

Sustainability education

Enough for all, forever

Mātauranga toitūtanga

Mā te katoa, mō āke tonu atu

Nāu tō rourou, nāku tō rourou, ka ora ai te iwi. With your food basket and my food basket, there will be enough for all.

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About this resource | Mō tēnei rauemi

Sustainability education – Enough for all, forever | Mātauranga toitūtanga – Mā te katoa, mō āke tonu atu, is designed to support New Zealand secondary school teachers to implement and assess action-based learning within sustainability kaupapa. The teaching and learning approaches outlined in this resource encourage teachers|kaiaako to create opportunities for students|ākonga to explore their own values as well as those of others; to make meaningful connections to place and people, and to develop a range of decision-making and collaborative skills, whilst taking meaningful action for a sustainable future. The approaches are consistent with those advocated for in climate change education (CCE).

This resource is a toolbox of inspiration for teachers to dip into; to access ideas and tools that will support them to scaffold student learning, and to build confidence in their own understanding of what underpins successful learning and positive assessment outcomes in sustainability education.

The resource aims to:

- support schools to engage with the NCEA Education for Sustainability (EFS) Achievement Standards (AS) by providing clarity and an effective framework for teachers and students
- build teacher confidence to utilise effective pedagogical approaches that underpin successful sustainability learning, action and assessment
- support students in developing the key understandings necessary for success in the Education for Sustainability Achievement Standards
- support teachers to acknowledge the learning and actions their students undertake, whether in a classroom or an extracurricular setting
- model culturally responsive pedagogies.

It will do this by:

- introducing a new inquiry framework - Pakirehua
- demonstrating links between the key concepts of sustainability and student action
- identifying the key learning outcomes of sustainability education, and linking these to NCEA assessment opportunities
- modelling the use of connections to local contexts and issues by exploring student case studies
- showcasing sustainability as a context for place-based, student-centred pedagogies and as the basis for a local curriculum
- integrating culturally responsive elements throughout.

We acknowledge that this resource has been written with the current Achievement Standards in mind. After the current NCEA review, these Achievement Standards will change. However the key concepts underpinning sustainability education and the pedagogical approaches suggested within this resource will remain relevant. This resource will be reviewed after resulting changes to NCEA have been gazetted.

Nāu tō rourou, nāku tō rourou, ka ora ai te iwi.
With your food basket and my food basket,
there will be enough for all.

This whakataukī speaks of collaboration and community. It acknowledges that everyone has something to offer. It emphasises that, by working together, pooling our ideas and integrating our positive actions, we can achieve whatever is needed for a sustainable future. In the context of sustainability, with this whakataukī we can acknowledge the dependance of people on nature, and the need to work together toward a better future, not just for ourselves but for the planet.

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Sustainability education – the theory | Mātauranga toitūtanga – te ariā

What is sustainability education?

In sustainability education, teachers support students in a collaborative manner, to think and act in ways that sustain and regenerate the future wellbeing of people and the planet. At the heart of sustainability education is action that is designed to address sustainability issues and lead to a more sustainable future. Ākonga | students build their knowledge in order to plan and take informed action, thereby developing a sense of agency, building resilience and hope for the future.

Ko au te awa, ko te awa ko au.
I am the river, and the river is me.

This whakataukī of the Whanganui river iwi speaks to a deep spiritual connection between people and place. It articulates the concept that underpinned their long struggle for the Whanganui to be recognised in law, as the first awa in Aotearoa to be granted legal personhood. It is also used by iwi in the Waikato region and elsewhere in Aotearoa who feel the same sense connection to their awa.

In the context of sustainability education, this whakataukī reminds us that our relationship with the environment is integral - we are part of nature and nature is part of us; inextricably linked. Everything we do impacts upon, and is impacted by, the environment around us. Out of this relationship comes the responsibility to look after our world - kaitiakitanga. This whakataukī encourages us to explore the related concepts of whakapapa, whenua, wairua, whanaungatanga, whānau and how they relate to ourselves, our students, our communities and our local environments.

These concepts are expressed, to some degree, using words such as interdependence, interrelationships, interconnectedness and ecosystems.

Sustainability education is about supporting students to take informed action for a sustainable future. Authentic opportunities are utilised to develop creative, reflective and critical thinking, whilst fostering student participation, shared agency, and action for a sustainable future. Sustainability education offers opportunities for students to make meaningful connections to nature – to explore the interrelationships between people and all other living things; and to build understandings through their experiences that foster values of respect, connection and kaitiakitanga. It allows students to express who they are culturally and provides an opportunity to acknowledge and utilise mātauranga Māori in a meaningful way. A sustainable future requires the development of ways of thinking and acting to meet the needs of the present generation without compromising the needs of future generations.



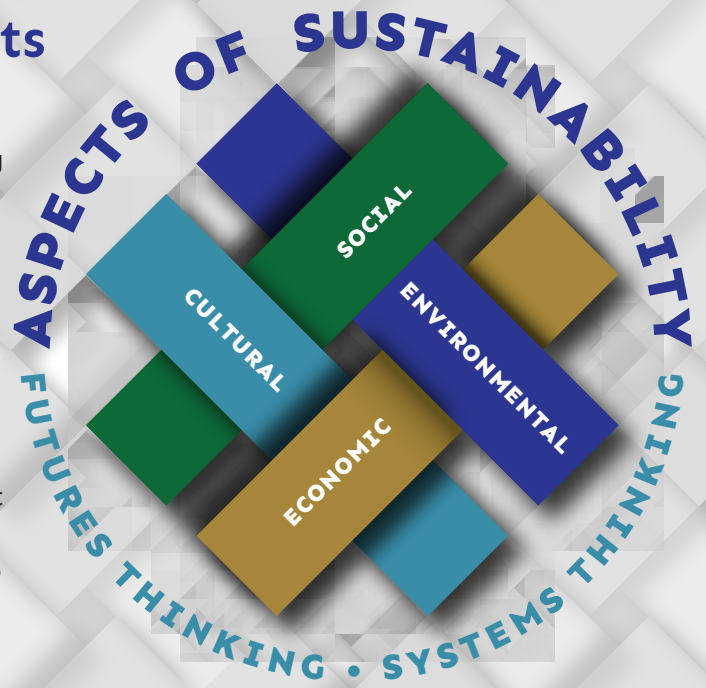
Sustainability education is also referred to in a variety

of other ways, including: Environmental Education (EE); Education for Sustainability (EFS); Education for a Sustainable Future (ESF) and Environmental Education for Sustainability (EEFS).



Key sustainability concepts

Planning and action for a sustainable future requires students and teachers to build a good understanding of the concepts underpinning sustainable thinking. For success in the Education for Sustainability Achievement Standards (EFS AS), students must be able to express their understandings of these concepts in relation to the context of their action in relation to the issue they have chosen. They need to demonstrate that they have identified which key concepts are relevant to the issue and how they connect to the action, initiative or the wider context of the issue. The interconnectedness of the key concepts of sustainability is shown in the diagram to the right.



The four aspects of sustainability are described below. They are lenses through which issues can be viewed. The diagram above shows how these overlap and are woven together to create a holistic picture of an issue, action or solution. The right hand column in the table below lists some suggested contexts and concepts that could be used to explore them. This page is designed to help ākonga see connections between issues and the key sustainability concepts.

<p>The ENVIRONMENTAL aspect acknowledges the need to enhance and maintain the biophysical systems that sustain all life on Earth. It includes understanding and exploring the structure and function of natural ecosystems and the interactions between them and people, and calls for the practice of kaitiakitanga.</p>	<p>biodiversity - biosecurity - interdependence - inter-relationships - interconnectedness - kaitiakitanga - whakapapa - conservation - sense of place - whenuatanga - personal responsibility - climate change - connection - regeneration - turangawaewae</p>
<p>The CULTURAL aspect acknowledges the need to nourish and share attitudes and values that represent diverse world-views, and the need for all people to be able to express their views freely and respectfully to participate in decision making. Addressing these needs can build resilience for the future.</p>	<p>diversity - values - principles - common practices - attitudes - perspectives - tolerance - tikanga - democracy - collaboration - community - partnership - whānau - iwi - ako - participation - responsibility - kaitiakitanga - heritage</p>
<p>The SOCIAL aspect acknowledges the need for equity within and between ethnic and social groups. It is inclusive of people’s mental and physical wellbeing and the cohesion of their communities, acknowledging the in-equitable impacts of how resources are distributed, within both global and local perspectives.</p>	<p>equity - intergenerationality - whanaungatanga - manaakitanga - inclusivity - connectedness - relationships - wellbeing - social justice - whakapapa - globalisation - think local-act global - responsibility - fair and equitable distribution of resources</p>
<p>The ECONOMIC aspect of sustainability acknowledges the interactions of humans with the natural environment, using resources to create goods and services which add value to their lives, but within the capacity of the planet. It encourages a fair trading system that equitably distributes benefits and costs. It fosters innovation and creativity in business, industry and development that lead to a sustainable future.</p>	<p>equity - distribution - resources - trading - value - circular economy - exchange - innovation - fair trade - globalisation - entrepreneurship - sharing - crop swap - food security - barter - altruism - heritage - sustainable tourism - fair and equitable distribution of resources - heritage - sustainable tourism</p>

FUTURES THINKING

Exploring how our society and environment may be shaped in the future through a creative process utilising divergent thinking and examining the consequences of past and future action.

SYSTEMS THINKING

A holistic approach acknowledging the interconnectedness and interdependence of all living things and their environment.

Whatungarongaro te tangata, toitū te whenua. As people disappear from sight, the land remains.

This whakataukī speaks to the importance and permanence of land. While people come and go, the land remains. It reminds us that we are connected to, and rely upon, the environment: that we must think long term and understand the big picture in a holistic and connected way, to ensure a sustainable future for all, forever. It reminds us that our future as humans is inextricably linked to that of the planet.

Sustainability concepts are explored within relevant and meaningful contexts. Students are encouraged to address local issues, but to also think in a wider context - regional, national and/or global. Decisions about which context(s) to utilise or explore should be co-constructed with students. This provides them opportunities to learn in a meaningful setting, exploring and developing a sense of place and agency within their environment and community.

It is important for students to find a solution for the issue they explore rather than creating a superficial change or alleviating the symptoms. The key to effective action is that it is directed and planned to address the cause of a problem, the root of an issue. However, students often feel powerless in the face of huge environmental issues. Offering opportunities for problem solving and for developing agency allows them to remain focused on hope and possibility rather than despair. However, students often need to be reminded that the action they take, no matter how small, will have an impact. Students are encouraged to create criteria which they can use to reflect upon and evaluate the success of their action(s).

The ability to critically reflect upon the current situation, understandings, skills, values and attitudes underpins sustainability education. Critical thinking is crucial to make necessary decisions and become change-makers.



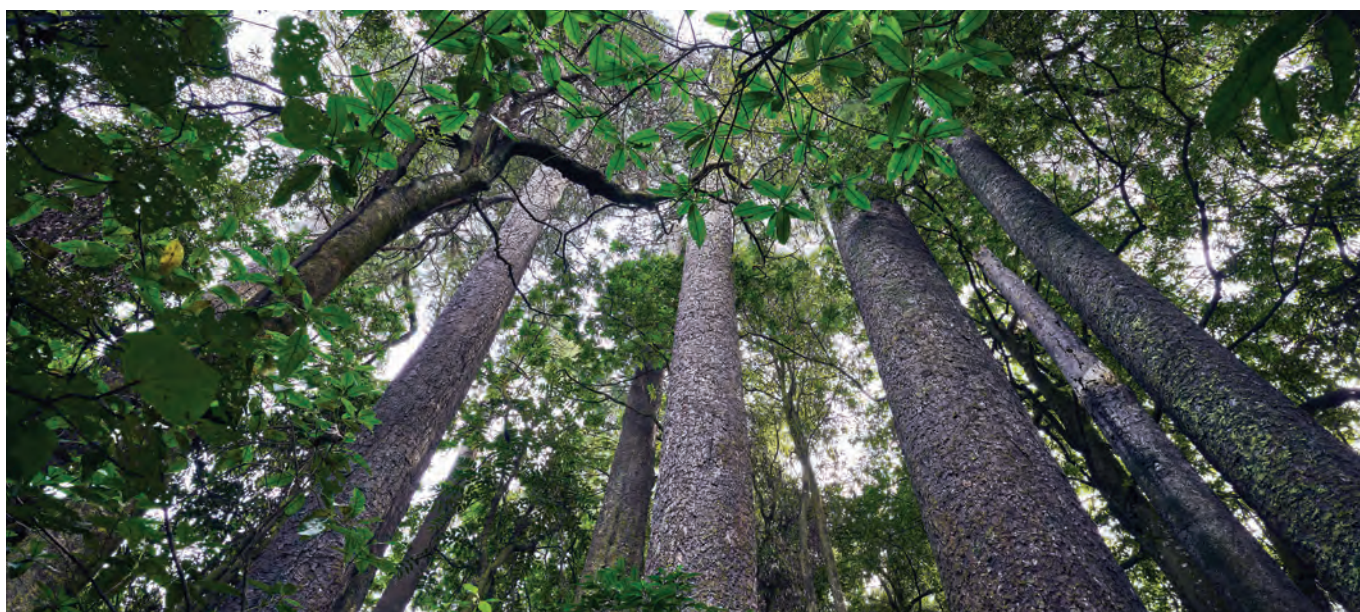
Some contexts for sustainability education learning are: offshore or mainland islands; marine reserves; fishing; mahinga kai; night sky reserves; green technology; transport; urban sprawl; climate change; erosion; waste; regenerative agriculture; biodiversity; thermal energy; food production and water quality.

