Education for sustainability

Version date: 30 June 2010
Key changes: Version 2
Subject facilitator email: seniorsecondary@tki.org.nz

What is education for sustainability about?

Education for sustainability (EfS) is about learning to think and act in ways that safeguard the well-being of people and the planet.

In EfS, students explore the relationship between people and the environment. They learn about the environmental, social, cultural, and economic aspects of sustainability. They learn to show leadership by example and to contribute to collective decisions that lead to actions for a sustainable future.

People can have very different views on sustainability. In EfS, students explore and evaluate different perspectives, rethink long-standing ideas, and consider alternative practices and directions. With the support of their teacher, they can take ownership of their learning and create new knowledge.

EfS is best taught collaboratively in conjunction with other subjects and supported by school and community policies and practices. Students then learn that no single area has a monopoly on solutions to complex issues. They also discover the power of partnerships, of working together.

> Mō tātou te Taiao ko te Atawhai
> Mō tātou te Taiao ko te Oranga
> It is for us to care for the environment to ensure its well-being
> In doing so we ensure our own well-being and that of future generations
>
> http://efs.tki.org.nz/Toitū-te-Ao-Carving

EfS has its foundations in environmental education. See Guidelines for Environmental Education in New Zealand Schools (Ministry of Education, 1999).

- Read three perspectives on a sustainable future

Education for sustainability curriculum guide content

Use the links below to access the sections of this guide. To navigate through the guide's web pages, select from the section and sub-section menu in the left-hand navigation.

- Rationale
- Key concepts
- Pedagogy
- Learning objectives
- Connections
- Learning programme design

- Resources

Teaching and learning guides are produced in HTML. They have been designed to be viewed online.

To print individual pages, select the 'Print' button at the top right of each page.

To print the complete guide, select the ‘Download this guide in PDF format’ button. If your browser default is set to automatically open PDF downloads in a PDF reader, the entire guide will open and can then be printed. If not, the entire guide will download into your download folder, where you can then open the document and print. Please note, some guides may be more than 200 pages long.

What does sustainability mean?

People can have very different views on sustainability. Here are three:

A United Nations perspective

The United Nations Report of the World Commission on Environment and Development, Our Common Future (1987), describes a sustainable future as one where people are able to meet their needs environmentally, socially, culturally, politically, and economically without compromising the ability of future generations to meet their needs and aspirations (chapter 2, section 1).

A Māori perspective

From a Māori perspective, everything is connected: land, sea, and air. Relationships among people and relationships between people and the environment are all part of this larger whole. People have a kaitiaki/guardian responsibility for the natural environment. See Grant Hawke, ' The Holistic Approach' and 'Māori and Sustainable Development', Landcare Research (2008).

> Ko te oranga taiao, he oranga tangata.
>
> A healthy environment is a healthy people.

A business perspective

Businesses often see sustainability in terms of being able to survive and grow. But their products and services depend ultimately on social and environmental resources. Increasingly, businesses are responding to customer demands that they be environmentally responsible and that they commit themselves to sustainable practices.

A shared responsibility

All perspectives on sustainability are responses to complex issues and reflect the values and knowledge of the people who hold them. EfS teachers and learners grapple with this multiplicity of views and understandings.

We all have responsibility for creating our future. It is only by sharing our knowledge, skills, and viewpoints that we are able to refine goals – personal, school, and community – and generate the fresh thinking needed to solve problems.

> What a great time to be alive! Because this generation gets to essentially completely change the world.
>
> Paul Hawken, Ecologist, 6 August 2008

Rationale

Why study education for sustainability?

We depend on the environment for everything.

One way or another, the opportunities that we have – or will ever have – come back to the environment. So how we treat our environment is of great importance. EfS challenges students to develop the kinds of thinking and behaviours that will secure the future.

As New Zealanders, we are proud of our natural heritage.

We like to think of our country as ‘clean and green’. But many of our practices put the environment and all its inhabitants at risk. In EfS, students learn to investigate such practices and to advocate for change.

What we do today has consequences for future generations.

Our everyday actions help shape the kind of earth that we hand on to our children. By investigating how people’s actions have created the sustainability issues that confront us now, EfS students learn to make informed decisions about how to live their own lives.

In EfS, students develop valuable, transferable skills.

EfS empowers students to:

- think critically and creatively about issues and solutions
- view the world from different perspectives, particularly those that are directly relevant to Aotearoa New Zealand
- negotiate complexity and deal with change and uncertainty
- be confident, connected, lifelong learners with a sense of responsibility for the well-being of their country and the planet
- connect thinking and actions in ways that will lead to a sustainable future – environmental, social, cultural, and economic.

EfS opens up pathways to a variety of careers with a sustainability focus.
Sustainability means enough for all, forever.

Key concepts

Key concepts are the big ideas and understandings that we hope will remain with our students long after they have left school.

The following are the key concepts/big ideas in EfS.

Sustainability

Sustainability is about individuals, groups, and societies adopting ways of thinking and behaving that allow them to meet their needs and aspirations without preventing future generations from meeting theirs.
Aspects of sustainability

Equity

Equity is about fairness. As understood in EfS, it incorporates respect for all life, social justice, intergenerational fairness, and the fair distribution of finite resources.
Concepts that relate to equity

Interdependence

Interdependence is about the interconnectedness of people and environments. This interconnectedness manifests itself as biodiversity, cultural diversity, community, democracy, and globalisation.
Concepts that relate to interdependence

Responsibility for action

This is about getting involved in shaping the future. As understood in EfS, this concept points to having an action orientation, informed decision-making, citizenship, guardianship or kaitiakitanga, thoughtful consumption, enterprise and entrepreneurship, resilience, and regeneration.
Concepts that relate to responsibility for action

Note: each of these four key concepts has an environmental, social, cultural, and economic aspect. These aspects are referred to as aspects of sustainability.

What are key concepts?

Key concepts are the ideas and understandings that we hope will remain with our students long after they have left school. Key concepts sit above context but find their way into every context.

Students need time and opportunity to explore these concepts; to appreciate the breadth, depth, and subtlety of meaning that attaches to them; to learn that different people view them from different perspectives; and to understand that meaning is not static. By approaching these concepts in different ways and by revisiting them in different contexts within a relatively short time span, students come to refine and embed understandings.

For further information, see Approaches to building conceptual understandings at Social Sciences Online.

Return to previous page

Aspects of sustainability

Sustainability needs to be considered from four angles. These are referred to as the ‘aspects’ of sustainability.

The four aspects

Environmental sustainability is about maintaining the integrity of life support systems. This aspect incorporates the important notions of biodiversity and ecosystem services. Environmental sustainability is fundamental to a sustainable future.

Social sustainability is about equity within and between generations and within and between ethnic and social groups. It is inclusive of people’s mental and physical well-being and the cohesion of their communities based on a fair distribution of natural resources.

Cultural sustainability refers to the nourishment and sharing of attitudes and values that represent diverse ways of viewing the world. Cultural sustainability is inclusive of political sustainability, which is about all citizens having the opportunity to express their views freely and participate in decision making.

Economic sustainability means using resources to provide necessary and desirable products and services for the present generation without compromising the ability of future generations to do the same.

An integrative model

Strong sustainability

(Source: See Change - Learning and Education for Sustainability, p.15)

This model has the economy completely located within society and society completely located within the environment. In other words, the economy is a subset of society and society is completely dependent upon the environment. This interdependence means that any sustainability-related issue must be considered holistically. For example, a unit on oceans as a resource might consider how the environment affects populations of sea life and establishing marine reserves (science), the cultural aspects of seafood harvesting (geography), and the economic impact of decreasing fishing opportunities versus increasing tourism (economics).

Regardless of which aspect is in the spotlight, the other aspects need to be considered to support action as an outcome. Where possible, teachers from different subject areas should be invited to share their relevant specialist knowledge.

It can be helpful to think of sustainability in terms of maintaining the capital we need for our continued existence. There are four types of such capital: natural, human, social, and built (includes both manufactured and financial). All four types are necessary if societies are to function.

See the Sustainable Measures website for a useful diagram that illustrates this concept.

Return to previous page

Concepts that relate to equity

Equity is a complex concept with other concepts sitting inside it. These include:

Respect for all life

We have a responsibility to all living things because our lives are intertwined with theirs. All organisms have a right to life and to an environment that will sustain them.

Social justice

Individuals and groups should have equal opportunity in relation to rights, resources, and services.

Intergenerational equity

Each successive generation should have the opportunity to determine its own future and provide for it.

Finite resources

Earth’s resources need to be used wisely, re-used or recycled and, if necessary, disposed of in ways that minimise impact on the environment.

Return to previous page

Concepts that relate to interdependence

Interdependence is a complex concept with other concepts sitting inside it. These include:

Biodiversity (environmental)

Biodiversity is the totality of living things, often taken as a measure of the health of biological systems and, therefore, of environmental sustainability.

Community (social)

A community is a group of people who interact with one another and develop partnerships that contribute to collective well-being.

