this learning opportunity.)

3) Professional relationships

Establish and maintain professional relationships and behaviours focused on the learning and well-being of each learner. (Not a foregrounded focus in this learning opportunity.)

4) Learning-focused culture

- Develop a culture which is focused on learning, and is characterised by respect, inclusion, empathy, collaboration and safety.
- Create and maintain learning-focused environments that are collaborative, inclusive and safe.

5) Design for learning

- Design for learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner.
- Design for learning based on professional knowledge, assessment information and an understanding of each learner's strengths, interests, needs, identity, language and culture.

6) Teaching

- Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace.
- Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace.

9. Rich materials and worthwhile activities

We are designing learning opportunities to develop the capabilities by adopting, adapting and developing material and activities that:

- create space for learners to take the initiative in their learning
- offer enough challenge to stretch and enlarge their current capabilities
- foster rich connections between the intended learning and learners' lives.

We are using [Science capabilities for citizenship](#) for guidance in designing the learning opportunities.

We are also using the OECD [principles of learning](#) and its description of the [building blocks of learning](#) to design the science learning opportunities.

The learning opportunities for each cohort address the questions and foci established in our overall Framework. The following table provides some examples of the local people and organisations teachers and ākonga are working with and the activities they are engaging in.

Level	Activity
CE to school	<p>People and organisations in the community</p> <ul style="list-style-type: none"> • District Council Recycling <p>Activity</p> <ul style="list-style-type: none"> • Paper for trees project
Years 1–3	<p>People and organisations in the community</p> <ul style="list-style-type: none"> • District Council Recycling <p>Activity</p> <ul style="list-style-type: none"> • Litterless lunches and zero waste schools and events
Years 4–6	<p>People and organisations in the community</p> <ul style="list-style-type: none"> • District Council Green team • Community Gardens • Food bank <p>Activity</p> <ul style="list-style-type: none"> • Ecology and life processes
Years 7–10	<p>People and organisations in the community</p> <ul style="list-style-type: none"> • Energise Ōtaki <p>Activity</p> <ul style="list-style-type: none"> • Solar energy project
Years 11–13	<p>People and organisations in the community</p> <ul style="list-style-type: none"> • Blended fuels solution NZ <p>Activity</p> <ul style="list-style-type: none"> • Alternative fuel project

10. Review

Teachers will be asked to review the success of their authentic activities and resources by asking ākongā and their whānau the extent to which they:

- *understand* their community as a system with social, cultural, political, and economic dimensions
- experience *belonging* to the wider community
- have learnt from and with *role models* that they can look up to and respect and who believe in them
- are *recognised for their contributions* as community members.

This is followed up in the Collaborative Inquiry tool.

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).

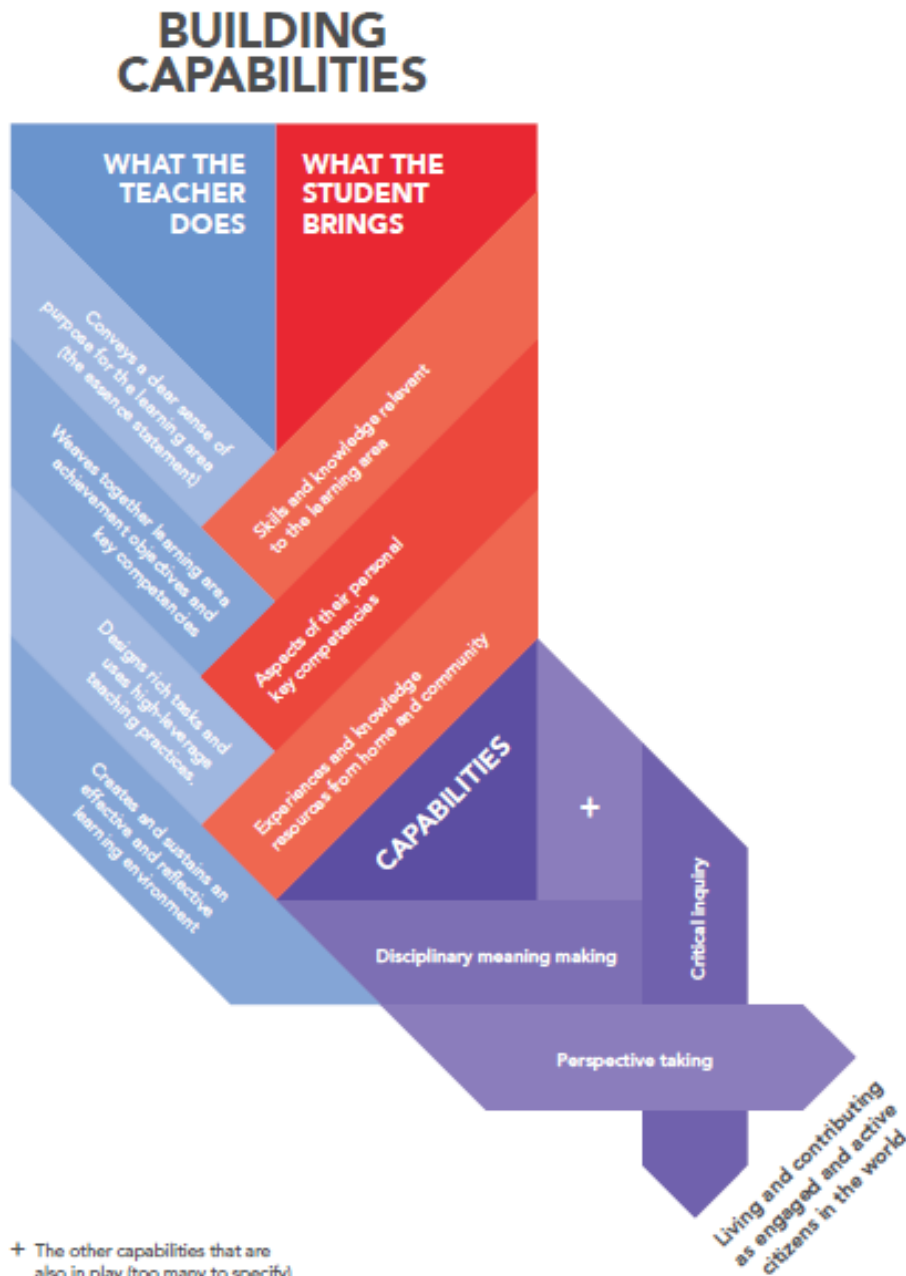
Rich tasks include a conceptual focus and a ‘doing’ focus that draws on aspects of *all* the key competencies. However, it is hard to focus the intended learning if we just say every key competency is in play. This is where the idea of capabilities can help. A ‘capability’ is demonstrated in action. 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.¹