More information can be found in the Education for Sustainability Teaching and Learning Guide (see reference section).

He iti te mokoroa, nāna i kati te kahikatea.

The mokoroa (grub) may be small, but it cuts through the Kahikatea.

This whakataukī reflects that small things can have a great impact. It encourages us to think big. Although numbers or resources may be small, like the mokoroa, it is possible to achieve great things.



Where does sustainability education fit?

Sustainability has been formally positioned in the New Zealand Curriculum (NZC) within the Vision, Principles and Values. As such, it has the potential to be integrated within and across any of the learning areas. The various national curriculum documents in Aotearoa ensure that learners are equipped to participate in and contribute to their own society, the wider world and to the future.

“ Students can learn *about* action (how to envisage the future and ways of achieving their vision), learn *through* action (experiencing planning and action taking), and learn *from* action (having opportunities to reflect on their actions and the actions of others to determine their efficacy).
(Birdsall S, 2010) ”

Sustainability learning can fit anywhere in the curriculum.

Literacy and numeracy skills are inherent, as are the Key Competencies. Many people see a natural fit for sustainability within the social sciences and sciences learning areas, largely due to the contexts often chosen for learning. However, the approaches we suggest in this resource demonstrate how sustainability also aligns well with other learning areas. The future-focus and action-based inquiry approaches are consistent with good practice in both the technology and health areas. Sustainability inquiries can often be data-rich and can be easily incorporated into a maths programme. Traditionally, teachers often expect written reports to provide evidence for learning in NCEA assessments: these can satisfy a range of english learning outcomes, as can aspects the inquiry. There is ample opportunity for students to conduct their inquiries and provide evidence of learning through other means, and in other learning areas, such as drama, video, media, design and art. The focus on mātauranga Māori, and the inclusive nature of learning through sustainability education provides opportunities for students to work within their own cultures and languages.

Waiho i te toipoto, kaua i te toiroa.
Let us keep close together, not wide apart.

This whakataukī speaks to the importance of keeping connected, of maintaining relationships and dialogue so that we can keep moving forward together.

Structuring learning around a sustainability theme or context provides opportunities for students to consider significant future-focused issues and become empowered to take action toward a sustainable future. It offers opportunities for students to make meaningful connections to society and the environment, as they grow to become competent members of society, developing a sense of responsibility through participation and action, benefiting their whānau, community and the local environment. Often the issues are complex and, to fully explore them, students often utilise skills pertinent to a range of curriculum learning areas.

Many secondary schools have introduced some form of problem-based, project-based or cross-curricular learning opportunities for students in the junior school. These are perfect places for sustainability education to fit, where the curriculum is more flexible and inquiry-based. Time can be given for students (and teachers) to gain experience, and build their skills and understandings before the higher-stakes NCEA years.

The case studies in Section three offer an insight as to how teachers have incorporated the learning into their programmes and some of the student work that was generated.

Teaching and learning within the sustainability kaupapa provides ample opportunities to demonstrate the values of teaching in action. By modeling good practice that supports and empowers students, they are able to connect with their place in the environment; take into account their own and other people's values and interact and work collaboratively with their peers, teachers and community in meaningful ways.

“It is most effective when whānau, hapū and iwi work together with schools and services to determine the cultural competencies that are particular to their communities.
(Ka Hikitia 2013)”

Exploring local sustainability issues provides a meaningful way for schools to co-create a local curriculum that is relevant for their students and wider community. It offers meaningful 'real world' contexts for place-based and problem-based learning, with connections across the whole curriculum. It fosters strong relationships and partnerships between teachers, students, the school, their whānau and local iwi/hapu — drawing upon the strengths and skills in the local community.

By incorporating action-based sustainability learning opportunities into school programmes, teachers have an ideal opportunity to put their own professional standards into action, and to build on their cultural competencies through the pedagogies they employ. Tātaiako, Ka Hikitia and Tapasā are three resources that can be utilised by teachers to support them with building their cultural competencies.



Exploring pedagogy

The pedagogies suggested in this resource have a strong basis in culturally-responsive practice and effectively foster Action Competence. The term Action Competence describes a set of attributes necessary to enable students to take action for a sustainable future.

Building Action Competence requires effective learner-centred teaching and learning approaches. These empower and encourage students to become strongly engaged in their learning and supports them to think critically about issues. Using these place-based, culturally responsive pedagogies fosters an ethic of care for one's self, for others, and for the environment.

Ko te tamaiti te pūtake o te kaupapa. The child – the heart of the matter.

This whakataukī (used by the Education Review Office) speaks to putting student learning needs first. In the context of this resource, it is a reminder that students' needs, skills, prior learning, backgrounds and community should be at the centre of the programme teachers design, and that the pedagogies chosen should allow the students to lead their learning.

Ka Hikitia (Ministry of Education, 2013), stresses the importance of identity, language and culture; teachers knowing where their students come from; building on what students bring with them and the importance of creating productive partnerships among teachers, Māori learners, whānau and iwi. Sustainability education creates opportunities to support the aims of Ka Hikitia for all students. Exploring and acknowledging the views and knowledge held by tangata whenua and mana whenua adds a richness and diversity to the learning process for both ākonga and kaiako. Discussing whakataukī can be an effective way to connect to Te Ao Māori and to build on understandings of mātauranga Māori, as can the exploration of local narratives, pūrākau, waiata etc.

Kaiako are asked to support their students to explore meaningful and relevant contexts that are important to them, allowing them to acknowledge and value their own experiences, identities and cultures; creating the freedom to make decisions and express themselves with integrity. The development of Action Competence is supported by pedagogies that embody the whakataukī introduced at the beginning of the resource: Nāu tō rourou, nāku tō rourou, ka ora ai te iwi | With your food basket and my food basket, there will be enough for all. By working together, integrating our ideas and actions, we can achieve whatever is needed for a sustainable future. We acknowledge the interdependence of people and nature, and the need to work together toward a better future, not just for ourselves but for the planet.

“In a society where change is constant and teamwork is a way of life at work, the lessons learned through involvement in problem-based learning are essential for students' career development.
(Flint, W, 2007) ”

Ako - a partnership in learning is developed where both students and teachers play a part: with students leading and teachers supporting. Often, teachers will learn alongside, or from, their students. As students | ākonga develop their Action Competence, teachers | kaiako can also develop their own.

Cooperative Learning - students work in teams, identifying and utilising the various skills and strengths of team members while collaborating to achieve commonly agreed goals and negotiating to solve problems.

Wānanga - discussion and reflection occurs throughout the learning process; exploring values and perspectives of members of the group, teachers, students and community. Wānanga includes co-construction. For example, by mutually deciding upon contexts to explore with their students, teachers are able to respond to their needs, identities, languages, cultures, interests, strengths, and aspirations.

Inquiry - a pedagogy where students investigate, research or explore a topic that piques their interest.

Pakirehua

This inquiry framework has been named Pakirehua to acknowledge that inquiry is a natural process embedded within local, Aotearoa learning settings. This diagram shows Pakirehua embedded within the community and environment, which provide context, background and relevance for student learning. Central to this diagram is the koru showing the phases of student inquiry. The concepts within the koru illustrate students' skills and understandings that support the inquiry process. The layers interact to create a unique set of circumstances for each student, and challenge teachers to design the curriculum to meet their needs. This framework offers a reminder and opportunity for teachers to encourage students to explore aspects of their world, allowing them to draw on their prior knowledge, relationships, values, cultures and identity as they undertake a change-making process of action-based inquiry - Pakirehua.

Pakirehua embedded in the student's world



I orea te tuatara ka patu ki waho. A problem is solved by continuing to find solutions.

This whakataukī speaks to the need for creative thinking, adaptability and perseverance. All of these are important problem solving skills. Continually thinking creatively to address the issue or problem that sparked the inquiry, reflecting on what is possible, what will/won't, did/did not work, builds resilience and fosters perseverance to overcome obstacles and think creatively to develop solutions.

Pakirehua is not designed to replace existing inquiry models, but to clearly identify key aspects of effective teaching and learning within a sustainability inquiry. The commonalities with many other inquiry processes can easily be seen. Explanation of the process is found within the diagram on page 11. Students are encouraged to work cooperatively in groups to conduct their inquiries. Some students will require more scaffolding than others with different parts of the process.

One main point of difference between inquiry within sustainability kaupapa and many other inquiry models, is that students are encouraged to take their learning an extra step; to include recommending, planning and taking action; working towards the resolution of environmental questions, issues, and problems.

The Pakirehua cycle is depicted as a koru and is a representation of a spiral learning process. Key learnings are reinforced throughout. As students move through an inquiry, they are building skills, connections, confidence, capabilities and understandings, and making a positive impact on their environment. They reinforce, and utilise, these every time they embark upon another inquiry. The most successful inquiries at NCEA level are those undertaken by students who have had practice with inquiry. As many primary schools undertake forms of inquiry with their students, it is important for secondary teachers to acknowledge prior learning and build upon the inquiry skills they may already have.

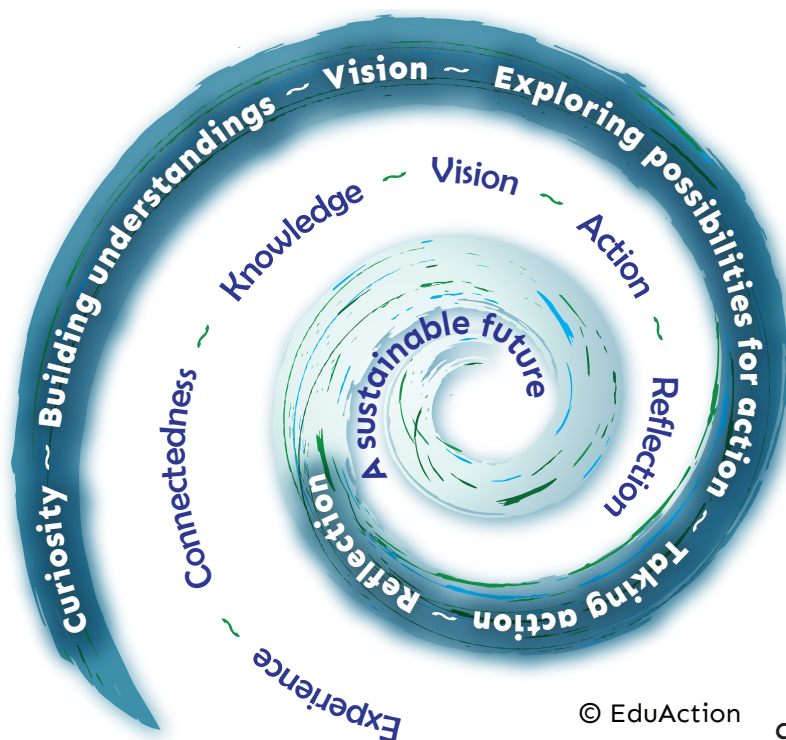


There are a variety of inquiry models. Some of these are widely utilised, whereas others have been developed specifically to meet the needs of a local or school-based curriculum or focus on inquiry. Other inquiry models include: Action Learning Cycle (familiar in Enviroschools, Health and Outdoor Education); Problem Based Learning; Future Problem Solving; Technology Design Process and the Action Competence learning process.