Cultural diversity

Cultural diversity encompasses the diverse world views that inform different ways of thinking and knowing.

Democracy (political)

Democracy refers to political systems where power is vested in the people.

Globalisation (economic)

Globalisation refers to the complexity of transnational interactions, communications, and exchanges of resources that effectively constitute a global economy.

Return to previous page

Concepts that relate to responsibility for action

Responsibility for action is a complex concept with other concepts sitting inside it. These include:

Action orientation

To have an action orientation means having the skills and motivation to take action to address sustainability issues.

Informed decision making

Informed decision making means seeking knowledge and using it ethically to make decisions that contribute to a sustainable future.

Citizenship

Citizens who are active and informed are in the best position to create a sustainable future.

Guardianship/kaitiakitanga

Guardianship is about diverse communities working together to care for and use resources in ways that ensure that future generations can also meet their needs and aspirations.

Consumerism

In this context, consumerism refers to knowledge, attitudes, and values that lead to the sustainable use of resources.

Enterprise and entrepreneurship

In this context, enterprise and entrepreneurship are about ensuring that innovation and creativity lead to solutions for a sustainable future.

Resilience and regeneration

Humankind’s ability to adapt will prove vital when regenerating our world in a way that is sustainable in the long term.

Return to previous page

Pedagogy for education for sustainability

Pedagogy is the ‘how’ of teaching. Together with content knowledge, it forms the core of our body of professional knowledge.

This section looks at approaches that are known to work with diverse learners and how teachers can know that their teaching is working.

Teacher actions promoting student learning

Effective teachers use a range of approaches to support student learning.

The New Zealand Curriculum offers generic information about effective pedagogy and describes a process for 'teaching as inquiry'. This cyclical process provides a framework that can help teachers to plan strategically and respond to the effects of their teaching, i.e. to think about how you're teaching and whether it's working. For example, is your teaching teacher directed or student directed, is it whole class, group work or individual work, is it text centred, discussion based or resource based? Is it developing action competence in students?

How are you monitoring student engagement? How do you get feedback from your students? Do you informally conference with them? Do you conduct class surveys – online or paper based?

- An inquiry process for teaching
- Four mechanisms that facilitate learning in the social sciences
- Approaches that encourage action competence
- Creating an inclusive learning environment
- Modelling what we value
- Developing the key competencies in EfS

Assessment in EfS

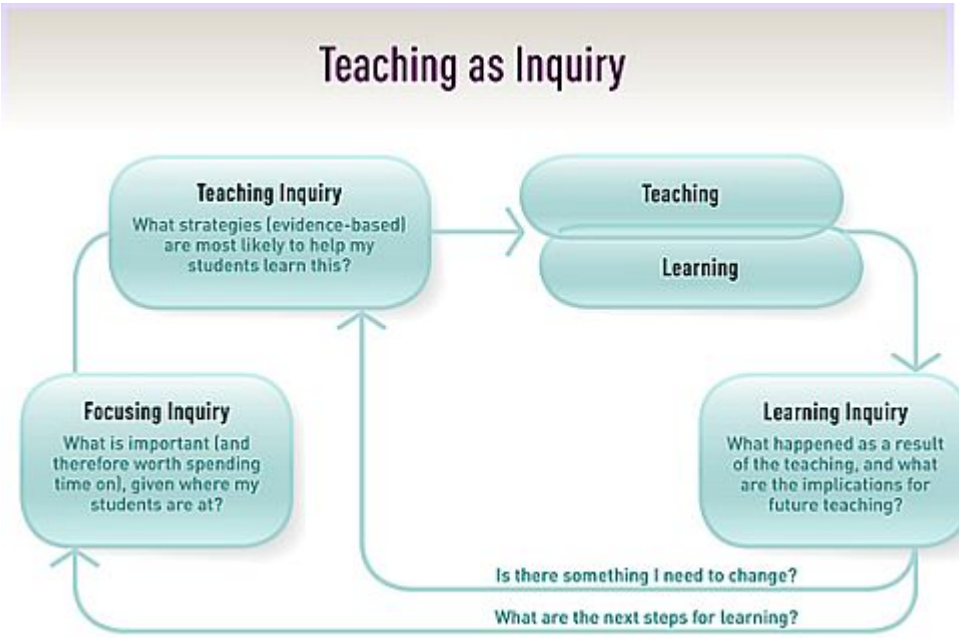
Good assessment practice, including summative as well as diagnostic and formative assessment, is part of good teaching.

- Assessing student learning in EfS
- EfS and external qualifications
- Readings and resource materials on assessment
- Cross-curricular learning and external qualifications

An inquiry process for teaching

The New Zealand Curriculum (page 35) suggests that, to be effective, we need to consistently ask ourselves three questions:

- What is it important for me to be teaching now (focusing inquiry)?
- What strategies are most likely to help my students learn this (teaching inquiry)?
- What worked, and for whom, and what are the implications for my teaching (learning inquiry)?



Teaching as inquiry diagram from NZC.

The first question requires us to know our students; the second, to have (or acquire) the appropriate content knowledge and pedagogical content knowledge; the third, to assess what learning has gone on and in whose mind. The answer to this third question will have implications for our teaching – and possibly, our own learning. We may find we need to look for different strategies or even a completely different approach.

The curriculum offers a brief summary of pedagogical approaches that are applicable to all teaching. For a more comprehensive guide, with a specific focus on the social sciences, see Effective Pedagogy in Social Sciences/Tikanga ā Iwi Best Evidence Synthesis Iteration [BES]. This synthesis identifies four ‘mechanisms’ that are at the heart of effective social sciences teaching and learning.

Education for sustainability places strong emphasis on supporting students to develop action competence. This emphasis is strongly embedded in the learning objectives and requires teachers to adopt a holistic approach to teaching and learning.

Efs in the curriculum: taking action (EfS community, TKI website)

Four mechanisms that facilitate learning in the social sciences

Four mechanisms that facilitate learning in the social sciences

The Effective Pedagogy in Social Sciences/Tikanga ā Iwi Best Evidence Synthesis Iteration (BES) identifies four mechanisms that facilitate learning for diverse students in social sciences: connection, alignment, community, and interest. Each of these mechanisms provides a lens through which we can examine our current practice. Each is backed by evidence that we can use when deciding what to do next.

- Make connections to students' lives
- Align experiences to important outcomes
- Build and sustain a learning community
- Design experiences that interest students

1. Make connections to students' lives

This mechanism particularly involves:

- drawing on relevant content
- ensuring inclusive content.

Students' understanding of important ideas and processes is enhanced when the teacher:

- encourages them to use their own experiences as a point of comparison when learning about other people's experiences in different times, places, and cultures
- uses language that is inclusive of all learners and their experiences
- selects resources that make diversity visible and avoid biased and stereotypical representations.

The connections mechanism at work in EfS

Students are more likely to achieve in EfS when they see themselves and their culture positively reflected in the subject matter and learning contexts.

Integrating an understanding of cultural identity into learning contexts promotes ako, a teaching and learning relationship in which the educator also learns from the student. By acknowledging, respecting, and valuing who students are and where they come from, teachers are in a position to build on what their students bring with them to the learning setting. This is essential for developing action competence. Cultural identity takes in relationships between people and between people and the natural world. Every culture has perspectives on and insights into the environment that can broaden possibilities for a sustainable future.

For example, the year 1–13 Te Kura Kaupapa Māori o Te Rā whiti Roa used sustainability to structure a whole-school learning journey: No hea tatou? In the context of their local awa (river), the students explored their links to the land and to the community's whakapapa. They centred the learning on protecting their awa by locating sources of problems, initiating community interest and support, and growing and planting trees for riparian conservation.

Community support for the learners' achievements from such school–community partnerships reinforces the students' sense of the worth of their learning.

- Creating an inclusive learning environment

TOP

2. Align experiences to important outcomes

This mechanism particularly involves:

- identifying prior knowledge
- aligning activities and resources to intended outcomes
- providing opportunities to revisit concepts and learning processes
- attending to the learning of individual students.

Student understanding of important ideas and processes is enhanced when the teacher accesses relevant prior knowledge, using it to minimise duplication of what is already known, and address misunderstandings that could inhibit new learning. If important outcomes are to be achieved, activities and resources need to be aligned to them. Teachers optimise alignment when they make it transparent to their students, design learning opportunities that are sequenced in response to ongoing assessment, and provide opportunities to revisit important content and processes.

The alignment mechanism at work in EfS

It is central to EfS that students develop the competence to take action for a sustainable future – and that they know why they are taking action.

> Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.
>
> Margaret Mead

The choices that people make when deciding on particular courses of action always come back to the key EfS concepts. For this reason, it is vital that students are given numerous opportunities to examine the key concepts in relation to each of the aspects of sustainability before deciding what action to take on a sustainability issue. Competence to act requires balancing thinking with acting.

Taking informed action could include raising awareness and influencing others' behaviours through speeches, letters, drama, artworks, articles, and other indirect forms of action.

It could also include direct actions taken to mitigate, remedy, or redesign systems for a more sustainable future, such as habitat restoration, systems for effective and efficient resource management, sustainable design, building and transportation, pest removal, and food production.