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 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.²

¹ <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."

² 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>

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:³

- 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.
- 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.⁴

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

³ 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/>

⁴ 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.)

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:

- *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.⁵ The analysis made it evident that each of these disciplines has its own epistemic practices.⁶ (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.

⁵ The reports are pending and will be released as a set.

⁶ 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.⁷ 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.⁸ 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.⁹

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.¹⁰ 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.¹¹

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

⁷ 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>

⁸ 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.

⁹ 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

¹⁰ 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>

¹¹ 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/>

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 arts¹²) 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 if 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.¹³

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*.

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:

¹² See for example <http://nzcurriculum.tki.org.nz/Curriculum-stories/Media-gallery/Learning-to-learn/Feedback-and-critique-in-art>

¹³ Other possibilities can be found at: <http://nzcurriculum.tki.org.nz/Key-competencies/Key-competencies-and-effective-pedagogy/Insights-into-the-key-competencies>

- 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.¹⁴
- 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.¹⁵
- Recent research on students' demonstrations of their science capabilities in several New Zealand schools.¹⁶
- 'Progress maps' from resource materials that support the national curriculum in Northern Ireland (which is not dissimilar to the New Zealand Curriculum).¹⁷
- A NEMP probe study that included a literature review of how children's investigative skills in science develop.¹⁸

¹⁴ See the short report 'What does making progress mean?' [Hyperlink when published](#)

¹⁵ <http://scientificargumentation.stanford.edu/project/>

¹⁶ <http://www.nzcer.org.nz/research/publications/capabilities-living-and-lifelong-learning-whats-science-got-do-it>

¹⁷ http://www.nicurriculum.org.uk/curriculum_microsite/TSPC/what_are_tspc/progress_maps/index.asp

¹⁸ <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)	<p>Look and know</p> <p>Students are just beginning to realise that what they think is different from why they think it. They can give their opinions and reasons.</p> <p>They can describe what they observe (parts/whole; same/different/ groups).</p> <p>They make simple predictions, ask different types of questions and actively search for answers.</p>
Level 2 Years 3–4	<p>Thinking and explaining</p> <p>Students look for evidence to test simple predictions. They can devise and explain simple inquiry methods and marshal evidence to support a case.</p> <p>They can sequence, order and rank on different dimensions, identify similarities and differences and make simple comparisons.</p> <p>They can suggest more than one cause for an event and/or possible solutions to problems.</p> <p>They can shape their opinions, and give their reasons for choices and actions.</p>
Levels 3–4 Years 5–7	<p>Knowledge testing</p> <p>Students can use different types of questions systematically and with purpose. They identify and order patterns and relationships in a range of ways.</p> <p>They recognise that more than one explanation could be plausible, which means that alternatives should be tested against the available evidence.</p> <p>They are willing to try alternative problem-solving solutions and approaches.</p> <p>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.</p> <p>They discriminate between fact and opinion and question the reliability of evidence.</p>
Level 5 Years 8–10	<p>Open-minded reasoning</p> <p>One key development is that students now recognise and address <i>disconfirming</i> evidence. They consider and eliminate alternative explanations more systematically, and they are beginning to identify bias and errors in arguments.</p> <p>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.</p> <p>They examine pros and cons of a decision, predict likely consequences and evaluate outcomes from a range of perspectives.</p>

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.