Developing Action Competence through Pakirehua

This diagram shows how the stages of Pakirehua are closely aligned with the attributes of Action Competence — by utilising Pakirehua as a framework for learning, students develop Action Competence. One key attribute of Action Competence is the concept of connectedness. Connectedness can be demonstrated in many ways, including: students' connection to the natural world; cultural connections; connecting values to actions; the interdependence within ecosystems and the interconnectedness between ecosystems and people; and a sense of belonging in society. The other attributes of Action Competence can be found in more detail in the Action Competence Framework (see the reference section).

Pakirehua aligned with Action Competence





The framework shows both the types of support a teacher might provide, and the actions and activities that students might be undertaking at each phase of the inquiry. Initially, students may have little experience conducting their own inquiry and will need significant scaffolding to support them. Relevant thinking templates, found in Section 4, and are referenced at each stage of the inquiry by using the first letters of each title as a key. For example, EV refers to Evaluating our Success.

Pakirehua - Ako in action



Exploring possibilities for action
Encourage students to think deeply and creatively about the consequences of their action whilst planning the details necessary for success. Students may need to revisit earlier phases of the inquiry at this stage.

Taking action
Encourage resilience, flexibility and problem solving - students may encounter unanticipated barriers or challenges possibly requiring them to revisit their plans, or actually be unable to complete the planned action.

Reflection
Support students to regularly reflect through the inquiry, evaluating their successes, challenges and failures on a personal and group level. Encourage students to think critically about the viability and effectiveness of their ideas, options, plans and actions; planning and recommending any further action or next steps. Support students to link their reflections and evaluations to the key sustainability concepts. (See page 3)

Exploring possibilities for action
Explore alternative solutions; decide what action/s might be best, and think through the steps necessary for successful action. (SS, CW, EV, CC, PA, DP)

Taking action
Students use their planning to inform and guide them as they carry out action. (PA, DP)

Reflection
Students use reflections from the inquiry, to evaluate the effectiveness of the action and on the learning or new perspectives they have gained, whilst considering possible next steps. (EV, CC, MS)

Vision
Explore ideas and visualise a sustainable future. (SS, CW, EV, CC)

Building understandings
Identify what questions still need to be answered; decide on an issue; sort ideas; focus in depth on one issue. (SS, CW)

Curiosity
Explore and share their own interests, heritage, and what excites them about the world around them.

Vision
Support students to visualise what a sustainable future might look like.

Building understandings
Facilitate discussions; support use of the thinking templates; foster research by connecting to useful expertise or resources. Each inquiry should focus on one issue at a time.

Curiosity
Utilise students' prior knowledge, culture, experience and interests. Design and immerse students in activities that stimulate their curiosity and foster engagement: rich, challenging experiences, exploring a range of current, local and meaningful issues and contexts.

Mahi (Ākonga)

Tautoko (Kaiako)

Sustainability education and NCEA | Wāhanga 2: Mātauranga toitūtanga me te marautanga

SECTION 2

Ka mate kāinga tahi, ka ora kāinga rua.
There is more than one way to achieve an objective.

The Education for Sustainability Achievement Standards (EFS AS) were developed for NCEA Levels 2 and 3 to acknowledge the learning achieved by students involved in sustainability programmes. NZQA has positioned these standards under the Social Science domain.

As part of the development of the EFS AS, learning objectives were written for Levels 7 and 8 of the curriculum, designed to dovetail with the learning outcomes already existing in the eight learning areas of the NZC.



These standards are also consistent with the achievement objectives from Te Marautanga o Aotearoa. See Papa Whakaako for the relevant learning area(s).

Level 7 Learning Objectives

- Investigate how to enhance and maintain biophysical systems and improve biodiversity.
- Investigate the aspects of sustainability in different contexts.
- Examine the values and behaviours that will contribute to a sustainable future.
- Plan, implement, and evaluate personal action for a sustainable future.

Level 8 Learning Objectives

- Evaluate social, economic, and technological measures that could be taken to sustain natural resources and improve biodiversity, now and for the future.
- Analyse the impact of strategies and initiatives for a sustainable future.
- Analyse the values of different groups of people, how these values are expressed in various practices, and the present and future consequences for sustainability.
- Analyse actions necessary for sustainability and plan, implement, and critically evaluate personal action for a sustainable future.

The EFS AS were designed as a set, assessing different aspects of the learning achieved through student inquiry, culminating in students taking action for a sustainable future. However, the EFS AS can also be used independently, integrated with other learning and assessment. For successful learning outcomes, if they are used in this way, room needs to be made in the programme for specific sustainability teaching and learning to occur.

Most of the internal Achievement Standards at Level 3 are a direct step up from those at Level 2 (2.1 - 3.1; 2.2 - 3.2 and 2.3 - 3.3). The step up for students largely involves their reflections, evaluations and critical thinking becoming more in-depth and richer, especially regarding the analysis of connections between their action and the key concepts of sustainability. The focus of teaching to reflect this step up moves from a guiding role, to scaffolding an informed, independent, action-based inquiry.

The Level 3 external Achievement Standards (3.3 and 3.4) are portfolio-style assessments and the Level 2 externals (2.4 and 2.6) are assessed through formal examinations.

Other Achievement Standards potentially relevant for assessing sustainability learning at Levels 1, 2 and 3 can be found across a variety of other learning areas. Some learning areas have especially strong synergies with sustainability, particularly those that support students to learn how to think critically and

take informed actions. Sometimes there is an opportunity to utilise a mixture of AS where some of the underpinning skills and learnings are similar. Several have a significant overlap, and it may be possible to structure a student learning programme designed to take advantage of these learning synergies. Some more obvious synergies are listed in the table below. Other subject areas also offer opportunities to assess aspects of learning in sustainability, such as english, graphics and media studies, especially in terms of communication, presentation, and reporting. The *Tips for teaching and learning*, listed for each standard, are derived from the EFS Assessment reports from NZQA, student work and the experience of experts in the field. They provide support for improved assessment outcomes.

Level 2 EFS Achievement Standards

AS90810 EFS 2.1

Undertake a personal action, with reflection, that contributes to a sustainable future (6 credits; Internal)



This AS requires students to go through the whole inquiry cycle, from planning and collaboration to action and reflection.

Key learning outcomes for students

- Plan an action.
- Take a personal action.
- Effectively reflect in order to draw conclusions about the impact of their action on a sustainable future.

Tips for teaching and learning

- Link the planning, action and reflection to a sustainability issue.
- Use data collected (quantitative or qualitative) as evidence for an in-depth and critical reflection.
- Suggest alternatives and next actions for personal and social responsibility.
- Reflect on personal shifts in behaviours and values, as well as those of others.
- Connect the action to students' ideas of a sustainable future, weaving in concepts of manaakitanga and kaitiakitanga.
- Consider the implications and future impacts of the action.

Other subject Achievement Standards with learning synergies

AS91158 Biology 2.6 - Investigate a pattern in an ecological community, with supervision.

AS91280 Social Studies 2.2 - Conduct a reflective social inquiry.

AS91282 Social Studies 2.4 - Describe personal involvement in a social action related to rights and responsibilities.

AS91237 Health 2.3 - Take action to enhance an aspect of people's wellbeing within the school or wider community.

AS91354 Technology 2.1 - Undertake brief development to address an issue.

AS91355 Technology 2.2 - Select and use planning tools to manage the development of an outcome.

AS90811 EFS 2.2

Explain how human activity in a biophysical environment has consequences for a sustainable future (4 credits; Internal)



Local examples of human activity can be used effectively for this AS, e.g., local industry, land use, tourism.

Key learning outcomes for students

- Understand the characteristics of a biophysical environment.
- Explain human impacts in a biophysical environment.
- Explain the consequences of human impacts on a sustainable future.

Tips for teaching and learning

- Gathering data is important to use as evidence.
- Describing the biophysical environment is required.
- Link the the impacts to the ideas of a sustainable future, weaving concepts of manaakitanga and kaitiakitanga throughout.
- Impacts can be negative or positive.

Other subject achievement standards with learning synergies

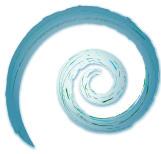
AS91158 Biology 2.6 - Investigate a pattern in an ecological community, with supervision.

AS91240 Geography 2.1 - Demonstrate geographic understanding of a large natural environment.

AS91298 Agriculture and Horticulture 2.6 - Report on the environmental impact of the production of a locally produced primary product.

AS90813 EFS 2.3

Demonstrate understanding of how different personal values have implications for a sustainable future. (3 credits; Internal)



Taking action is not a requirement of this AS but is best achieved if students are reflecting within the context of their own actions.

Key learning outcomes for students

- Understand what a personal value is.
- Reflect on their own personal values about an issue.
- Evaluate others' personal values and how they impact on a sustainable future.

Tips for teaching and learning

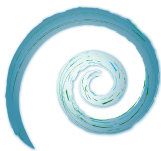
- It is important that students demonstrate they have explored their own values as well as the values of others.
- The values must be related or linked to, perspectives and/or behaviours.
- The implications of the values and consequent behaviours must be linked to a sustainable future.

Other subject Achievement Standards with learning synergies

AS91245 Geography 2.6 - Explain aspects of a contemporary New Zealand geographic issue.

AS91733 EFS 2.4

Demonstrate understanding of initiatives that contribute to a sustainable future (4 credits; External)



This external AS is assessed in an exam format. Students will be given two case studies outlining environmental initiatives such as: a small composting business; coffee roasting and blending production; a construction business recycling waste. Students will answer a series of questions to demonstrate their understanding of how the initiative contributes to a sustainable future.

Key learning outcomes for students

- Identify aspects of sustainability in a case study outlining an initiative.
- Explain how an initiative contributes to a sustainable future.

Tips for teaching and learning

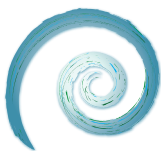
- A deep understanding of the key sustainability concepts is important.
- Exploring the concept of a sustainable future.
- Weave in concepts of manaakitanga and kaitiakitanga.

Other subject Achievement Standards with learning synergies

AS91600 Social Studies 3.5 - Examine a campaign of social action(s) to influence policy change(s).

AS91734 EFS 2.5

Develop a collaborative response that promotes a sustainable future, in relation to a current issue (4 credits; Internal).



A response that promotes a sustainable future should include:

- working cooperatively with peers and stakeholders
- Systems Thinking
- Future Thinking
- data collection.

Key learning outcomes for students

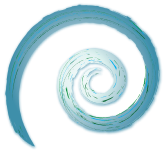
- Reflect on how to work collaboratively with others to plan a response or action to address a current issue.
- Develop a plan for a response or action.
- Understand how the response links to aspects of sustainability.

Tips for teaching and learning

- A response may include a strategic plan; a vision statement; an art work, drama or dance; a technological artifact.
- Student's individual contributions need to be evident in the response.
- Explore the interconnectedness of elements within a system, weaving concepts of manaakitanga and kaitiakitanga throughout.
- Students should develop their vision for a sustainable future.

AS90814 EFS 2.6

Develop understanding of aspects of sustainability in different contexts (4 credits; External)



This external AS is in an exam format. Students are provided with case studies and a series of questions to prompt them to apply and demonstrate their understanding of the key concepts of sustainability. Past case studies include:

- Paris Climate Agreement
- school 'Strike for Climate'
- responsible air travel.

Key learning outcomes for students

- Understand how aspects of sustainability apply in different contexts.
- Explain the interrelationships among the aspects of sustainability in different contexts.
- Understand potential changes in local, and/or international practices that would promote sustainability.

Tips for teaching and learning

- A deep understanding of the key sustainability aspects and how they intersect is important (see page 4).
- Explore the concept of a sustainable future and describe what it could be like.
- Explain how initiatives can impact upon behaviour change.
- Integrate concepts of manaakitanga and kaitiakitanga.

Level 3 EFS Achievement Standards

AS90828 EFS 3.1

Evaluate a personal action that contributes towards a sustainable future (6 credits; Internal)



This AS is designed to develop a student's evaluation and reflection skills, building on a past action. For example, a past action taken for AS2.1 can be built upon or developed further for this standard.

Key learning outcomes for students

- Carry out research and/or a practical investigation to develop and inform a plan for personal action.
- Evaluate a personal sustainability action.
- Identify the aspects of sustainability within the action.
- Understand that actions can change attitudes and/or behaviours.
- Be able to draw conclusions about the impact of a personal action on a sustainable future.

