NZCER
Rangahau Mātauranga o Aotearoa

# Weaving a coherent curriculum:
## How the idea of 'capabilities' can help

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# Contents

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 four types of capabilities shown in the diagram that follows, 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 on the next page summarises how capabilities can help to support the weaving of key competencies into the enacted curriculum. The following sections then describe the capabilities, their links with the key competencies, and how they are developed.

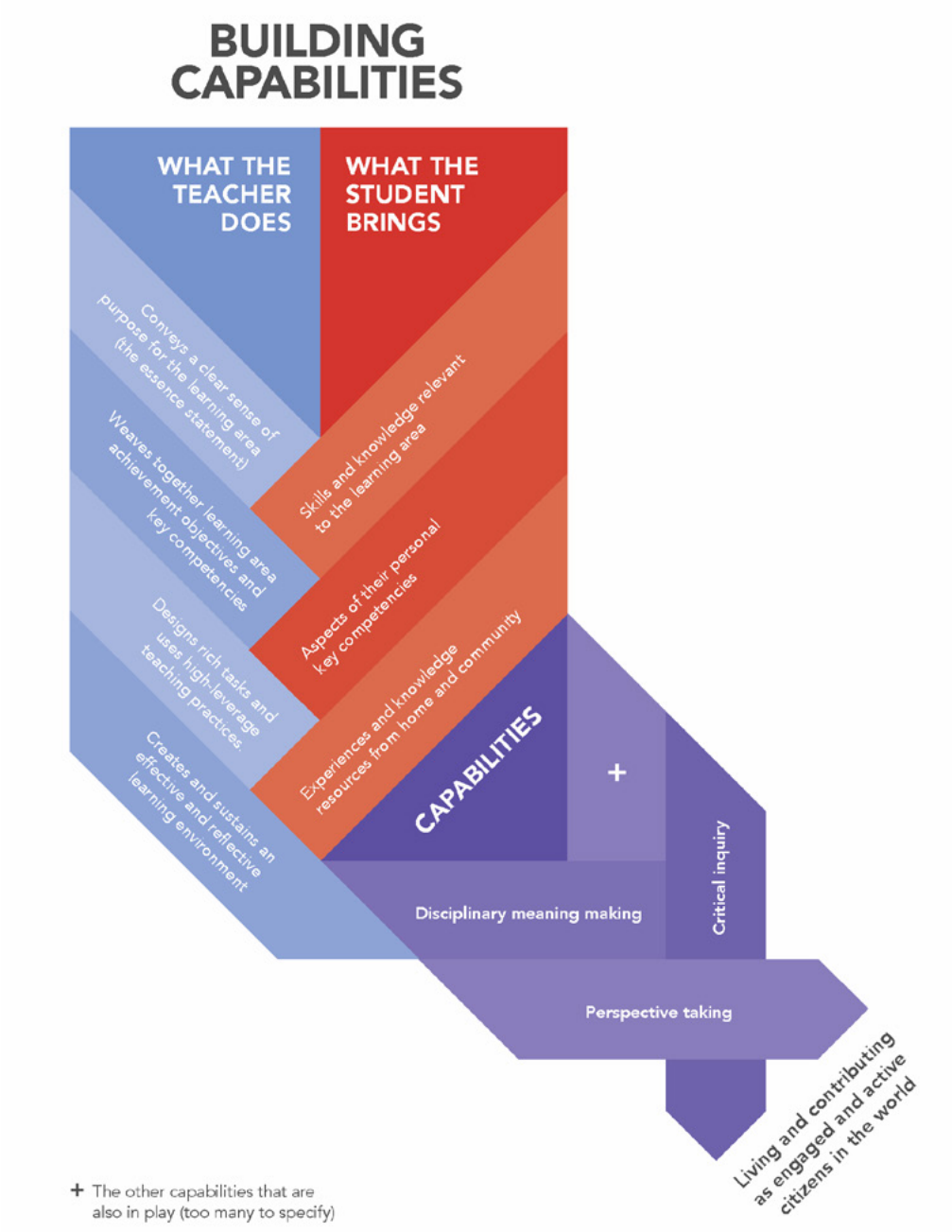
# Linking teacher decision-making to *NZC*

The table below shows links between *NZC* and the actions described on the model under "what the teacher does." Notice how different parts of *NZC* are woven together via the actions.