The use of real-life, integrated contexts, in which students are active participants, teaches them to examine what is currently happening with a view to thinking and acting for a more sustainable future.

Use a range of teaching actions and teaching models to help your students:

- develop knowledge and understanding of issues
- learn to think empathetically
- build their capacity to take action on issues and concerns of interest

- learn how to target their actions to resolve concerns and issues at the source.

Going on a beach cleanup organised by the teacher is an activity, not an action for sustainability. Identifying a source of litter at the beach, such as plastic shopping bags, and developing a solution that targets the cause (for example, planning a campaign to reduce the use of plastic bags at the supermarket or designing advertising to promote safe disposal of litter at a boat club) is an action for a sustainable future.

The experiential learning cycle, co-operative learning, problem-based learning, and inquiry-based learning are all useful approaches for EfS.

TOP

3. Build and sustain a learning community

This mechanism particularly involves:

- establishing productive teacher–student relationships
- promoting dialogue
- sharing power with students.

Student understanding of important ideas and processes in the social sciences is enhanced when teachers:

- establish productive relationships with students
- explicitly develop their students' interaction skills
- put in place inclusive practices that acknowledge multiple abilities and contributions
- delegate to students authority to make decisions about their learning
- design tasks and organise experiences that require student–student dialogue and interaction.

The community mechanism at work in EfS

The EfS classroom environment should enable debate and the expression of diverse views. Students need to feel that it is safe to propose and critique ideas for action. A supportive environment is also important when students are exploring how to identify and assign roles and act coherently as a group.

A supportive learning environment will develop when you:

- model and expect respectful relationships between individuals
- invite and value student contribution
- encourage the students to establish protocols for classroom discussion and debate
- challenge wide-ranging curiosity and inquiry across the learning areas, from different cultural perspectives, in local, national, or global contexts, and embracing diverse viewpoints.

Ka Hikitia – Managing for Success: The Māori Education Strategy 2008–2012 (Ministry of Education, 2008) suggests that involving students in decision making about their learning will invite commitment to their learning.

TOP

4. Design experiences that interest students

This mechanism particularly involves:

- meeting diverse motivational needs
- maximising student interest
- using a variety of activities.

Student understanding of important ideas and processes is enhanced when the teacher:

- makes learning as memorable as possible by deliberately designing learning experiences that are sensitive to students' differing interests, motivations, and responses
- provides a variety of experiences that become memorable anchors for learning and subsequent recall
- helps students draw the learning from these experiences.

The interest mechanism at work in EfS

EfS demands a holistic approach to teaching and learning. This has long been characterised as 'education about, in, and for the environment'.

This approach provides for a diversity of student learning styles and emphasises learning experiences that students will reflect on – two important factors in the development of action competence.

Rather than be dogmatic, EfS seeks to empower students to address issues that concern them and, in this way, to engage with their own futures. The visioning aspect of action competence requires students to consider alternatives to current thinking and acting, and to consider what kind of future they would like.

The 'about, in, and for approach' emphasises inquiry, experiential, and co-operative pedagogies. For useful examples, see learning experiences (EfS community, TKI website).

The focus on action in EfS stimulates student participation and contribution and helps them to see that they can make a difference. Teachers support students to design manageable and achievable actions for sustainability.

Approaches that encourage action competence

EfS is about engaging students with the world they live in and developing the ability to take action for a sustainable future. This means that teaching needs to develop action competence and the key competencies. The four approaches described here have been developed in different contexts, but they have direct applicability for teaching and learning in EfS.

- Experiential learning
- Co-operative learning
- Problem-based learning
- Inquiry-based learning

Experiential learning

The Curriculum in Action materials online include detailed information about the experiential learning cycle, including a diagram that depicts the cycle's teaching and learning process.

- Diagram (Curriculum in action website)

This information was developed for teachers of health and physical education, but the approach is effective for teaching and learning in many school subjects, including EfS.

For example, have students reflect on the experience of a beach cleanup and respond to questions such as, 'What did I find?' 'Was I surprised?' 'Will this waste be back on the beach next week?' 'Where has it come from?' 'What changes are needed to reduce the waste on the beach?' Reflecting on an authentic learning experience helps students to build the knowledge that enables them to take focused action.

The UNESCO site Teaching and Learning for a Sustainable Future promotes the value of experiential learning in EfS.

Co-operative learning

Co-operative learning is an interactive or collaborative approach. The teacher guides or facilitates the learning to develop a sense of collective responsibility for the well-being of the group, the wider community, and the environment. Learning that explicitly aims to benefit all can energise and inform actions for a sustainable future.

For example, as part of a beach cleanup, support your students in working co-operatively. Discuss how working as a co-ordinated unit can have a greater impact than a bunch of individuals acting alone. Ask the students to think about their individual skills and preferences as they plan how to reduce marine waste in future. How do their collective skills match up with the actions they have identified? Who is most confident about approaching local businesses? Who would like to draft up letters to local newspapers? Are there art or design or photography students who could spearhead designing posters or fliers?

TOP

Problem-based learning

In problem-based learning, students assume primary responsibility for researching a problem. They can have a part in deciding on the problem to be researched and connecting the learning to their own interests.

For example, as they reflect on the results of a beach cleanup, have students choose an issue (such as waste disposal) that most interests them. Ask them to generate a plan to solve the problem or improve the situation, such as designing an awareness campaign targeted at commercial fishing operators or developing biodegradable packaging.

The teaching and learning strategies described on UNESCO site Teaching and Learning for a Sustainable Future include future problem solving and community problem solving.

TOP

Inquiry-based learning

Inquiry-based learning involves the students in asking questions, gathering information and ideas, examining relevant issues (big ideas), and making systematic attempts to answer the questions they have identified. The questions and possible answers may lead into possible actions.

For example, the students could generate focus questions based on the data about the waste they collected during a beach cleanup and relating to the key concept of interdependence, in this case, how society's decisions and actions impact on the marine environment.

These focus questions and possible answers could flow on to actions such as lobbying local takeaway outlets to reduce packaging or designing an awareness campaign to save an endangered animal (the Maui's dolphin) or plant (pingao or pikao).

You can read more about inquiry-based learning on the UNESCO site Teaching and Learning for a Sustainable Future.

Also useful is the Building Conceptual Understandings in the Social Sciences (BCUSS) book Approaches to Social Inquiry (Ministry of Education, 2008). See the Social Sciences Online homepage for a PDF of this book.

Creating an inclusive learning environment

Students are more likely to achieve in education for sustainability when they see their concerns and ideas taken seriously and their cultures valued in subject content and learning contexts.

By recognising that students have a cultural identity and inviting them to share their cultural knowledge in learning contexts, teachers promote ako, a teaching–learning relationship in which the teacher also learns from the student.

For the teacher, ako involves acknowledging, respecting, and valuing who students are and where they come from and, through deliberate and reflective practice, building on what they bring with them to the learning setting. People of all cultures have skills, knowledge, and qualities that can be built on.

Principles of a kaupapa Māori pedagogy

New Zealand's foundations are bicultural, so tikanga Māori should be at the centre of learning and all teaching should be informed by the kaupapa Māori principles identified by Russell Bishop and Ted Glynn [1]

Tino rangitiratanga – the right to determine one's own destiny. Parents and children are involved in decision-making processes.

Taonga tuku iho – the treasures from the ancestors, providing a set of principles by which to live our lives.

Ako – a mutual teaching and learning relationship in which the educator is also learning from the student.

Kia piki ake i ngā raruraru o te kāinga – reaches into Māori homes and brings parents and families into the activities of the school.

Whānau – the development of connections with the community to support learning.

Kaupapa – acknowledging and valuing the language and culture in the classroom and chosen contexts.

Read more about Te Kotahitanga

Read more about the Effective Teaching Profile (PDF)

Some suggested contexts and approaches

- Visiting a marae to learn from kaumatua about Māori views of land ownership/kaitiakitanga;
- Field trips to sites that are of special significance to Māori;
- Collaborating with a local marae on a conservation or recycling project;
- Case study of a Pacific island (for example, Tuvalu) that is threatened by rising sea levels or global warming.
- Case studies of lost or endangered species of particular significance to Māori;
- Inviting individual (or groups of) students to chose a context that has particular cultural

significance for them;
- Inviting kaumatua to participate in a hui on a local or topical issue such as mining on conservation estate or declining populations of īnanga or kai moana;
- Case study of a Māori-owned eco-tourism or cultural tourism venture;
- Case study of pollution (or loss) as it affects a part of the world from which one or more of your students come. For example ocean plastic (Pacific Islands), mining effluents (Papua New Guinea or Africa), or pesticides (India or Bangladesh).
- Meetings with family and whanau to outline programmes of work and discuss ways in which they might support students in their learning;
- Upskilling teachers in terms of pronunciation and familiarity with the concepts that underlie Māoritanga;
- Case study of an economic or cultural initiative for sustainability in a part of the world from which one of more of your students come.