Tips for teaching and learning

- Consider the validity and reliability of the data collected.
- Discuss the effectiveness of the plan in relation to the expected outcomes.
- Explain any modifications of the plan and what would they do differently next time.
- Weave concepts of manaakitanga and kaitiakitanga throughout project planning and action.
- Use two or more of the key sustainability concepts to reflect on how the action may contribute to a sustainable future. The following excerpt of student work shows a shift in values and behaviour in the community, due to the action of ecological restoration creating social and environmental wellbeing. *Because my action involved multiple community members we saw the discussion change from "We did that before and it never works" to "I have never seen so much buy-in and community support. Well done! I can see it has already made a difference to how the space is being used."*

Other subject Achievement Standards with learning synergies

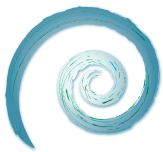
AS91597 Social Studies 3.2 - Conduct a critical social inquiry.

AS91608 Technology 3.1 - Undertake brief development to address an issue within a determined context.

AS91609 Technology 3.2 - Undertake project management to support technological practice.

AS91735 EFS 3.2

Evaluate measures that may be taken to sustain and/or improve a biophysical environment (4 credits; Internal)



This AS is designed to build on learning from EFS AS 2.2, but 2.2 is not a prerequisite.

Key learning outcomes for students

- Understand the characteristics of human impacts and the consequences of these on a biophysical environment.
- Analyse the potential of possible measures that may be most effective in terms of sustaining and improving a biophysical environment.

Tips for teaching and learning

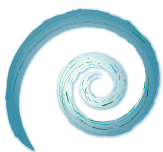
- The characteristics of a biophysical environment must be described.
- Students must analyse the relationship between humans and the biophysical environment through the lenses of the aspects of sustainability.
- In this AS the term 'measures' could be social, cultural, economic and/or technological, and must be designed to address a sustainability issue.
- The measures are to be evaluated in terms of their effectiveness and their future implications.

Other subject Achievement Standards with learning synergies

AS91432 Geography 3.7 - Analyse aspects of a geographic topic at a global scale.

AS91736 EFS 3.3

Analyse how different world-views, and the values and practices associated with them, impact on sustainability (4 credits; External)



Students submit a written report that provides evidence of a systematic investigation into, and analysis of, TWO different world-views and their implications for a sustainable future.

Individual research and independent critical analysis must be evident in the report.

Key learning outcomes for students

- Understand that there are different world-views which have associated values and actions.
- Understand that different world-views have an impact on sustainability.
- Understand that world-views are complex.

Tips for teaching and learning

A world-view represents perspectives, ideologies or theoretical positions. They could be from two different historical periods; cultures; spiritual/belief systems; civilisations or political/economic systems. Students should draw conclusions based on evidence and using examples about the similarities and differences of the world-views in terms of their impact on aspects of sustainability.

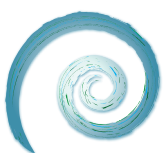
Other subject Achievement Standards with learning synergies

AS91427 Geography 3.2 - Demonstrate understanding of how a cultural process shapes geographic environment(s).

AS91279 Social Studies 2.1 - Demonstrate understanding of conflict(s) arising from different cultural beliefs and ideas.

AS90831 EFS 3.4

Analyse the impact that policies have on a sustainable future (5 credits; External)



Students submit a written report that provides evidence of a systematic analysis of TWO existing policies (and their attendant practices) in relation to their impact on a sustainable future.

Independent research and independent critical analysis must be evident in the report.

Key learning outcomes for students

- Understand how political, cultural, environmental, social and/or economic forces have shaped at least two policies.
- Identify the intended outcomes of the policies and the practices developed to implement them.
- Draw evidence-based conclusions about the extent the policies contribute to a sustainable future.

Tips for teaching and learning

Policies may have been developed by government or private sector organisations or groups. They may be local, national or international, from a single business or organisation, or a range of organisations, for example: Forest and Bird, Department of Conservation, a supermarket chain, a local business or NGO. Students should be able to justify the extent to which the policies achieved their intended outcomes and weave in relevant Māori concepts and values.

Other subject Achievement Standards with learning synergies

AS91430 Geography 3.5 - Conduct geographic research with consultation.

AS91532 Agriculture and Horticulture - 3.5 Analyse a New Zealand primary production environmental issue.

AS91283 Social Studies 2.5 - Describe a social action that enables communities and/or nations to meet responsibilities and exercise rights.

AS90832 EFS 3.5

Develop a strategy for an organisation that will contribute to a sustainable future (5 credits; Internal)



If a suitable context is chosen, the learning required for this AS could also be utilised to support the assessment of EFS 3.1 (AS90828) and 3.2 (AS91735).

Key learning outcomes for students

- Understanding of a sustainable future.
- Understanding what a strategy is and how it is structured.
- Exploring a range of possible alternatives to address a sustainability issue within an organisation.
- Make conclusions about the likely effectiveness of the strategy in addressing the sustainability issue.

Tips for teaching and learning

A strategy is a plan developed in response to a sustainability issue. It should outline a rationale and policies and propose further action. This AS requires the student to work with an organisation to identify an issue and develop a strategy to address the sustainability issue identified. An organisation could be a school, local council or business; an NGO, government agency or a household. Strategies should weave in relevant Māori concepts and values.

Other subject Achievement Standards with learning synergies

AS91433 Geography 3.8 - Apply spatial analysis, with consultation, to solve a geographic problem.

AS91599 Social Studies 3.4 - Examine personal involvement in a social action(s) that aims to influence policy change(s).

Exploring key assessment ideas

As well as utilising culturally responsive pedagogies for learning, teachers have some influence over how their students might record and present their work for assessment. The internal standards provide flexibility for teachers to write or modify assessment tasks to meet the needs, interests and strengths of their students, allowing students to record and present their reflections and learning in ways that suit them. Presentation styles could include waiata | song, drama, pūrākau, student friendly technologies etc., or a combination of more than one method. Encourage students to gather and present evidence for assessment in more engaging ways than the traditional report, powerpoint/slideshow etc.

Regularly documenting learning is an important part of Pakirehua and should be at both a personal and group level. Individual group members are expected to demonstrate both their group and their own contributions to the inquiry, action and outcomes. However, documentation is not simply about keeping a logbook of actions.

It should include reflections throughout the inquiry on the following: the way the group worked; the effectiveness of the planning, communication and action; how the inquiry and thinking connects to the key sustainability concepts. Reflections should be undertaken regularly throughout the inquiry, not just in a summative sense. They tell a story of changing ideas, thinking and perspectives, and should include evidence of critical thinking with justified opinions and/or conclusions.

“These standards variously emphasise students’ understanding and ability to analyse environmental and sustainability issues in different contexts (including the scientific and human systems that interact around these issues), and in some cases, provide assessable evidence of actual actions undertaken by the learner (with reflection on those actions) in response to their understanding of the issues with the view to making some kind of difference.”
(Bolstad R, 2020)

Underpinning all the EFS AS are the key sustainability concepts. For success in all of them, students must demonstrate a clear understanding of sustainability. This requires students to demonstrate their understanding of a sustainable future, and apply this to their learning and/or action. A teacher's role is to support students to regularly reflect, integrate, link and discuss key sustainability concepts throughout their planning and reflection - scaffolding them to explain how the aspects of sustainability, at key parts of the Pakirehua, link to a particular context and/or action. Students should be able to show these links in a holistic and connected way, thereby demonstrating their ability to think at a systems level.

Many Pakirehua | inquiries are ongoing. From year to year, the same, or different, groups of students may deepen their understandings and take further action relevant to addressing a particular sustainability problem, building upon previous work. It is perfectly acceptable for students to continue and build upon previous inquiries. They may further action already begun, or act upon recommendations provided by previous groups of students. The annotated case studies in Section Three discuss some examples of student work generated in NCEA programmes using EFS AS for assessment and highlight what some of the learning outlined above can look like.



Case studies | Wāhanga 3: Ngā rangahau arongatahi

SECTION 3

These case studies provide examples of student voice within a sustainability learning context. In order to maintain authenticity, the student voice has not been edited. These examples were extracted from evidence collected during student inquiries. They are not intended to indicate quality or levels of achievement, but to demonstrate how students explore and express their ideas and understandings. Although the examples chosen are all from a Level 2 course, the annotations are also pertinent to learning at Level 3.

Case study one – Manga | stream contextual inquiry

Exploring sustainability concepts through the context of a local stream will provide a rich diversity of knowledge and opportunities for values exploration. It develops skills such as reflection and action. In this example, a teacher is using the local manga as a context for learning in a senior biology course. The data collected in one field trip was utilised across several different EFS and Biology standards. By carefully planning the activities on the field trip, the teacher was able to ensure sufficient data was collected to meet the requirements for EFS AS 2.2 and both Biology AS91158 and AS91153. This piece of writing was submitted as part of the evidence for EFS AS 2.2. Opportunities were provided for students to develop a range of scientific skills and action competencies. The teacher wove in opportunities for students to express their personal cultural values and perspectives, to develop shared agency and to take effective action and critically reflect on the impacts it has on the students vision of a sustainable future.

Learning opportunities for ākongā

- Explore the aspects of sustainability in terms of this context: environmental, economic, cultural and social (see page 5).
- Explore their own values in relation to the awa.
- Develop a survey to find out what people thought of the awa, what values they have about the awa and what actions others can take or have taken to look after local waterways and why.
- Listen to the stories of the awa, has it always been like it is now? What are some local Māori waiata or whakataukī about the manga or awa?
- Reflect on if or how their own values about the awa may have changed.
- Consider what personal action should they take to restore or protect the local awa.

Ākongā | student voice:

"The local manga | stream was running through the back of the school grounds. It was overgrown with weeds and access to the water was restricted to one small official path and several ones that had been made by people over years. The manga was a dumping ground and for many decades had accumulated rubbish that could be seen when the water level dropped in summer. Rubbish we could see from the edge included bikes, bags, a dishwasher, shelving and numerous pieces of litter. The people living here didn't value the manga. It was just an overgrown mess of weeds with a few larger trees overhanging the water. I heard some people talking about the stream, they called it unsightly, a mess and not valuing its importance to our biodiversity and ecosystems at all.

My Nan told me about how if the manga is unwell people will be unwell. Things were very different when she was young. She tells me about how they all swam in the manga in summer and collected many tuna for kai. My whanau has collected mahinga kai here for generations, for Tangi and gatherings it was always important for them to gather kai locally and now they won't even go



The ākongā is discussing changing values over time, and different

values held by different people. They also explore their own changing values regarding the manga. This excerpt demonstrates their understanding of cultural sustainability.

In this case study, the ākongā is collecting biophysical and observational data that could be used to assess AS EFS 2.2

near the manga. It makes her sad. This project has given me the chance to sit and ask Nan these questions. I feel angry that the stream has become this degraded. I never knew what it was like years ago. I feel a sense of connection to this place now and want to make a difference. Kaitiakitanga is an important part of who I am but I hadn't connected the place to this idea before now.

As a class we spent time at the stream, measuring temperature, light intensity and mapping out the flow of the manga. We learnt about the biodiversity within the area, including the macroinvertebrates in the stream. In the water sampling we found a lot of snails, worms and mosquito larvae. The bird survey we carried out showed us an abundance of bird life. The species we saw were sparrow, waxeye, myna, starlings and tui. We used pest tunnels and test bite strips along the edge of the manga and found we had mice and rats and only a few bites showing possums.

Our inquiry continued and a group of us went down to the local aged care home to interview some of the other older people who had been around here when the stream was different, cleaner and usable. We had a small set of questions we asked each person. The one I most wanted to ask was about what the stream used to look like? Did you ever swim in the stream? And then Why do you think it is like it is today? The answers were all very similar to what my Nan was talking about. The manga was a lovely place, easy access through a small bit of bush to a lovely water, fast flowing in parts, cool in the summer and home to many different small insects and fish. They all swam in it and it was seen as a treasure, a taonga.

Part of this unit is teaching us to reflect on our learning. What have we learnt so far and what do we still want to find out? I think I am developing this skill quite well. I want to find out more about how the stream got so bad and also find out how we can get it back to what it was before. A restoration plan of action that is now my goal. I will do it for my Nan.