TABLE 1 **Links between *NZC* and teacher actions**

| Action (verbatim from model) | NZC links |
|---|---|
| Conveys a clear sense of purpose for each learning area | Summaries or Essence Statements (p.17)<br>Expanded learning area statements (pp.19–33) |
| Weaves together learning area achievement objectives and the key competencies | Key competencies (pp.12–13)<br>Values (p.10) because key competencies "draw on knowledge, attitudes **and values** in ways that lead to action" (p.12) |
| Designs rich tasks and uses high leverage teaching practices | School curriculum design and review (pp.37–42)<br>Principles as "foundations of curriculum decision-making" (p.9) |
| Creates and sustains an effective and reflective learning environment | Effective pedagogy (pp.34–36)<br>Effective uses of assessment information (p.40) |

FIGURE 1 **Building Capabilities**



# 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 that 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.

## Weaving the key competencies

The list below illustrates how students might need to draw on aspects of multiple key competencies as they demonstrate their meaning-making capabilities.

### Using language, symbols and texts

Work with the representations, tools, and methods of a knowledge area. Recognise how these cultural tools shape what can and cannot be said/known from that perspective

### Thinking

Think critically when working with the various texts of a discipline—e.g. when accessing the ideas of others, expressing own understanding and ideas, and creating ideas

Use metacognition to think about how meaning is, or could be, best expressed

### Participating and contributing

Communicate in appropriate ways to meet a specific purpose, in a specific context

### Managing self

Be prepared to make the effort to not just take meaning-making for granted (critical thinking is always effortful)

### Relating to others

Select meaning-making strategies that are appropriate to a specific audience (know what is needed to reach that audience)

## 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)
- how construction of written texts conveys meaning (grammar and vocabulary)
- how simulations, 3D visualisations and other types of multimodal texts convey complex meanings
- how body language communicates meaning (in dance and drama for example there are 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.

## 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.[1] The analysis demonstrated that each of these disciplines has its own epistemic practices. (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 NMSSA 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.

Year 8 students who have not demonstrated expected progress against the levels in the *NZC* 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.

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

# 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. In an earlier project called Key Competencies and Effective Pedagogy, this emerged as an important component of many rich learning tasks.[2]

Perspective-taking supports the *NZC* vision of educating our young people to be and become actively engaged members of society. For example, it has been shown to be essential to understanding complex issues in our world. 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.

## Weaving the key competencies

The list below illustrates how students might need to draw on aspects of multiple key competencies as they demonstrate their perspective-taking capabilities.

### Relating to others

Consider a challenge, situation, or action sequence from a different point of view

### Managing self

Requires the ability to put own thoughts and feelings to one side while exploring other ideas (see also metacognition)

### Thinking

Think critically about relevant perspectives—those that are present but also those that might be missing (e.g. critical literacy)

Metacognition—being aware of own thinking and how it might differ from others

2 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".

### Participating and contributing

Many different inquiry/action contexts require a consideration of different perspectives

### Using language, symbols and texts

Seeing from the 'perspective' of a discipline requires awareness of how knowledge is created, validated and expressed in different discipline areas

## 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.[3]

## 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:[4]

- Very young children are not able to clearly differentiate between social (intentional) perspectives of self and others.

3 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

4 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 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.[5]

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.

5 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.)

# Capabilities for *critical inquiry*

Critical inquiry is an umbrella term that signals the importance of students being active **participators** in knowledge-building. When students take an active part in authentic inquiry practices they build their awareness of how new knowledge claims are made and justified in different learning areas. They are acting like 'junior' scientists, mathematicians, social scientists, literary critics, and so on.

Different discipline areas have their own specific inquiry practices so it is important that students experience critical inquiry across the range of *NZC* learning areas. 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.[6]

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.

## Weaving the key competencies

The list below illustrates how students might need to draw on aspects of multiple key competencies as they demonstrate their critical inquiry capabilities.

### Thinking

Ask curious and critical questions (both creative and critical thinking needed)

Tease out cause and effect connections (an aspect of systems thinking)

### Using language, symbols and texts

Using the representational practices of the discipline to think with, or ask questions, or shape explanations etc. (These practices could include diagramming, modelling, drawing, using metaphors or analogies, creating flow charts etc.)