Return to Pedagogy main page

Footnotes

1. Culture Counts: Changing Power Relations in Education (1999). The Dunmore Press, Palmerston North.

Modelling what we value

Education for sustainability is not values free. Core EfS values are closely related to the values found in the curriculum. Students expect to find congruence between the values their teacher promotes and the way that teacher teaches.

Teachers of sustainability teach for values (in other words, that values are important and influence our behaviour) and about values (the values that underpin sustainability).

Importantly, because EfS requires students to examine their own values and those of others, teachers need to be respectful of those values. By modelling respect, teachers demonstrate an integrity that gives students the confidence to be honest.

For examples of how the values of the New Zealand curriculum are fundamental to EfS and EfS teaching, see EfS and the values of the New Zealand curriculum.

Developing key competencies in EfS

Our sustainable future depends on being able to think critically, participate, act, reflect, and connect. Developing the key competencies is part and parcel of EfS.
EfS promotes development of the key competencies through learning activities that engage, encourage, challenge, and motivate students and teacher actions that foster student inquiry, discussion, understanding, active participation, and reflection.

There are generally no right answers in the process of inquiry and discussion, but there must be opportunities for exploring new understandings and insights about how we live in relationship to one another and all living things on this planet, and how these opportunities can lead to positive change and actions.

EfS equips young people to identify and think critically about sustainability issues and the choices necessary to secure a decent and humane future. Our future depends on people understanding the web of life and understanding the need to be responsible citizens of a biotic community.

Thinking
Using language, symbols, and texts
Managing self
Relating to others
Participating and contributing

Thinking

Teachers model active curiosity about the world. They encourage students to reflect on ideas, experiences, and information and to critique underlying assumptions about sustainability issues.

Well-designed learning activities help students become aware of:

- their own ways of thinking
- their approaches to and strategies for problem solving and appreciative inquiry
- how (and why) other people think the way they do
- their own perspectives and motivations.

These learning experiences can help students to draw on others' strengths in active group work to find collaborative solutions and take actions.

Understanding the consequences of our ways of thinking and acting is a necessary constraint on creative thinking. Creative thinking, using multiple perspectives and knowledge systems, leads to innovative ideas for a sustainable future.

Students develop curiosity about sustainability issues. This spurs them to research to create knowledge and to develop decision-making skills to respond to new opportunities.

Students could:

- investigate consumer pressures and relate them to their own actions
- use information about climate change, examine the implications for the school environment, identify key stakeholder groups and barriers and enablers to achieving change, and develop

a strategy to present to their school board
- identify an issue relating to sustainability (for example, energy use) and investigate alternatives or solutions to be used in their schools or homes.

TOP

Using language, symbols, and texts

EfS requires students to interpret how implicit and explicit messages are communicated to individuals and society and to understand how this knowledge can be used to challenge and communicate positive change in a range of communicative modes.

Students begin to understand sustainability from a variety of perspectives by recognising and using a range of languages, symbols, and texts to explore ideas and issues in relation to different target groups.

Students could:

- investigate the language of consumerism in advertising (‘upsizing’, ‘buy one get one free’, and so on)
- investigate shop designs and layouts
- analyse slogans and communications strategies used by social marketers, protest movements, or lobby groups and explore how these use knowledge about different target groups
- examine media clips and films about sustainability issues for the messages they contain.

TOP

Managing self

Taking action for a sustainable future is central to EfS. Only by learning to reflect on their own values, attitudes, and behaviours are students in a position to understand what drives others, and so take effective action. Students need to have opportunities to set goals, manage timelines, negotiate with others, and respond appropriately in the face of difficulties.

Students need support as they explore what an individual can do to influence and bring about small- and large-scale change. Also, they need to examine the negative impacts anonymity can have on individual behaviour. They need to realise that they are part of an ecological system and that they have a responsibility for that system. They also need to recognise and understand their own strengths and weaknesses and take these into account when making plans.

Students could:

- understand that their use of resources has local and global impacts and implications
- develop and carry out an action plan, for example, changing a behaviour to make their way of life at home more sustainable
- survey other students’ attitudes to making change, consider the responses, and develop possible actions
- organise a guest speaker to motivate and inspire other students and teachers to take part in action on waste.

TOP

Relating to others

Many EfS learning activities require students to collaborate with others, providing opportunities for them to develop their abilities to listen and hear, recognise and appreciate different points of view, negotiate, and share ideas.

Activities also require students to engage with complex issues where they examine processes, diverse perspectives, and underlying assumptions. These activities may involve exploring traditional cultural and/or religious practices that embrace or challenge notions of sustainability. Students may find themselves relating to or empathising with people whom they may never meet.

Students could:

- allocate roles in an action task to achieve certain collective goals
- invite experts to class to discuss an environmental or sustainability issue from a range of different perspectives to find a compromise that could work for all stakeholders
- build a vision map of their school
- plan a strategy for a business, integrating sustainability into their practices.

TOP

Participating and contributing

EfS can be context situated and authentic on all levels from local to global.

Learning experiences aim to engage students in real issues that affect them now and may continue to do so in the future.

Learning opportunities in both authentic and simulated contexts allow students to apply and practise their new learning.

By working with others on issues relevant to their communities, students see that they have a role to play in influencing change and that they can contribute to problem solving and decision making. Engaging with others on sustainability issues helps them understand the meaning of interdependence and their responsibilities to others now and in the future.

Students could:

- work in partnership with a marae committee to improve their waste system
- understand the importance of forests and initiate a planting event at their own school
- join or organise a school envirogroup or group of eco warriors to raise awareness of sustainability issues in their own school.

TOP

Developing the key competencies in EfS, years 1–13

A table showing how the competencies can be developed through experiences in education for

sustainability in early childhood and years 1–13 through to tertiary education is provided at

Development of the Key Competencies Through Experiences in Education for Sustainability. (PDF, 43 KB)

Assessing student learning in EfS

Assessment is bigger than NCEA. It is the means (provides the evidence) by which we are able to judge how effective our teaching is, and for whom. And it is the means by which students can measure their progress.

Diagnostic and formative assessment
Recognising action competence: an example
Involve students in their own assessment

Diagnostic and formative assessment

Effective teachers use diagnostic and formative assessment:

- to identify different students' strengths and needs
- to provide detailed and thorough measurement of students' progress
- to identify the impacts of their teaching and the implications for future teaching.

EfS focuses on how students learn, as well as what they learn. How can you show the process by which their learning develops? What is the evidence of this process? What has happened for the student? What are the wider outcomes? Has something been protected in the environment, an environment enhanced, or a system developed or changed?

Evidence for a rounded EfS assessment may include the student's plan, their journal or online log, evidence (for example, photographs) that they have carried out their planned actions, and their written evaluations of their work in relation to a sustainable future.

Recognising action competence: an example

Assessment needs to capture and contribute to building action competence.

For example, at Auckland Girls' Grammar School, students keep online journals (similar to a blog) recording how their work is going, indicating barriers, things that are going well, and so on. The journals are accessible from outside school.

The teacher can see each student's feedback, but the students see only what they have posted. The teacher responds with feedback and suggestions of what to do next.

One group that wanted to promote sustainability needed to talk to people at school and described in their journals their attempts to do this, while another group had to change plans suddenly. The teacher used journal feedback to offer alternatives to both.

The journal provides dated evidence that the students have been working at or outside the school. It is particularly useful for groups or for students who prefer to work alone.

Involve students in their own assessment

Knowing what is expected of them strengthens the ability of EfS students to judge when they have got there and contributes to developing their action competence.

Formative assessment in a variety of contexts should be based on shared learning intentions and explicit success criteria developed through quality discourse and learning conversations and reinforced by focused feedback.

Self and peer assessment exercises, opportunities for reflection together with attention to the processes of reflection, and journals or portfolios are all useful tools to help students benefit from assessment information.

Students in pairs or small groups could grade or annotate exemplar scripts then compare their evaluations with the actual rankings in class discussion.
Suggest that, in addition to teacher assessment and self-evaluation, students may also find it useful to seek feedback from other people (extended family, people in the community).

See also the section approaches that encourage action competence

EfS and external qualifications

This section lists the available EfS achievement standards and highlights several considerations for their use.

- NCEA achievement standards
- EfS and university entrance
- Action and its evaluation are both necessary
- Using local contexts for internal assessments

NCEA achievement standards

These standards are designed for use in an EfS programme or in other integrated or subject programmes of work at year 12 or 13. Most of the standards can be used to assess learning in a local context.

Assessment specifications, moderators' reports, and clarification documents are available on the NZQA website.

- NCEA: Achievement standards

Level 2

- AS90810 Education for sustainability 2.1 Plan, implement, and evaluate a personal action that will contribute towards a sustainable future; Internal, 6 credits.
- AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.
- AS90812 Education for sustainability 2.3 Describe world views, their expression through practices and activities and the consequences for a sustainable future; External, 4 credits.
- AS90813 Education for sustainability 2.4 Describe values and associated behaviours in relation to a sustainable future; Internal, 3 credits.
- AS90814 Education for sustainability 2.5 Describe aspects of sustainability in relation to a sustainable future; External, 4 credits.
- AS90815 Education for sustainability 2.6 Work cooperatively to develop and present a strategy or design for sustainability in response to a future scenario; Internal, 3 credits.