We have organised a clean up day, and we will do a waste audit of what we remove from the stream. We have been working with the local council with a restoration plan. There is already a community group that has been working on restoration upstream from the part just behind the school. It makes sense to work in with others to fix the manga. Clearing weeds and planting the right plants. If we put in the hard mahi now it will get back to being like the place it used to be, hopefully we will have more tuna and more birds as well. That is our vision for the future and by working together we are respecting the past."



The ākonga is developing an holistic way of thinking. By

observing that "It makes sense to work with others", they are acknowledging that others are also contributing. They are creating a vision for the future, thinking about not only the health of the stream, by planting and cleaning up, but also the added biodiversity impacts. This an example of Systems Thinking (see page 4).



Chris Eames

Case study two – Litter is more than a waste problem

Exploring sustainability concepts through the context of litter can allow students to view an issue through multiple lenses. It also provides an opportunity not to just focus on litter as a problem, but also on the concepts of natural resources and sustainability, consumer choices, ethical considerations and viewing waste as a resource. The student voice in this case study was generated during a health studies programme where students undertook an inquiry into how the school environment could be improved. It involved significant whole class learning, and different groups became focused on different aspects of the school environment. This piece of work came from one group in the class who took on board the issue of litter in the school, with a vision to improve the state of the grounds, thereby providing a better environment for student wellbeing. The students explored the links between values, attitudes and behaviours in multiple contexts as part of the 'Building Understandings' phase of the inquiry. There were multiple opportunities for developing a range of data gathering and communication skills. The teacher supported their students by encouraging students to express their personal cultural values and perspectives throughout.

Student agency was a significant outcome of the rich learning offered. The work was submitted as part of the evidence for the planning in EFS 2.1. However, it could also have been used for EFS 2.3 and had significant overlaps with Health AS91237.

Learning opportunities for ākongā

- Explore the aspects of sustainability in terms of this context: environmental, economic, cultural and social.
- Explore their own values in relation to waste.
- Carry out a waste audit to find what waste is created across the school.
- Use a map of the school to identify the location of litter/waste and track it's movements through a day from the source to the end. Reflect on whether this is a circular journey.
- Sort waste from a waste audit depending on the source – e.g., local or global, food or other.

Questions ākongā might ask

- How do we define what waste is? Has this changed over time?
- What are some alternatives to packaging?
- Is there such a thing as zero waste? What would that look like?
- How does a landfill work?
- Is plastic good or bad?
- What did we use before plastic?
- Students can reflect on if or how their own values about waste may have changed.
- What personal action should/could they take?

Ākongā | student voice:

"Waste in schools is an ongoing issue. The littering by students on the grounds and on the classrooms is a problem. Our school is always covered with litter at the end of the day and we see the caretaker using a petrol powered machine to suck it all up. Most of it on a windy day blows across the road into the local park and stream. The waste we create in the classrooms just all goes in one bin. I am not sure if it even goes to the recycling, who separates it? Or does it just all go to landfill? I hope not.

My class decided to explore waste across the school. My group surveyed year 9,10 and 11 students and teachers to see what their thoughts | values are about waste. My personal value is that waste is a big issue, packaging of products should be limited and I am really pleased we no longer have one use plastic shopping bags. This shows that if you really want change to happen it can. I try to put my rubbish in the bin but sometimes there isn't a bin close. The survey results showed us that actually the majority of the students felt that recycling was the right thing to do – however only 35% of them actually said they recycled on a regular basis.



The ākongā is identifying the issue, and building curiosity

by questioning what is happening with waste in their school. There was also an opportunity to explore the cost of resources used dealing with waste by using a petrol powered machine to pick it up. This is an example of exploring the Economic aspect of sustainability.

This ākongā is exploring their own and others' values about an issue. This could support the assessment of EFS 2.3. It is important for students to understand the difference between values "My personal value is that waste is a big issue" and behaviours "I try to put my rubbish in the bin".

Using a survey to gather data could be used for EFS 2.3.

Surveys are a good way of finding out people's values and actions around waste.

Teachers had a higher percentage of recycling and almost 100% indicated that it was an important thing to do. In their classrooms though they said they had no idea where the waste went to and were aware of the fact that waste was not sorted within the classrooms and maybe that needed to change? They talked about how they just hadn't thought about that aspect and did a lot more recycling at home than at school.

I have found this really interesting; people value recycling but their actions don't always match. I try to put rubbish in the bin and recycle at home but not always. Talking to my whanau about this project has connected this information. I had a light bulb moment when I realised that these stories I hear at home and the actions I take and the school takes are actually connected.

Kaitiakitanga should be part of who we are, connected to the whenua. Paptuanuku is living, and we are filling her up with our waste. That just is not sustainable meaning we cannot keep doing this we shouldn't have been doing it. My ancestors used everything. There was no waste and nothing was wasted. My Dad tells me our people feed the land and you cannot take without giving back. Karakia and giving thanks for the soil having nutrients to be able to grow our kai. When I realised that so much waste goes to landfill and the environmental issues that it creates I have now made a greater effort to not buy highly packaged items, to recycle always even if that means I take waste home and recycle there. I have more awareness now about the impacts of my actions and I am on a mission to show others as well. I have created a campaign called 'Stop the drop'. I have kept a portfolio of my thinking and planning the campaign – evaluating the results of how successful it has been and how it has changed my thoughts about waste. Following on from this I decided that I needed to work with the whole school management to make some changes at a classroom level. Together we are developing a strategy for change.”



This is an example of cultural sustainability where it is explored in a genuine way, allowing for personal and whānau ideas to be expressed.

The ākonga taking personal action could be used to assess EFS 2.1.

The ākonga worked with the stakeholders (BOT, principal and school community) to develop a waste strategy for the school. This could be used to assess EFS 3.5. This example shows how one context can be used to assess numerous standards – and how useful contextual learning though Pakirehua can be.



Case study three – Energy and sustainability

A context like energy offers rich learning opportunities and the possibility to look at issues through multiple lenses, such as equity, economics, resource use or climate change etc. This work was generated in a senior social studies class and was submitted as part of the assessment evidence for EFS 2.3, in amongst a programme mainly assessed using social studies standards. By widening the scope of the discussions and the 'Building Understandings' part of the inquiry to include the key sustainability concepts, the students were able to generate work that provided evidence for Social Studies AS91282 and AS91280 as well as for EFS AS 2.3 as there is some overlap in what is expected for the assessments.

Energy generation was locally topical in this town. Wind farms had recently been built and could be seen from the school. The teacher leveraged student agency, and an interest in engineering, to explore alternative solutions to burning fossil fuels. The 'Curiosity' phase of the inquiry included building on students' scientific understanding of energy concepts and the social and cultural implications of decision making processes. The teacher encouraged students to explore differing perspectives, creating a deeper understanding of social sustainability as the students took a deep dive into the issue of electricity generation.

Learning opportunities for ākonga

- Audit school and home energy use. What does the data tell us about our energy consumption? Has it changed over time? Are there seasonal differences?
- Survey people to explore how others value energy conservation.
- Brainstorm actions to conserve energy.
- How is energy produced in your local area?
- Is the distribution of energy equitable? How and why might energy consumption vary between different groups?
- How does energy get from where it is made to where it is being used?
- What impact does energy production have on the environment?
- What environmental impacts did building the energy production infrastructure, e.g. hydro dams and wind farms have?

Ākonga | student voice:

"We see lots of adverts saying we produce our energy through sustainable sources, but do we really? This inquiry I will be exploring energy production and natural resources. A resource is something we use and there are both renewable and non-renewable resources. Fossil fuels like coal, oil, coal and natural gas are non-renewable, they are a limited resource. Once we use them all up there is no more. If we think about future generations then we need to be making decisions now about how much fossil fuel and non-renewable resources we are using up. Finding alternative technology is important. For Humans to be about to continue to live on this Earth then we need to think about the future and not just like next year but generations into the future – we need to think sustainably. Energy is needed for everything we do and Aotearoa New Zealand has different ways it produces energy. Some sustainably some not. Here in NZ we can produce energy from geothermal, solar, wind, water and fossil fuels like burning coal and natural gas which is found underground and piped to the surface and then to houses. That is how we get hot water in our house. Most of our energy generation is by hydro dams, water in rivers being pushed through big turbines and that creates electricity. This is sustainable but building them has had big impacts as it floods big areas and also the fish can get caught up in them, once built they are sustainable so long as we have good rainfall. Wind is another big generator of power, a big expense going up and then the wind pushes the arms which turns the turbines generating power- but of course if there is no wind then there is no power generation. We still have big furnaces in Huntly that burn coal to generate electricity. These use a fossil fuel and generate a huge amount of pollution as it burns. This is not a sustainable option yet we still use it – why? We need to think of more ways to create energy that is better for the environment and for us.



The ākonga is expressing an understanding of the concept of Futures

Thinking by demonstrating understandings about non-renewable resources and the implications for future generations (see page 4).

The ākonga is exploring environmental sustainability by explaining the environmental impacts and the need to conserve and look after what we have.

With a growing population and more things that need electricity to run our demand for power is increasing. In my house we have six people living there, everyone except my little sister has a phone, and other devices such as ipads and computers. They all need charging. My neighbour has an electric car. I see them pug in it sometimes. I am sure it must use lots of power, more than my small phone does anyway. When I am at school kids charge their phones in the classrooms, we have multiple devices we use in different classrooms and of course the lights are always on. So how do we know how much power we actually use? My class has done an energy audit of our school and we also had a smaller audit we could do at home. When we shared our data about our home energy audits it showed a big range in how much people used. I had wondered about my friend who lives in a small house with lots of family, her Gran as well as her 3 sisters and Mum and Dad. Their audit was so much lower than mine and I realised that it was because they only had a small heater that was only turned on when it was really cold. The rest of the time they just put on more blankets or jerseys. My home has a big fire as well as heat pumps, one down the hall and one in the family room; I don't feel cold at home. As we talked about this in class we explored the concept of equity and I now realised that for Humans to be sustainable we also need to think about equity. We can't have a sustainable future when some of us are going without and others have more can we?

I was shocked to know our school has a coal fired boiler system for heating the radiators in the classes over winter. We also found that the school has over 300 light bulbs and the majority of these are on all day during winter and also over summer as some of the classrooms are in blocks and the natural light doesn't reach the middle of the classroom. Then we added in the number of data show projectors, laptops, printers, computers and the air conditioners in the staff room. We also asked for permission to monitor the power bills across a year. Basically my inquiry has found that we need to conserve power. This, for two reasons. We can save money and save the environment at the same time. There is only some much energy our renewable sources can produce – so it makes sense to try and stay within that and not have to burn coal. One simple way to save electricity is to 'Switch it off' This is my campaign to save power through the school – if we turned off lights when we left the room instead of leaving them on, we will reduce power consumption. So we have designed some stickers to go over the light switches and posters to tell everyone about why it's important to 'Switch it off'. We will see how much power we save by monitoring the monthly power usage through the bills.

What I have realised is that everything we do whether it is sustainable or not, has an impact on something. Getting the balance right for these decisions is enormous but very important for future generations. I feel empowered to make a difference. I have reduced my power usage at home and I always turn the light off when I leave a room, including classrooms. This may have a small impact but what I am thinking to do next is to form a petition to push for more renewable power to be built. I have realised that there is no equity. I can choose to turn power off and my friend has no choice they cannot pay for it."



The ākonga is exploring social sustainability by acknowledging the need for equity based on a fair distribution of resources.

The ākonga is also exploring economic sustainability by linking the monetary cost of power to the cost of producing it on the environment. They could also think about the cost of the resources used to generate power, exploring a fair system that distributes equal benefits and costs to both the environment and consumers.

Systems Thinking is evident in this work as the ākonga make links between decision-making and a sustainable future.

Case study four - Think global, act local

Globally, we are facing many challenges. Degradation of the environment, loss of biodiversity, air pollution, pandemics and inequality to name a few. These are complex challenges which are often interconnected, involving environmental, economic, social, cultural aspects of sustainability. They are often very difficult to solve. An important pedagogical approach to maintaining student well-being is to create opportunities for them to take meaningful action. Supporting students to take action for a sustainable future empowers them to be part of a solution and feel positive about the future of people and the planet.

This case study was generated in a Year 12 Geography class in which the primary assessment was Geography AS91246. The global issue chosen was climate change. This is an example of a complex, multi-faceted issue with significant challenges facing humans as we creatively problem solve around it. Supporting students to tackle issues of this nature requires teachers to encourage students to take small successful and measurable actions, and to trust that the collective and cumulative actions of many will have a significant positive impact on a sustainable future. This is an example of work generated during the 'Building Understandings' part of an inquiry, and demonstrates formative thinking around the issue of climate change and potential action taking. The students demonstrate shared agency within this work and with further direction this work could provide some of the evidence for EFS 2.1, 2.3 and 2.5.