6 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

### Managing self

A *disciplined* form of creativity is needed (not just 'anything goes'): the inquiry will be bounded by the practices of the learning area and by the practicalities of the context

### Participating and contributing

Inquire into issues of relevance to students' lives

Be more discerning about knowledge sources and deal with conflicting evidence

### Relating to others

Identify own assumptions and values, and compare them with those of others (see also perspective-taking)

## The scope of critical inquiry

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.[7] 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.[8]

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.[9] 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.[10]

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.

7 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.

8 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

9 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

10 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/

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)[11] 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.

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 *NZC*—the vision that it is important to foster *students' dispositions to learn* and to *contribute as active members of society*.

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.[12]

## Developing critical inquiry

Students develop increasing sophisticated inquiry capabilities as they come to understand that new concepts and insights are not just 'out there' waiting to be picked up. Their way of understanding the status of knowledge in the world will change over time in several important ways. The names below have been chosen to broadly describe how students 'know' at different stages of their development.[13]

- **Look and know:** in the early years of school, children are just beginning to realise that what they think is different from why they think it. They can give their opinions and reasons make simple predictions, ask different types of questions and actively search for answers.
- **Thinking and explaining:** as they move through their primary school years, most children learn how to shape explanations and support them with evidence. They learn that there could be more than

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

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

13 These ideas have been synthesized from several sources, including recent research on: making progress in argumentation (http://scientificargumentation.stanford.edu/project/); students' demonstrations of their science capabilities in several New Zealand schools (http://www.nzcer.org.nz/research/publications/capabilities-living-and-lifelong-learning-whats-science-got-do-it); how children's investigative skills in science develop (http://www.nzcer.org.nz/research/publications/using-nemp-inform-teaching-science-skills); and progress maps from resource materials that support the national curriculum in Northern Ireland (http://www.nicurriculum.org.uk/curriculum_microsite/TSPC/what_are_tspc/progress_maps/index.asp)

one cause for an event, or more than one possible solution to a problem. They can shape their opinions, and give their reasons for choices and actions.

- **Knowledge testing:** In the middle years, students come to recognise that because more than one explanation could be plausible, alternatives will need to be tested against the available evidence. 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 are learning to discriminate between fact and opinion and question the reliability of evidence.
- **Open-minded reasoning**: There is an important step up from knowledge-testing to recognising and addressing *disconfirming* evidence. (Many adults cannot do this.) Older students need a lot of practice and support to consider and eliminate alternative explanations more systematically, and to identify bias and errors in arguments. They are beginning to understand that interactions between variables can make deciding and/or explaining more complex, which means they need to predict likely consequences and evaluate outcomes from a range of perspectives.

Note that the demands of a task will influence students' ability to demonstrate their critical inquiry capabilities. This means that it will be important to gather information about the learning context and/or assessment task(s) used to generate achievement data.

# Taking action (Living and contributing as active engaged citizens in the world)

Knowing when and how to take a specific course of action and being disposed to do so all come under the umbrella of this capability. Different aspects of the other 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.

Look back at the weaving diagram 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 all their capabilities.

## Weaving the key competencies

The list below illustrates how students might need to draw on aspects of multiple key competencies as they demonstrate their action-taking capabilities.

### Participating and contributing

Sustain and extend capabilities built in school (e.g. read for pleasure and leisure; take personal action for own and others' wellbeing)

Use appropriate strategies to achieve specific action plans

### Managing self

See yourself in the big picture. Demonstrate personal responsibility where there is a choice of ways to act

Be prepared to take a risk and try something new, and to learn from mistakes

### Relating to others

Be respectful of appropriate practices in different cultural contexts

Show awareness of impact of own choices and actions on others

### Thinking

Use cause and effect thinking to work out possible solutions and consequences (see also critical inquiry)

Metacognition: show awareness of own strengths and areas where it could be necessary to ask for help and support.

### Using language, symbols and tests

Specific types of meaning-making will always be needed, as relevant to the context and tasks

## The scope of taking action

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: When we see instances of participation, such as those outlined below, we will know that our young people are successfully taking their learning into the world.

- 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.

## Developing action taking capabilities

Many 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. For younger students the relevant curriculum ideas will be simpler and fewer, with conceptual depth and cross-curriculum complexity gradually increasing over time.

The nature of the context will also determine how readily students are enabled and supported to take action. More familiar contexts will be less challenging than those that where students need to build personal familiarity, knowledge and confidence before they can determine an appropriate course of action and take it.

# Aspects of critical inquiry summarised from a range of frameworks

This appendix summarises each aspect of critical inquiry to reflect content from different critical thinking 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 counter-evidence 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.

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