Level 3

- Education for sustainability 3.1 Evaluate a planned personal action that contributes toward a sustainable future; Internal, 6 credits.
- Education for sustainability 3.2 Investigate the interrelationship between humans and a biophysical environment in relation to a sustainable future; Internal, 4 credits.
- Education for sustainability 3.3 Compare and contrast initiatives in relation to a sustainable future; External, 4 credits.
- Education for sustainability 3.4 Describe policies and practices, their development and contribution to a sustainable future; External, 5 credits.
- Education for sustainability 3.5 Develop and justify a strategy for an organisation that will contribute to a sustainable future; Internal, 5 credits.

EfS and university entrance

EfS is an additional domain on the National Qualification Framework, and credits obtained in EfS contribute to the 'last' 14 of the minimum of 42 credits at level 3 for entrance into a New Zealand university. (Credits can be accumulated over more than one year.)

EfS is not on the approved list at present. Courses of study that are not on the list of approved subjects may be based on standards from more than one domain. Schools need to be aware of NZQA specifications when setting up programmes and advising students.

Action and its evaluation are both necessary

EfS achievement standards require students to think critically (evaluate). Students sometimes underestimate the worth of evaluation because they see action as the thing that matters. They need to understand that, for an action to be considered and justifiable, the why of an action is as important as the how – and they need to learn to reflect on the success of an action in terms of how well it achieved its aim.

To meaningfully evaluate actions in different contexts, students need in-depth understanding of the sustainability concepts at stake and the different sides of the debates; for example, to evaluate actions relating to climate changes, students need to compare bases of the competing claims of scientists and sceptics.

Students also need support to recognise the difference between an activity (for example, riparian planting) and the effect of that action on a sustainable future (cleaner water, reduced erosion, invertebrates able to multiply).

Using local contexts for internal assessments

Several schools report students achieving higher levels of success in NCEA achievement standards when the focus has been on issues in the local environment.

For example, a year 12 class at Taipa Area School studied the local harbours, sand dunes, and marine reserves. Students could choose an activity carried out in a harbour (AS90811 2.2), take action to protect the sand dunes (AS90810 2.1), or discuss different values involved in setting up a local marine reserve (AS90813 2.4).

A year 13 class at Mangakahia Area School worked with a local marae to devise a strategy (AS 3.5) and then used it to plan and carry out an action (AS 3.1).

Several geography classes have incorporated AS90811 2.2, often as part of a field trip.

Ruawai College's year 12 science class incorporated AS90815 2.6 when looking at scientific issues for the future.

An extended example of teaching and assessment in a local context (Kaikorai Valley College and the Kaikorai Stream) is attached as PDF file 3 to the section in this guide on learning programme design.

Cross-curricular learning and external qualifications

An EfS programme that involves two or more learning areas allows for students to be assessed against a number of possible achievement standards. This section suggests a variety of outcomes that are based on EfS learning objectives and could be assessed using achievement standards from other subjects or learning areas.

See the sample unit plan (PDF) in the learning programme design section of this guide.
[This section will be updated when achievement standards are finalised. Please check before use.]

- Arts
- Biology
- Chemistry
- Earth and space science
- Economics
- English
- Geography
- Health and physical education
- Mathematics and statistics
- Physics
- Science
- Social studies
- Technology

Arts

Level 6

Research and refine ideas about a local issue, and develop a drama to inform others. (EfS LO 6.2)

AS90007 Drama 1.2 Devise and perform a drama; Internal, 5 credits.

Level 7

Explore how New Zealand drama reflects different people's opinions on sustaining our natural environment. Research and analyse the influences of the native bush on different artists' works. (EfS LO 7.2)

Research and document methods and ideas in the context of a drawing study (painting, photography, printmaking, sculpture, design). AS90233, AS90473, AS90471, AS90474, AS90472 (2.1)

Apply drama techniques in a group within a scripted context. AS90300 (2.2)

Level 8

Research the development of contemporary Māori art and its relationship to the land. (EfS LO 8.2)

Visual arts 3.1 Research and analyse approaches within established design/painting/photography/printmaking/sculpture practice; Internal, 4 credits.

TOP

Biology

Level 6

Investigate the effects of pollution on the stream ecosystem. (EfS LO 6.1)

Research the factors affecting the distribution of the Ross River Virus mosquito. (EfS LO 6.3)

AS90925 Biology 1.1 Carry out a practical investigation in a biological context, with direction; Internal, 4 credits.

Describe the control of an introduced species that affects native species. AS90165 (1.5)

Level 7

Research the effects of an introduced predator on specific native species.

Compare different methods of control and make recommendations.

Investigate the impact of anthropocentric pollution on dissolved oxygen as it affects stream invertebrates. (EfS LOs 7.1 and 7.3)

AS91154 Biology 2.2 Analyse the biological validity of information presented to the public; Internal, 3 credits.

AS91155 Biology 2.3 Demonstrate understanding of adaptation of plants or animals to their way of life; Internal, 3 credits.

AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.

Level 8

Investigate the possible consequences of using genetically modified corn in New Zealand.

Prepare a pamphlet for the public setting out the pros and cons of the introduction of genetically modified food crops. (EfS LOs 8.2, 8.3, and 8.4)

Research a contemporary biological issue; Internal, 3 credits.

Education for sustainability 3.1 Evaluate a planned personal action that contributes toward a sustainable future; Internal, 6 credits.

TOP

Chemistry

Level 6

Investigate the use of chemical filters in coal-burning power stations.

Make unbleached paper and compare its properties with bleached equivalents for flammability, strength, and so on. (EfS LO 6.3)

AS90931 Chemistry 1.2 Demonstrate understanding of the chemistry in a technological application; Internal, 2 credits.

Process information to describe a use of chemistry knowledge with direction. AS90170 (1.2)

Level 7

Research and write a report on the CCS process. (EfS LO 7.3)

Research information to present a scientific report. AS90771 (2.2)

Level 8

Investigate the possible effects of rising temperatures on the absorption of CO2 in the ocean and the production and availability of carbonate ions.

Analyse nitrate concentrations in a local waterway and link to land use and sewage contamination. (EfS LOs 8.1 and 8.2)

AS91387 Chemistry 3.1 Carry out an investigation in chemistry involving quantitative analysis; Internal, 4 credits.

Education for sustainability 3.2 Investigate the interrelationship between humans and a biophysical environment in relation to a sustainable future; Internal, 4 credits.

TOP

Earth and space science

Level 7

Investigate distribution patterns on a local coast and compare these to historical records. Identify and carry out possible methods of restoration. (EfS LOs 7.1 and 7.4)

AS91188 Earth and space science 2.2 Examine an earth and space science issue and the validity of the information communicated to the public; Internal, 4 credits.

AS90810 Education for sustainability 2.1 Plan, implement and evaluate a personal action that will contribute towards a sustainable future; Internal, 6 credits.

AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.

Level 8

Investigate the link between climate change, changes in ocean temperatures, changes in air temperatures, and the likely effects on weather and climate patterns in New Zealand

Compare articles on climate change by a scientist and a sceptic and analyse the use of vocabulary and conventions to influence an audience. (EfS LOs 8.1, 8.2, and 8.3)

AS91411 Earth and space science 3.2 Investigate a socio-scientific issue in an Earth and space science context; Internal, 4 credits.

AS91414 Earth and space science 3.5 Demonstrate understanding of processes in the atmosphere system; External, 4 credits.

Education for sustainability 3.2 Investigate the interrelationship between humans and a biophysical environment in relation to a sustainable future; Internal, 4 credits.

TOP

Economics

Level 6

Investigate how consumer pressure can be used to drive sustainable practices. (EfS LOs 6.2 and 6.3)

AS90983 Economics 1.1 Demonstrate understanding of consumer choices, using scarcity and/or demand; External, 4 credits.

Understand and use the consumer decision-making model. AS90200 (1.6)

Level 7

Investigate the effects of compulsory riparian planting on the farming industry. (EfS LOs 7.1 and 7.2)

Analyse government policies, such as a biodiversity strategy, conservation, and costs associated with them, trade-offs, and real-cost economics for sustainability outcomes. (EfS LOs 7.2 and 7.3)

Process, present, and analyse statistical data in relation to given economic issues. AS90797 (2.4)

AS90813 Education for sustainability 2.4 Describe values and associated behaviours in relation to a sustainable future; Internal, 3 credits.