Learning opportunities for ākonga

- Exploring their own whakapapa and connections to the environment.
- Exploring the science within a global context.
- Exploring the validity of sources of information and evidence.
- Develop action competence and reflection skills by exploring what effective action looks like.
- Exploring what collaboration looks like.
- Understanding how councils gauge community voice and what opportunities there are to be heard.

Ākonga | student voice:

"We have been investigating climate change. It is a massive topic and really complicated. It has been important to our group to understand some of the science involved in climate change, in a nutshell climate change is happening because Humans have been putting too much Carbon Dioxide and other Greenhouse gases into the atmosphere over a short period of time. This means that the environment and animals within it are struggling to adapt to their changing habitats. This will have major impacts especially within our oceans. We have been studying ocean acidification and CO2 increases in the atmosphere alongside rising sea levels. I am very interested in this impact of climate change as my ancestors have gathered shell fish for generations and we may not be able to continue to do so in the future. Sea level rise is impacting communities that live across the pacific and will be impacting us here in Aotearoa New Zealand.

Part of our investigation is to learn about what a sustainable future is, how we can develop our thinking and what actions can we take to make sure we look after our environment so it is still ok for future generations? What we know is that everything is interconnected, my father tells us stories of the Atua, how without one we would not have the others. He describes our whakapapa in that way and the connections and senses of belonging to a place are part of who we are as a people. We are all connected to each other and to the environment.

*"Ko ahau te taiao, ko te taiao, ko ahau"
I am the environment and the environment is me*

When we think about what the impacts of climate change are it is easy to get down about it. It is a massive problem and we need everyone to take action. The school strikes for climate were a good start. They really showed that students have a voice and really want action to make a difference. I want to



The ākonga is discussing a sustainable future.

They are linking their one small action to others and understanding that combined, a larger difference can be made.



They are also discussing the impact of continuing climate change

on a sustainable future by explaining the potential impact on the sustainability of collecting shellfish. This shows the student's understanding of Systems Thinking.

The EFS AS provide an opportunity for students to express their learning and understandings through their own cultural thinking and constructs.

live in a future where I can still gather food for the ocean, I can still spend time at my Marae by the beach. I want a future for my children and their children that keeps them safe and they have all they need. A sustainable future is hard to imagine but we all can play our part. One action leads to another and another and soon we have a huge action that does make a difference. So I have decided to put my name forward for a youth group associated with the local City Council. I have got a group of students together at school to get their ideas about this topic and we are working together to add in ideas for change. We have also looked through the Council annual plan and have chosen some aspects to write submissions about. I want to take this opportunity to be heard and have a collective voice. Some of the student group are not as confident as I am about speaking. Together we can work on a shared vision – one that is a sustainable future. It feels so much better when we are all talking about these issues and have a really positive vibe when we come up with a plan for action.

Our first action was creating posters to put up in local shop windows across town and the school. They will create more momentum with the Council as well. We also have asked for a climate action week at school, we will run some of the activities we have done in class at lunchtime to show what happens to shells in the ocean if it becomes too acidic with increased CO₂. It gives us an opportunity to talk with other students and empower them with more understanding about what's happening globally.

We know change won't happen overnight but we really believe our actions will make a difference, they have too. We need to "think Globally and act Locally."



The ākonga is developing Action Competence by increasing the

impact of their actions. They are reflecting on the power of having a shared vision and planning for action collectively.

It is vital that student wellbeing is in the forefront of planning while supporting them through Pakirehua. They need to believe they are making a meaningful difference, however small, and we need to encourage them to do so.

What plans are there to support students' action after the learning has finished? Most students will want to continue some form of action longer term. It is important they are supported in this.



Ralf Lotys (Sicherlich)

“You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make.”
Dame Jane Goodall

Thinking templates | Wāhanga 4: Ngā tauira whakaaroaro

SECTION

4

Ko te manu kai ana i te miro nōna te ngahere.

Ko te manu e kai ana te mātauranga, nōna te ao.

If you feed a bird from the miro tree they can navigate the forest, if you feed a bird knowledge/understanding they can navigate the world.

This whakataukī can suggest the importance of supporting and nurturing student learning. One way of doing this is to provide tools that scaffold their thinking.

These seven thinking templates are graphic organisers designed to support students to clarify their ideas. They scaffold student thinking by providing prompting questions for students to respond to and record the most important considerations throughout an inquiry.

Each of the thinking templates is designed to support students to demonstrate aspects of their learning that are crucial to success in the EFS AS. They are designed for students to record brief notes, bullet points or key sentences that can later be used as the basis for more extended explanations, discussions and evaluations.

Each thinking template is presented with teacher notes, explaining some of the ways they may be used. Many of the templates can be adapted and used at multiple stages through the Pakirehua cycle.

As students build their confidence in planning and taking action, they will be able to choose the appropriate thinking template to help them sort ideas at any particular stage of their inquiry.

Many well-known templates can also be used successfully to scaffold student thinking and planning. Two of the most familiar are PMI – Positives/Minuses/Interesting and KWL – What do I know/What do I want to know/What have I learned?

Some of the prompting or guiding questions for use with students at the beginning of an inquiry are listed below. These questions can be used by a teacher to get to know their students. The responses can then help with planning the 'Curiosity' phase of the inquiry.

- Who are we? What are our backgrounds? What is important to us?
- What do we know about the local environment and sustainability?
- What are we passionate about?
- What do we care about?
- Why do we care?

Using the prompting questions in these templates helps to clarify students' thinking and planning. It helps them consider what might be realistic for them to manage. Based on the information, ideas and discussions generated by using these thinking templates, students might realise they need to move to an earlier phase of Pakirehua, perhaps to gather more information, interact with a wider stakeholder group, refine their action etc. For instance, if they recognise they have 'bitten off more than they can chew', or if they have identified insurmountable barriers, they may have to rethink some of their planning. That is a legitimate learning aspect of Pakirehua and helps build resilience. Inquiry is not a linear process. Different stages may be returned to again and again as required.

The Sharing Square (SS)

In cooperative learning situations, negotiating priorities and sharing important ideas are often necessary. Sometimes, using a template such as a sharing square to help organise thoughts and ideas and to structure a negotiation is useful.

How could it be used?

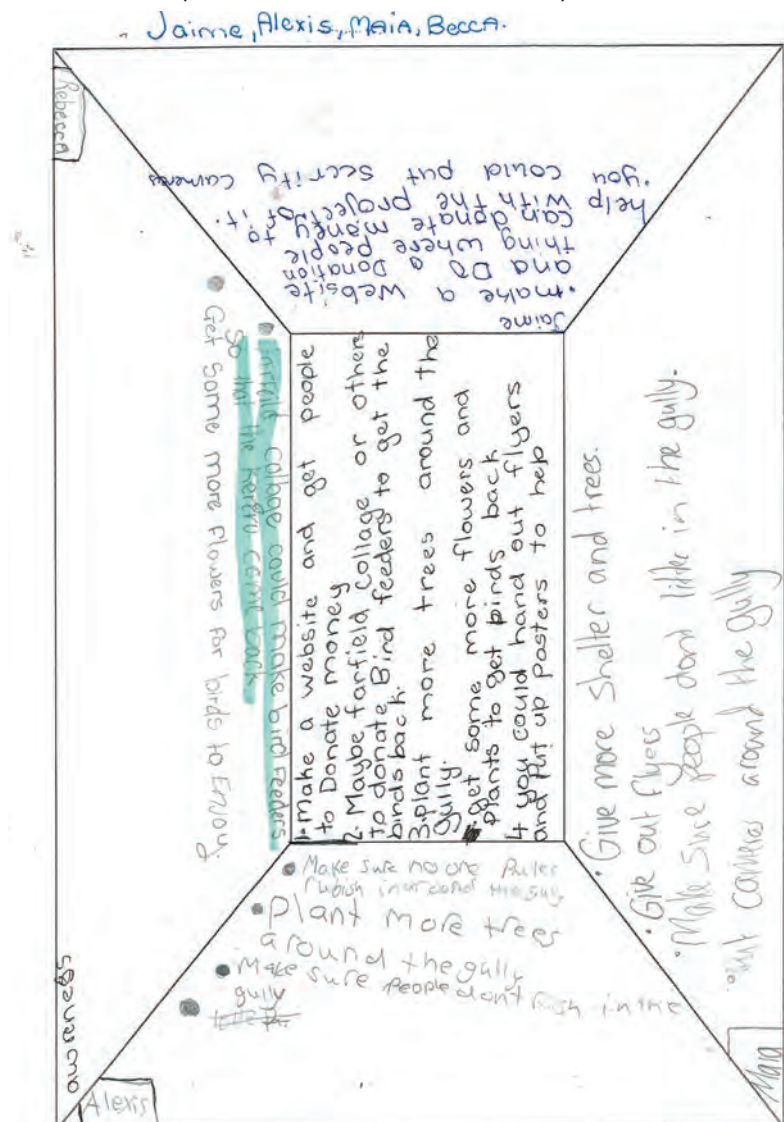
For sharing/negotiating ideas

It is best if this is printed onto A3 paper to allow all students in the group to gather around and write their ideas at once. A template can easily be devised to suit the number of people in a group. In this case, the template is designed to be used by four people.

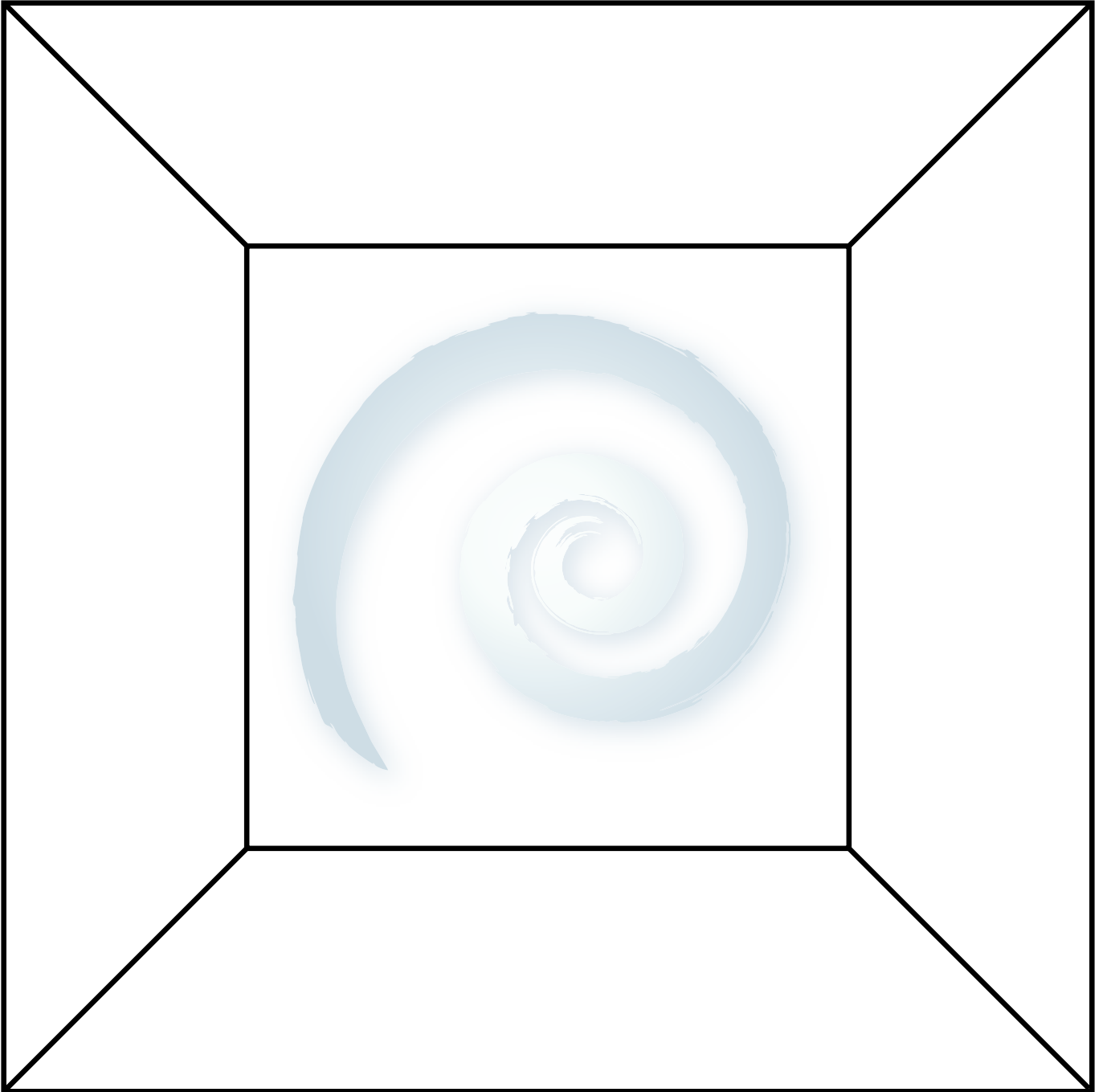
- Each student writes four or five points into their side of the template. These could be:
 - main or important point/s, e.g. from a learning experience, video, discussion, presentation etc
 - ideas for action
 - priorities for discussion or action as a team
 - solutions to a problem
 - issues that may be addressed.
- Students then share their ideas with each other.
- The ideas are discussed, and the students negotiate which points are the most valid, important, urgent or practical. What these points might be and what steps are undertaken next will depend on: the purpose of the negotiation, when it is used and what the next steps in the inquiry might be.
- Record the (negotiated) top three to five point/s in the centre of the template.
- The agreed point/s are either:
 - shared and discussed with other groups or the class
 - used for the group to decide on next steps.
- It may be necessary to further refine the ideas through discussion and come up with one final idea, such as which action might be the best one to take.