Level 8

Research the possible effects and responses if European consumers move towards local dairy products in response to a food miles campaign. (EfS LO 8.2)

Collect and process information, and carry out an economic analysis. AS90778 (3.5)

Compare and contrast initiatives in relation to a sustainable future. AS90830 (3.3)

TOP

English

Level 6

Construct a brochure to persuade junior students to put food in a school worm farm. (EfS LOs 6.2

and 6.4)

Produce a media or dramatic presentation. AS90059 (1.8)

Research, organise, and present information. AS90060 (1.9)

Level 7

Research and write a report on a local environmental issue from a personal viewpoint. (EfS LO 7.2)

Produce crafted and developed formal transactional writing. AS90376 (2.2)

Level 8

Compare articles on climate change by a scientist and a sceptic, and analyse the use of language structures to influence an audience. (EfS LOs 8.2 and 8.4)

Respond critically to written text(s) studied. AS90721 (3.2)

Construct and deliver an oral presentation. AS90725 (3.6)

TOP

Geography

Level 6

Examine the catchment of a stream flowing through farmland and urban settlements. (EfS LO 6.1)

Examine the impact of extractive or agricultural industries on communities and environments, mitigating actions, and values conflicts. (EfS LO 6.3)

Carry out and present directed geographic research. AS90206 (1.5)

Describe a contemporary geographic issue and evaluate courses of action. AS90207 (1.6)

Level 7

Investigate the effect of human activities on a local coastline and take action/make recommendations for a sustainable future. (EfS LOs 7.1, 7.2, and 7.4)

Investigate tourism in a post peak-oil world. (EfS LO 7.3)

Carry out and present guided geographic research. AS90335 (2.5)

Explain a contemporary geographic issue and evaluate courses of action. AS90336 (2.6)

AS90810 Education for sustainability 2.1 Plan, implement and evaluate a personal action that will contribute towards a sustainable future; Internal, 6 credits.

AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.

Level 8

Compare the differences between natural erosion in an estuary (for example, at Mangamangaroa) in the past and in the present, with the effects of subdivision, higher population, and global change. (EfS LOs 8.2 and 8.4)

91432 Geography 3.7 Analyse aspects of a geographic topic at a global scale; Internal, 3 credits.

Education for sustainability 3.2 Investigate the interrelationship between humans and a biophysical environment in relation to a sustainable future; Internal, 4 credits.

TOP

Health and physical education

Level 6

Investigate the way your local regional council provides access to the coast for people's recreation while protecting natural ecosystems. (EfS LOs 6.2 and 6.3)

Level 7

Investigate the methods used by a local authority to balance the effects of new subdivisions, light industry, and the protection of a local waterway. (EfS LOs 7.2 and 7.4)

Alternatively: Investigate the spiritual connection a local iwi has to indigenous species in the area and the impact people have had over time, or investigate health and well-being when natural balances are compromised.

Develop, describe, implement, and evaluate a plan of action to enhance hauora/well-being. AS90328 (2.3)

Education for sustainability 3.4 Describe policies and practices, their development and contribution to a sustainable future; External, 5 credits.

Level 8

Analyse how a council has used both technology and legislation to ensure physical, social, and environmental health in a new subdivision. (EfS LOs 8.2 and 8.4)

AS91461 Health 3.1 Analyse a New Zealand health issue; Internal, 5 credits.

Describe policies and practices, their development and contribution to a sustainable future. AS90831 (3.4)

TOP

Mathematics and statistics

Level 6

Evaluate a statistics report by a regional council purporting to show improvements in water quality.

(EfS LO 6.3)

Evaluate some of the statistics about global environmental change, such as climate change, global warming, and waste disposal. (EfS LO 6.3)

Use statistical methods and information. AS90193 (1.5)

Level 7

Examine statistical reports on chemical levels in a stream to determine relative risks. (EfS LO 7.3)

Select a sample and use this to make an inference about the population. AS90288 (2.5)

Level 8

Conduct an inquiry into consumer preferences for sustainable products and evaluate the results. (EfS LO 8.3)

Select and analyse continuous bi-variate data. AS90645 (3.5)

Determine the trend for time series data. AS90641 (3.1)

TOP

Physics

Level 6

Investigate the use of dams and weirs in a stream to protect banks and habitats. (EfS LOs 6.1 and 6.3)

AS90935 Physics 1.1 Carry out a practical physics investigation that leads to a linear mathematical relationship, with direction; Internal, 4 credits.

Level 7

Investigate the effects of artificial reefs on wave action on a surf beach and the resultant changes to habitats. (EfS LOs 7.1 and 7.3)

Take measurements of physical quantities and analyse data graphically to determine a relationship. AS90252 (2.1)

Demonstrate understanding of physics in an integrated context. AS90258 (2.7)

AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.

Level 8

Compare the production of energy from different renewable sources, and make recommendations for Auckland to be completely powered by renewable means. (EfS LOs 8.1, 8.2, and 8.3)

Carry out a practical scientific investigation with guidance. AS90727 (3.1)

Research a current scientific controversy. AS90728 (3.2)

Education for sustainability 3.3 Compare and contrast initiatives in relation to a sustainable future; External, 4 credits.

TOP

Science

Level 6

Investigate pollution in a local stream by monitoring N, P, and Cl levels. Identify a source of pollution and take action to reduce the current levels. (EfS LOs 6.1 and 6. 4)

Compare the energy required to make new metal products as opposed to recycling, for example, aluminium and iron. (EfS LO 6.2)

AS90918 Agricultural and horticultural science 1.1 Carry out a practical agricultural or horticultural investigation; Internal, 4 credits.

Carry out a practical science investigation with direction. AS90186 (1.1)

Process information to describe a use of science knowledge, with direction. AS90187 (1.2)

AS90931 Chemistry 1.2 Demonstrate understanding of the chemistry in a technological application; Internal, 2 credits.

TOP

Social studies

Level 6

Investigate how people use the local stream and the consequences of these actions. (EfS LO 6.1)

Investigate climate change issues for Tokelau, which may lead to consequences both on the islands and for New Zealand. (EfS LO 6.2)

Examine differing values positions. AS90218 (1.4)

Decide on social action(s) in relation to a social issue. AS90219 (1.5)

Level 7

Investigate New Zealand’s responses to the Kyoto Protocol and how these have changed over time. (EfS LO 7.2)

Conduct an advanced social studies inquiry. AS90273 (2.3)

Level 8

Discuss the changes to the RMA and how this could impact on the rights of small groups trying to protect their local environment. (EfS LOs 8.2 and 8.4)

AS91597 Social studies 3.2 Conduct a critical social inquiry; Internal, 6 credits.

3.4 Describe policies and practices, their development and contribution to a sustainable future; External, 5 credits.

TOP

Technology

Level 6

Make choices on materials to use based on CO2 production during the lifecycle of each material. (EfS LOs 6.2 and 6.3)

Present an outcome developed through technological practice that addresses the requirements of a brief. AS90050 (1.6)

Level 7

Research the effects of planned redundancy of products in the mobile phone industry and the resultant environmental issues this produces. (EfS LO 7.3)

Examine how technological practice is influenced by responsibilities to the wider community. AS90773 (2.4)

Design and present a solution for an architectural or environmental brief. AS90323 (2.6)

AS90815 Education for sustainability 2.6 Work cooperatively to develop and present a strategy or design for sustainability in response to a future scenario; Internal, 3 credits.

Level 8

Investigate the lifecycle of a computer and the development of environmentally friendly computers.

What are the implications for the design, development, and disposal of computers in a sustainable manner? (EfS LO 8.3)

Describe technologists' responsibilities to the wider community. AS90676 (3.4)

3.5 Develop and justify a strategy for an organisation that will contribute to a sustainable future; Internal, 5 credits.

Readings and resource materials on assessment

Information about effective pedagogy, including the teaching as inquiry process, can be found in The New Zealand Curriculum (pp. 34–36).

Specific approaches or mechanisms for teaching the social sciences are described on pages 54–55 of Effective Pedagogy in Social Sciences/Tikanga ā Iwi: Best Evidence Synthesis Iteration [BES] (Ministry of Education, 2009).

Effective pedagogy in EfS is discussed on the Education for Sustainability website.

The wider social dimensions of EfS are discussed in the New Zealand Parliamentary Commissioner for the Environment's report See Change.

See the learning programme design section of this guide for suggestions on how to plan EfS programmes.

See The New Zealand Curriculum (pp. 39–41) for a discussion of assessment in relation to school curriculum design and review.

See the resources section of this guide for links to online assessment resources.

Learning objectives

As the Curriculum does not have achievement objectives for education for sustainability, learning objectives have been developed to describe the intended outcomes. These objectives are structured in three strands:

- Knowledge and understanding
- Attitudes and values
- Actions

Progression in EfS

As they move from level 6 to 8, students develop their action competence. They move from describing how people affect the environment to planning and participating in positive action, through to evaluating action and its impacts, both short-term and long-term. At the same time, the focus moves from guided action to informed, independent action.

For more on action competence, see Approaches that encourage action competence.

Indicators

Indicators are examples of the behaviours and capabilities that a teacher might expect to observe in a student who is achieving at the appropriate level. Teachers may wish to add further examples of their own.

Context elaborations

Context elaborations are possible contexts for learning, with a suggestion of how they might be used with the focus achievement objective.

The listed context elaborations are examples only. Teachers can select and use entirely different contexts in response to local situation, community relevance, and students' interests and needs.