For considering the aspects of sustainability

- Write the issue or action in the centre and brainstorm relevant ideas regarding each of the aspects of sustainability - one aspect per side of the square.
- Draw connecting lines between the ideas jotted on each side.
- Use these to help structure sentences, statements or paragraphs linking the action or issue to the aspects of sustainability.



The Sharing Square



Exploring our Vision (EV)

Exploring our vision (EV) is a template designed to prompt students' critical thinking around a sustainable future. It is focused on sorting the key ideas to consider when thinking about taking action – this is at the 'big picture' level.

Students are prompted to consider the big ideas – to refine a vision, to think about what a sustainable future might look like with regard to their issue. It also prompts them to identify the root of the issue, and its implications, through the lenses of the key sustainability concepts (see page 4).

This template prompts students to start thinking at a systems level – making connections between past actions and events, the current situation, and to visualise how things might be in the future if this issue were to be resolved.



Exploring our Vision

What is the cause of the problem?

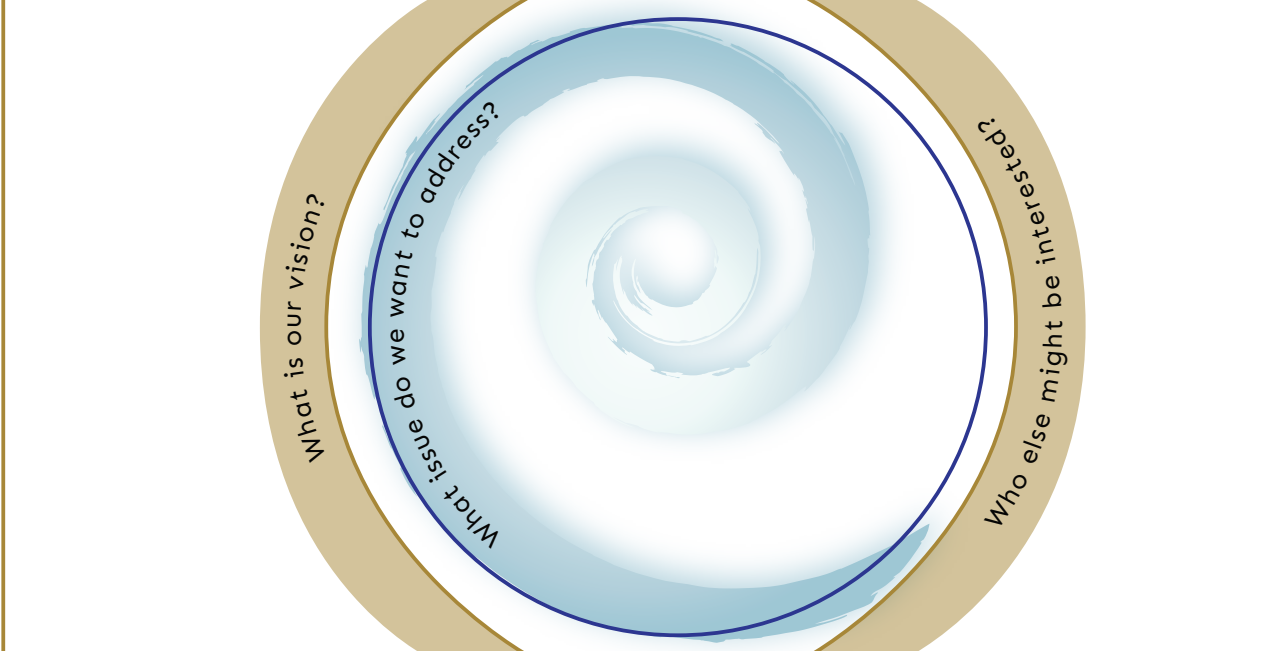
Why did we choose this issue?

How did it get to be like this?

How do other people feel about this issue?

What aspects of sustainability are involved in this issue?

What do we want to achieve?



The Consequence Wheel (CW)

This familiar worksheet template helps to generate, sort and structure ideas generated around a central theme or point. It can be used in a number of ways, and at different stages of an inquiry. The Consequence Wheel can help students focus on the future impacts their ideas, decisions or actions may have.

The wheel can be used to explore potential actions; before an action is undertaken, or as a reflective tool.

How could it be used?

For exploring a range of possible actions and to clarify the consequences of each one.

1. Students write an issue or problem into the centre circle.
2. They then write a possible solution into each quarter of the next layer out.
3. They then think about and write two consequences of each action or solution into the final layer (possibly using a pros and a cons approach, or a brainstorm approach).
4. Students reflect and discuss which of the actions might be best to take.

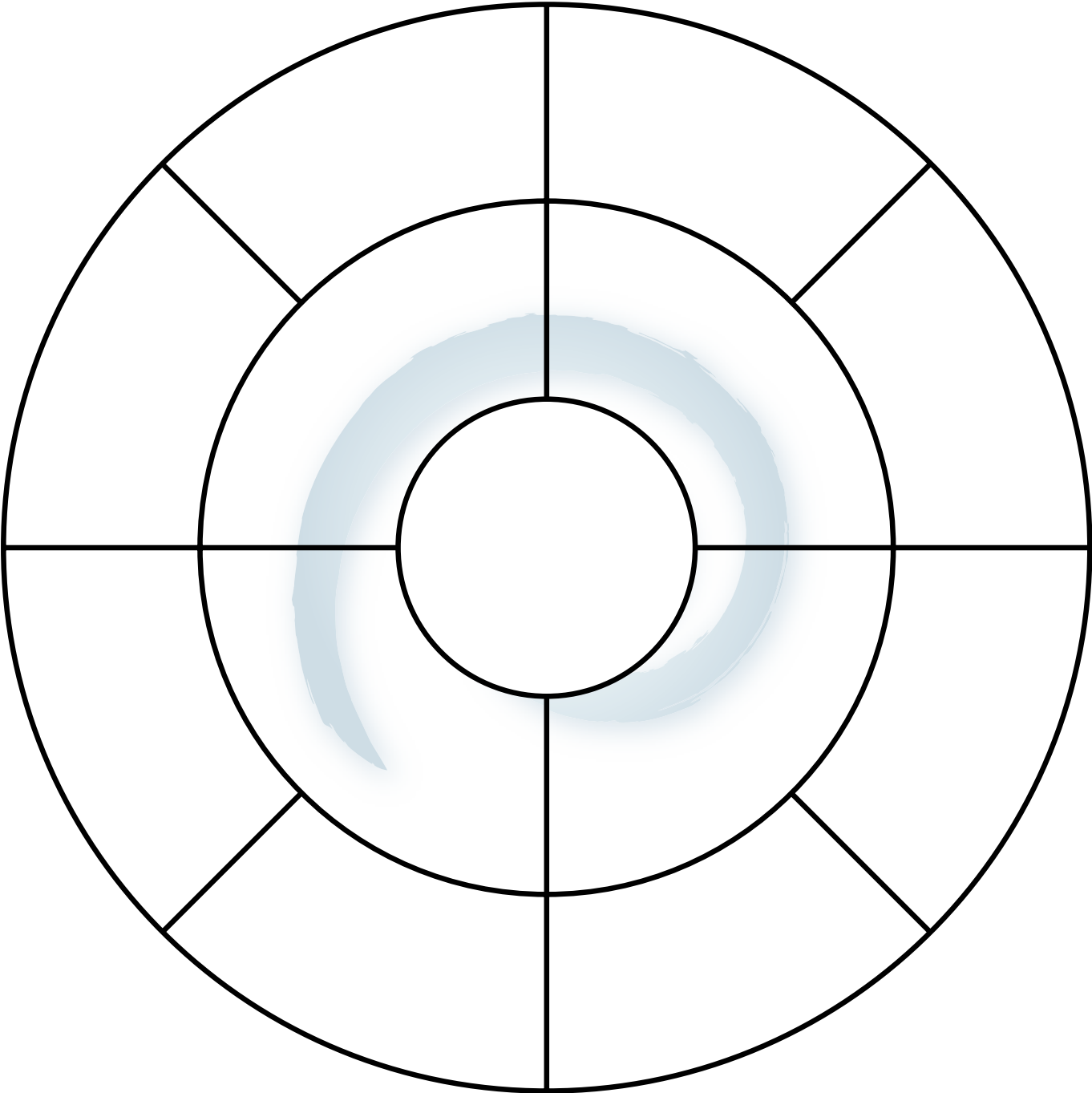
For exploring an action or solution.

1. Students write an action or solution to the problem or issue into the centre circle.
2. They then write a possible consequence of the action into each quarter of the next layer out. These could be organised as consequences related to the aspects of sustainability, if appropriate.
3. In the outer layer, they elaborate on the consequences even further with one of the following:
 - a. using a pros and cons approach
 - b. looking at connections to the aspects of sustainability (see page 4)
 - c. identifying any further action that may be needed to mitigate negative consequences
 - d. exploring ways in which these consequences do or don't lead to a sustainable future.

4. Reflect and discuss which consequences need to be considered and/or mitigated. Prompting questions could include:
 - a. Why is the issue an important one?
 - b. Which action would contribute towards the best future?
 - c. What consequences need to be mitigated?
5. Use the ideas generated to help structure sentences, statements or paragraphs linking the action or issue to the aspects of sustainability, or to analyse the consequences of action in relation to a sustainable future.



The Consequence Wheel



Tē tōia, tē haumatia.
Nothing can be achieved without a plan, workforce
and a way of doing things.

This whakataukī speaks to the importance of being well planned.

The following three templates are specifically designed to support students' with some of the practical aspects of planning.

Planning for Action (PA)

This thinking template provides questions that scaffold student's thinking around the action they propose. It asks them to justify their action in terms of achieving their vision, and prompts them to think of some of the practical aspects of planning that need to be considered in order to successfully undertake their action.

Detail Planner (DP)

This planning template is simply a recording sheet – it supports students' to plan, in detail, what tasks are necessary to carry out the action, and to consider budgets and timelines. In terms of sustainability, it is important to recognise that 'in kind' donations, of time, skills and wisdom are also valuable assets: that the economic aspect of sustainability does not only refer to money.

Measuring our Success (MS)

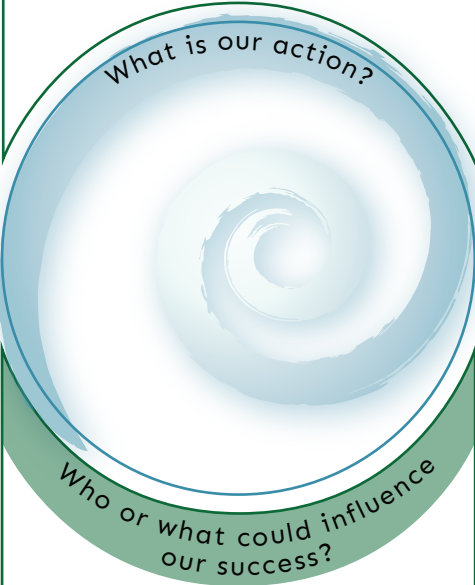
This thinking template prompts students' to think deeply and critically about what constitutes a successful action.

The left-hand side should be filled in before action is taken. Students are encouraged to think about the desired outcome/s of their action and create a set of criteria by which they can evaluate success, or otherwise, once the action has been completed. Successful action addresses the root of an issue, rather than the symptoms. Students often need support on this point. Thinking about whether, and how, their action contributes to a sustainable future can be prompted by asking students to consider questions such as: Has their action created lasting change? How long-term is the impact of their action? Will the impact of their action be sustainable? Effectiveness may be gauged in a physical sense, e.g., planting along a stream, or it may be a reflection of their own and others' shift in personal values, attitudes and action.

Student reflections on what else is required to contribute or build upon their action for a sustainable future can constitute of Systems and Futures Thinking (see page 4).

Students can use their responses in the template to generate statements and paragraphs that demonstrate their ability to critique the effectiveness of the action, the planning that went into it, their personal contributions, and the success of the teamwork along the way.

Planning for Action

<p>What other information do we need?</p>	<p>What skills do we need?</p>	<p>What tikanga is appropriate?</p>
<p>How will we communicate our plans?</p>		<p>How will we record our progress?</p>
<p>Who else needs to be involved?</p>		<p>Are there any safety considerations?</p>


Detail Planner

What tasks need to be done?	Who will do each one?	When will each task be completed?

What funds or resources will we need?

Resource	Where will we get it?	Who will find/buy it?	What does it cost?

What other resources do we need?

<div style="background-color: #c6e0b4; padding: 2px; border: 1px solid #000; margin-bottom: 5px;">Our time</div> <div style="border: 1px solid #000; min-height: 150px;"></div>	<div style="background-color: #c6e0b4; padding: 2px; border: 1px solid #000; margin-bottom: 5px;">Other peoples' time</div> <div style="border: 1px solid #000; min-height: 150px;"></div>	<div style="background-color: #c6e0b4; padding: 2px; border: 1px solid #000; margin-bottom: 5px;">Expertise</div> <div style="border: 1px solid #000; min-height: 150px;"></div>
<div style="background-color: #c6e0b4; padding: 2px; border: 1px solid #000; margin-bottom: 5px;">Anything else?</div> <div style="border: 1px solid #000; min-height: 150px;"></div>		<div style="background-color: #c6e0b4; padding: 2px; border: 1px solid #000; margin-bottom: 5px;">What is our timeline?</div> <div style="border: 1px solid #000; min-height: 150px;"></div>

Measuring our Success

Before you take action:

What do we want to achieve? What is our vision?
How will our action contribute toward the vision?
How will we know what success looks like?
What criteria could we use to measure our success?
• • • • • •
Is our action going to be a one-off action, or part of a series of ongoing actions? Why do we say that?

After you have taken action:

Did we achieve what we planned? Why/Why not?
Did our action move us towards our vision? Why/Why not?
What difference has it made?
Did we meet our criteria? Why/why not?
What went well?
What challenges did we face? How did we overcome them or what did we change in our plan along the way?
What would you improve next time?



Recommendations:

What recommendations for future action could be made, to achieve the vision?
--

Connecting Concepts (CC)

This thinking template supports students to critically reflect upon their action and the outcomes of their inquiry, looking through the lenses of the key sustainability concepts (see page 4). They will respond to the prompting questions in this template to help them sort their ideas, reflecting on their experience holistically, looking at both the immediate and the wider impacts and utilising the criteria they previously set for evaluation.

The template structure encourages students to see all these things together, creating a connected story, thereby utilising a Systems Thinking approach. Students are prompted to write a statement in each of the aspect boxes, and highlight the relevant contexts and concepts in each of the lists on the right.

Students will use the ideas generated to help structure sentences/statements or paragraphs linking the action or issue to the aspects of sustainability and to analyse the consequences of their action in relation to a sustainable future.



Connecting Concepts

Looking at my/our learning	A sustainable future
How have my/our attitudes, values and perspectives changed?	How did my/our action lead to a more sustainable future?
How have the attitudes, values and perspectives of other people changed?	What could/should the next steps be?
What else have I/we learned?	What recommendations can we make, and to whom?

Write a sentence or a couple of bullet points to briefly show how each of the aspects of sustainability connect to your issue or action.

Highlight the relevant concepts and contexts that are related to your issue and action.

Environmental aspect:

Biodiversity; biosecurity; interdependence; inter-relationships; interconnectedness; kaitiakitanga; whakapapa; conservation; sense of place; whenuatanga; personal responsibility; climate change; connection; regeneration; turangawaewae

Cultural aspect:

Diversity; values; principles; common practices; attitudes; perspectives; tolerance; tikanga; democracy; collaboration; community; partnership; whānau; iwi; ako; participation; responsibility; kaitiakitanga; heritage

Social aspect:

Equity; intergenerationality; whanaungatanga; manaakitanga; inclusivity; connectedness; relationships; wellbeing; social justice; whakapapa; globalisation; think local, act global; responsibility; fair and equitable distribution of resources

Economic aspect:

Equity; distribution; resources; trading; value; circular economy; exchange; innovation; fair trade; globalisation; entrepreneurship; sharing; crop swap; food security; barter; altruism; heritage; sustainable tourism; fair and equitable distribution of resources; heritage; sustainable tourism

How is my/our action connected to other actions, outcomes or kaupapa, i.e. how is it connected to the big picture of environmentally sustainable change?

Useful resources and references | He rauemi, he tohutoro whaitake

As well as the organisations and resources listed below, other locally relevant resources are available through regional and district councils.

NCEA support materials

Assessment resources including the Achievement Standards themselves, external exemplars, moderators reports etc.
<https://www.nzqa.govt.nz/ncea/subjects/education-for-sustainability/levels/>

Education for Sustainability Learning Objectives, Ministry of Education <https://seniorsecondary.tki.org.nz/Social-sciences/Education-for-sustainability/Learning-objectives>

Education for Sustainability Teaching and Learning Guide, Ministry of Education <https://nzcurriculum.tki.org.nz/Curriculum-resources/Education-for-sustainability>

Exemplar tasks that can be modified/adapted to meet the needs of your students and local contexts
<https://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>

Teaching and learning resources supporting sustainability education

Department of Conservation - Te Papa Atawhai
<https://www.doc.govt.nz/get-involved/conservation-education/>

Educating for Sustainability: Te Mauri o te Taiāo (New Zealand Association for Environmental Education) www.nzaee.org.nz

Enviroschools
<https://enviroschools.org.nz/creating-change/>

Manaaki Whenua - Landcare Research
<https://www.landcareresearch.co.nz/tools-and-resources/education/>

NIWA - Taihoro Nukurangi
<https://niwa.co.nz/education-and-training/educational-resources>

Project Based Learning (PBL)
<https://www.pblworks.org/>

Problem-based Learning: Welcome to the "Real World": A Teaching Model for Adult Learners Flint W., Booksurge Publishing, 2007

Science Learning Hub
<https://www.sciencelearn.org.nz/>

Te Aho Tūroa
<https://www.teahoturoa.org.nz/>

Readings for personal professional development - sustainability education

A framework for developing Action Competence in Education for Sustainability – Facilitator Guide, Crown (2010) http://www.tlri.org.nz/sites/default/files/projects/9245_Appendix%20F.pdf

A framework for developing Action Competence in Education for Sustainability – Teacher Guide, Crown (2010) http://www.tlri.org.nz/sites/default/files/projects/9245_Appendix%20E.pdf

Approaches that encourage Action Competence. Ministry of Education <https://seniorsecondary.tki.org.nz/Social-sciences/Education-for-sustainability/Pedagogy/Approaches-that-encourage-action-competence>

Climate Change Report - Secondary 2020. Bolstad, R (2020) <https://www.nzcer.org.nz/research/publications/climate-change-and-sustainability-secondary-schools-report>

Empowering students to act: Learning about, through and from the nature of action. Birdsall, S. (2010). Australian Journal of Environmental Education, 26, 65-84 <https://search.informit.org/doi/10.3316/INFORMIT.731643230572840>

Environmental education: A place in the curriculum? Bolstad, R, NZCER (2004) <https://www.nzcer.org.nz/research/publications/environmental-education-place-curriculum>

Environmental Education for sustainability strategy and action plan 2017-2021. Department of Conservation (2017) <https://www.doc.govt.nz/about-us/our-policies-and-plans/education-strategies/environmental-education-for-sustainability-strategy-and-action-plan/strategy-and-action-plan-20172021/>

Environmental education in New Zealand schools: Research update 2015, NZCER (2015) <https://www.nzcer.org.nz/research/publications/environmental-education-new-zealand-schools-research-update-2015-0>

Investigating teachers' pedagogical approaches in environmental education that promote students' action competence NZCER Eames, C et.al. (2006) http://www.tlri.org.nz/sites/default/files/projects/9224_summaryreport.pdf

Ministry for the Environment - <https://environment.govt.nz/>

Parliamentary Commissioner for the Environment - <https://www.pce.parliament.nz/>

Royal Society Te Apārangī - <https://www.royalsociety.org.nz/>

Office of the Prime Minister's Chief Science Advisor - <https://www.pmcsa.ac.nz/who-we-are/our-office/>

Student activism: Learning through doing, NZCER, Watson (2022) <https://www.nzcer.org.nz/research/publications/student-activism-learning-through-doing>

Supporting future oriented learning and teaching – a New Zealand perspective, Education Counts, Ministry of Education <https://www.educationcounts.govt.nz/publications/schooling/supporting-future-oriented-learning-and-teaching-a-new-zealand-perspective>

Readings for personal professional development materials - cultural competencies and pedagogy

Ka Hikitia - Ka Hāpaitia, The Maori Education Strategy, Ministry of Education <https://www.education.govt.nz/our-work/overall-strategies-and-policies/ka-hikitia-ka-hapaitia/>

Papa Whakaako - Te Marautanga o Aotearoa <https://tmoa.tki.org.nz/Taumata-Matauranga-a-Motu-Ka-Taea>

Tapasa – Cultural Competencies Framework for teachers of Pacific learners. New Zealand Teaching Council (2018). <https://teachingcouncil.nz/assets/Files/Tapasa/Tapasa-Cultural-Competencies-Framework-for-Teachers-of-Pacific-Learners-2019.pdf>

Tātaiako: Cultural Competencies for teachers of Māori learners <https://teachingcouncil.nz/resource-centre/tataiako-cultural-competencies-for-teachers-of-maori-learners/>

Tau Mai Te Reo: The Māori Language in Education Strategy for all learners <https://www.education.govt.nz/our-work/overall-strategies-and-policies/tau-mai-te-reo/>

Authors & acknowledgements | Ngā kaituhi me ngā kupu aumihi

Biography for Lynnette Rogers and Andrea Soanes

Lyn and Andrea are seasoned classroom teachers. Combined, they have over 60 year's experience in the education sector. They are experienced in providing engaging Professional Learning and Development opportunities in sustainability and science education and associated pedagogies. They are both experienced in teaching in EE and EFS, and have supported many schools across the formal schooling sector to embed both culturally responsive and sustainable practices.

Andrea and Lyn are experienced and innovative writers and resource developers in Science, EE and EFS. As co-authors they have had eight books published. They have also contributed to, and created, numerous resources including many online. They continue to contribute widely to the EFS communities at both national and regional levels. They were both involved with the previous EFS AS review and in creating exemplar materials for MoE.

They utilise collaborative practices in all their mahi. They share a belief in, and actively foster Aotearoa's bicultural heritage, consistently seeking meaningful consultation with Mana Whenua, and acknowledging and supporting the incorporation of matauranga Māori into their mahi wherever possible.

Andrea and Lyn have both received the Kudos award for their contributions to science education, in 2018 and 2019 respectively.

Acknowledgements

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Our goal was to provide clear, connected information; to inspire and support passionate sustainability educators who understand the importance of nurturing Action Competent ākonga. We hope that you find the information and guidance helpful to build your confidence and to support you in developing your own sense of agency, both with your students and with your peers.

All the best for your journey in sustainability education - nurturing strong, sustainable ākonga voices that will be heard now, and in the future.

Lyn and Andrea

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