Assessment for qualifications

Possible achievement standards are suggested for each learning objective. Note that there are no EfS-specific achievement standards for level 6.

EfS learning objectives

Following are the EfS learning objectives by level and strand. Click on the learning objective for possible concept links, indicators, possible context elaborations, and relevant achievement standards.

Level 6 Level 7 Level 8

Level 6

Students will gain knowledge, skills, and experience to:

Knowledge and understanding

- Investigate a local ecosystem and identify human impacts on its biodiversity and physical systems.
- Identify environmental consequences of some technological, economic, or social changes.

Attitudes and values

- Identify some of the values and associated behaviours of different people in relation to a sustainability issue.

Actions

- Plan and participate in an individual or co-operative action for sustainability.

Level 7

Students will gain knowledge, skills, and experience to:

Knowledge and understanding

- Investigate how to enhance and maintain biophysical systems and improve biodiversity.
- Investigate the aspects of sustainability in different contexts.

Attitudes and values

- Examine the values of different groups of people, how these values are expressed in various practices, and the present and future consequences for sustainability.

Actions

- Plan, implement, and evaluate personal action for a sustainable future.

Level 8

Students will gain knowledge, skills, and experience to:

Knowledge and understanding

- 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.

Attitudes and values

- Analyse the values and behaviours that will contribute to a sustainable future.

Actions

- Analyse actions necessary for sustainability and plan, implement, and critically evaluate

personal action for a sustainable future.

Learning objective 6.1

Students will gain knowledge, skills, and experience to:

- investigate a local ecosystem and identify human impacts on its biodiversity and physical systems.

Possible concept links

- Biodiversity, guardianship

Indicators

- Describes the major plant and animal groups and physical systems in an ecosystem and their interdependence.
- Identifies historical and contemporary cultural uses of an ecosystem.
- Describes changes that have occurred to biodiversity in an ecosystem through human activities.

Possible context elaborations

- ‘Adopt a stream’: impact of land use on water quality and living organisms.
- Recreational location, school camp, or ski field: endemic species and physical systems; impact of tourists (transport, waste, energy use, resource use).
- The school community as a local ecosystem: how could it be enhanced?

Assessment for qualifications

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 6.1 can be assessed using the following achievement standards:

- AS90949 Science 1.10 Investigate life processes and environmental factors that affect them; Internal, 4 credits.
- AS90951 Science 1.12 Investigate the biological impact of an event on a New Zealand ecosystem; Internal, 4 credits.
- AS90925 Biology 1.1 Carry out a practical investigation in a biological context, with direction; Internal, 4 credits.

Return to previous page

Learning objective 6.2

Students will gain knowledge, skills, and experience to:

- identify environmental consequences of some technological, economic, or social changes.

Possible concept links

- Respect for all life, finite resources, guardianship, resilience, and regeneration.

Indicators

- Gives examples of how the production of consumer goods has environmental consequences.
- Describes the effects urban development has on an ecosystem.
- Gathers data on the effects that social action has on a particular environment.

Possible context elaborations

- Personal computers: production and disposal of components – the environmental impacts.
- A new motorway is planned/being built: impact of construction and operation on a local stream.
- A new tuckshop: its impact on the school's waste management strategy.
- The life cycle of a cellphone: environmental impacts of the drive for the latest gadgets.
- A local industry shifts manufacturing offshore: environmental impacts of transport of goods.

Assessment for qualifications

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 6.2 can be assessed using the following achievement standards:

- AS91009 Geography 1.3 Demonstrate geographic understanding of the sustainable use of an environment; Internal, 3 credits.
- AS91010 Geography 1.4 Apply concepts and basic geographic skills to demonstrate understanding of a given environment; External, 4 credits.
- AS91052 Technology 1.9 Demonstrate understanding of the ways a technological outcome, people, and social and physical environments interact; Internal, 4 credits.

Return to previous page

Learning objective 6.3

Students will gain knowledge, skills, and experience to:

- identify some of the values and associated behaviours of different people in relation to a sustainability issue.

Possible concept links

- Social justice, cultural diversity, citizenship

Indicators

- Identifies how people's values are connected to cultural beliefs.
- Gives examples of how behaviours in relation to a particular issue have changed over time.
- Describes how sustainable behaviour can be affected by political decisions.
- Illustrates (in relation to a particular sustainability issue) how behaviours are associated with people's values.

Possible context elaborations

- Damming a river for hydroelectric power generation and/or irrigation: what are the different viewpoints?
- Proposal for a new wind farm: how have the community reacted, and why?
- Polystyrene: environmental friend or enemy? How do people feel today compared with 20 years ago?
- Mining on the conservation estate: is a win-win outcome possible?
- Rural marae: how is land valued and food harvested?
- The local community: how does ethnicity affect values and behaviours with respect to recycling?
- The 'fart tax': is it fair?

Assessment for qualifications

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 6.3 can be assessed using the following achievement standards:

- AS90931 Chemistry 1.2 Demonstrate understanding of the chemistry in a technological

application; Internal, 2 credits.

- AS91011 Geography 1.5 Conduct geographic research, with direction; Internal, 4 credits.

Return to previous page

Learning objective 6.4

Students will gain knowledge, skills, and experience to:

- plan and participate in an individual or co-operative action for sustainability.

Possible concept links

- Action orientation, informed decision making

Indicators

- Gathers information about the causes of a sustainability issue from a range of sources.
- Works co-operatively with others to plan an action on a sustainability issue.
- Participates in an action on a sustainability issue and reflects on its outcome for the future.

Possible context elaborations

- The school recycling system: how could it be improved?
- Community planting: work with the council.
- Energy conservation: plan with family to reduce energy use in and around the home.
- Māori Language Week: plan a school or community initiative that involves exploring Māori perspectives of the environment.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 6.4 can be assessed using the following achievement standards:

- AS91012 Geography 1.6 Describe aspects of a contemporary New Zealand geographic issue; Internal, 3 credits.

Return to previous page

Learning objective 7.1

Students will gain knowledge, skills, and experience to:

- investigate how to enhance and maintain biophysical systems and improve biodiversity.

Possible concept links

- Biodiversity, guardianship

Indicators

- Researches methods for controlling a pest (animal or plant) within an ecosystem.
- Researches the effect of a control method on biodiversity.
- Creates a presentation to show how choices in land use can impact on the health of waterways.
- Explains the economic advantages and disadvantages of protected (reserve) areas.

Possible context elaborations

- The decline of īnanga/whitebait: causes and solutions.
- The local environment: gather data on biodiversity and abiotic factors.
- A pest fish population in your local stream: its impact on the ecosystem.
- A wetland that has been set up to mitigate the effects of stormwater.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 7.1 can be assessed using the following achievement standards:

- AS90811 Education for sustainability 2.2 Describe the consequences of human activity within a biophysical environment in relation to a sustainable future; Internal, 4 credits.
- AS91154 Biology 2.2 Analyse the biological validity of information presented to the public; Internal, 3 credits.
- AS91155 Biology 2.3 Demonstrate understanding of adaptation of plants or animals to their way of life; Internal, 3 credits.

Return to previous page

Learning objective 7.2

Students will gain knowledge, skills, and experience to:

- investigate the aspects of sustainability in different contexts.

Possible concept links

- Environmental, social, cultural, and economic sustainability

Indicators

- Explains possible strategies to achieve a sustainable future.
- Researches a range of case studies on sustainability issues.
- Uses the aspects of sustainability to evaluate change strategies.

Possible context elaborations

- Biofuels: advantages and disadvantages.
- A local harbour: what impacts might global warming cause?
- A community garden: cost/benefit analysis.
- Radiata pine plantations vs native bush: pros and cons.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Return to previous page

Learning objective 7.3

Students will gain knowledge, skills, and experience to:

- examine the values of different groups of people, how these values are expressed in various practices, and the present and future consequences for sustainability.

Possible concept links

- Social justice, intergenerational equity, cultural diversity, guardianship

Indicators

- Illustrates how different world views have implications for the environment.
- Explains how the environmental practices of different cultures are related to their values.
- Examines how and why economic practices can change to become more sustainable.

Possible context elaborations

- Native Indians and cattle ranchers: the future of the Amazonian rainforest.
- Māori views of land and land ownership.
- 'The story of stuff': the drivers of consumerism.
- Buddhism and Christianity: values and practices in relation to the environment.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 7.3 can be assessed using the following achievement standards:

- 90813 Education for sustainability 2.4 Describe values and associated behaviours in relation to a sustainable future; Internal, 3 credits.
- AS91237 Health 2.3 Take action to enhance an aspect of people's well-being within the school or wider community; Internal, 5 credits.

Return to previous page

Learning objective 7.4

Students will gain knowledge, skills, and experience to:

- plan, implement, and evaluate personal action for a sustainable future.

Possible concept links

- Action orientation, informed decision making, enterprise and entrepreneurship

Indicators

- Develops and presents a plan for personal action on a sustainability issue.
- Carries out research to inform action to address the cause of a sustainability issue.
- Evaluates how an action in which they been involved contributes to a sustainable future.

Possible context elaborations

- Energy efficient actions in the local community: implement action with the help of a business mentor.
- Famous environmental activists: evaluate the social and environmental consequences of their actions.
- Harakeke garden: use and harvesting of flax.
- Composting systems or chickens for the home garden.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 7.4 can be assessed using the following achievement standards:

- AS91188 Earth and space science 2.2 Examine an Earth and space science issue and the validity of the information communicated to the public; Internal, 4 credits.

Return to previous page

Learning objective 8.1

Students will gain knowledge, skills, and experience to:

- evaluate social, economic, and technological measures that could be taken to sustain natural resources and improve biodiversity now and for the future.

Possible concept links

- Finite resources, biodiversity, guardianship, enterprise and entrepreneurship

Indicators

- Evaluates the costs and benefits of an agricultural development.
- Uses statistics to show the impacts of increases in fuel prices.
- Researches technological innovations and evaluates their sustainable outcomes.

Possible context elaborations

- Waste management on a ski field: how could waste be reduced?
- Mainland islands: a cost/benefit analysis.
- The most sustainable product: evaluation in relation to sustainability aspects, using a decision-making grid.
- Urban neighbourhoods: planning for enhanced environmental and social outcomes.
- Renewable energy sources: options for the local area.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Return to previous page

Learning objective 8.2

Students will gain knowledge, skills, and experience to:

- analyse the impact of strategies and initiatives for a sustainable future.

Possible concept links

- Community, democracy, globalisation, enterprise and entrepreneurship, resilience and regeneration

Indicators

- Evaluates a social marketing campaign.
- Compares strategies for conserving endangered species.
- Investigates strategies used by sustainable businesses.
- Explains the environmental intentions and consequences of an Act of Parliament.

Possible context elaborations

- Global, national, and local policies for sustainable development.
- Practical sustainability projects: Working with a local university or polytechnic.
- The Sustainable Business Network: Strategies for promoting sustainability in business.
- An eco-tourism venture: How does it balance environmental care with providing a good experience for tourists?
- Cultural tourism/local iwi initiative: a case study.
- An urban restoration project (for example, Zealandia): What are its impacts?
- Emission trading schemes: What will they achieve?

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 8.2 can be assessed using the following achievement standards:

- Education for sustainability 3.3 Compare and contrast initiatives in relation to a sustainable future; External, 4 credits.
- Education for sustainability 3.4 Describe policies and practices, their development and contribution to a sustainable future; External, 5 credits.

Return to previous page

Learning objective 8.3

Students will gain knowledge, skills, and experience to:

- analyse the values and behaviours that will contribute to a sustainable future.

Possible concept links

- Social justice, intergenerational equity, community, cultural diversity, guardianship

Indicators

- Investigates the attitudes and values of a community conservation group.
- Constructs a survey to identify the common values in a community.
- Investigates how local policy reflects the needs of the people concerned.
- Uses evidence to reach and argue a conclusion/recommendation.

Possible context elaborations

- A local marae: the significance of their awa.
- Values of own family or culture towards the environment: their likely impact on the future.
- A community conservation group: where does it get its drive and is it being effective?
- Local government policies: how are they influencing and/or influenced by community values and behaviours?

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Return to previous page

Learning objective 8.4

Students will gain knowledge, skills, and experience to:

- analyse actions necessary for sustainability and plan, implement, and critically evaluate personal action for a sustainable future.

Possible concept links

- Action orientation, informed decision making, citizenship

Indicators

- Presents an idea for a technological solution to a sustainability issue.
- Evaluates past political actions on a sustainability issue.
- Explains what criteria could be used to judge the effectiveness of a personal action for sustainability.

Possible context elaborations

- A cost-effective prototype for a ski-lift pass that will biodegrade in a household compost system: research, design, and manufacture.
- An eco-footprint or environmental review of school: actions that will reduce this footprint.
- Food production: an action for sustainable production methods.
- ‘Shop until you drop’: challenging the culture of consumption.

Possible achievement standards

At the time of publication the NCEA achievement standards were in development to align them with The New Zealand Curriculum. Please ensure that you are using the correct version of the standards by going to the NZQA website.

Aligned level 1 achievement standards were registered for use in 2011 and level 2 for use in 2012; level 3 will be registered for use in 2013.

Full information on the draft standards and the alignment process can be found on TKI: Alignment of NCEA standards with The New Zealand Curriculum.

Learning objective 8.4 can be assessed using the following achievement standards:

- Education for sustainability 3.1 Evaluate a planned personal action that contributes towards a sustainable future; Internal, 6 credits.
- 91476 English 3.5 Create and deliver a fluent and coherent oral text which develops, sustains, and structures ideas; Internal, 3 credits.

Return to previous page

Connections

This section looks at how EfS fits the wider curriculum and how it can be an important and valuable part of a student's learning pathway.

> There is a limit to how much education you can sustain for no obvious reason … but if they are starting to develop a view that what I am doing will lead me to this area or that area, if they see the connection, it gives them a reason to continue to learn their English, to develop their maths, or whatever they need … that there is a purpose for it …
>
> (Stuart Middleton, Manukau Institute of Technology)

EfS as a collaborative enterprise

A survey of the achievement objectives in The New Zealand Curriculum will show that many of them relate to the themes and the learning around EfS. Most of these are in the social sciences, health and physical education, science, technology, and the arts. In other subjects, such as English and mathematics and statistics, EfS can provide relevant themes and contexts for parts of the learning programme.

EfS works well when taught collaboratively by more than one teacher and by drawing on more than one subject. While this can be challenging in a secondary school, even a modest collaboration can give teachers greater confidence when working with complex issues and can model the interdisciplinary nature of those issues.

Teaching and learning in EfS can be powerfully reinforced by a whole-school approach that brings together the school's learning programmes, the ways members of the school community work with one another, sustainable practices and policies in the school, and the way the school and its grounds are cared for.

Strong community partnerships support learning in EfS and also help students to understand that what they are learning and doing now makes an immediate contribution to a sustainable future.

> You can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it.
>
> Seymour Papert, mathematician, computer scientist, and educator

The learning programme design section of this guide discusses integrated approaches.

The pedagogy section of this guide makes numerous suggestions as to how EfS learning can be assessed using achievement standards from a variety of different subjects.

EfS and the principles of the New Zealand Curriculum

The examples below suggest how EfS can support the principles of the New Zealand Curriculum.

High expectations

Students gain a sense of success through planning and completing an action that brings about a change. For example, students collaborate in a community garden to support an initiative to supply a local foodbank.

Treaty of Waitangi

Students establish a relationship with their local iwi, focused on the whenua. For example, students initiate discussions and make plans to help their local marae become more sustainable.

Cultural diversity

Students examine a variety of worldviews in considering sustainability issues. For example, students examine cultural perspectives on harvesting seafood.

Inclusion

The different skills, attributes, and needs that students bring to collaborative projects are recognised, affirmed, and supported. For example, students present a formal submission to council with different roles assigned to team members as appropriate.

Learning to learn

Students are supported as they develop processes to reflect on their action experiences. For example, students use starter question cards in a circle discussion that help them to think deeply about their action experiences.

Community engagement

Students form relationships with a number of established communities (including families) or organisations beyond the classroom. For example, students work with the local Forest and Bird branch to build nesting boxes for penguins.

Coherence

Students work on action projects that incorporate achievement objectives from more than one learning area. For example, students undertake an inquiry project into a sustainability issue of their choice in one of the social science subjects and present a speech on the issue for English (Speaking, Writing, and Presenting).

Future focus

Students explore the links between the four future-focused issues. For example, students work in collaboration with a business or industry to develop a sustainability policy that takes into account elements of globalisation, enterprise, and citizenship.

EfS and the values of the New Zealand Curriculum

EfS continually confronts students with values-related issues. Students are challenged to uncover the values that lead people to act in the ways they do and, at the same time, they are challenged to explore and test their own values. Below are examples of how learning in EfS can develop the values listed in the New Zealand Curriculum.

Excellence; hiranga

Students set realistic goals and persevere in addressing an issue in spite of barriers. For example, students are resilient and keep going (when faced with resistance) as they work on an action to mitigate wasteful practices in their school.

Innovation, inquiry, and curiosity; pokirehau, whakamatemate

Students consider various viewpoints, are open to differences, and use a variety of thinking tools when investigating an issue. For examples, students conduct a study on the spread of HIV in Africa and discuss the links with poverty, environmental degradation, and climate change.

Diversity; rereketanga

Students engage ethically with difference and recognise that we each view the world through lenses that are shaped by culture, language, and history. For example, students consider the values and debate the practices of shellfish gathering by Pākehā, Māori, and Asian communities.

Equity; tika/pono

Students develop an understanding of fairness and social justice by critically analysing relationships of language, power, social practices, identities, and inequalities. For example, students consider fair trade and the use of child labour by investigating the manufacture of T-shirts from growing the cotton to final purchase.

Community and participation; porihanga

Students develop an understanding of the common good through participating in community activities. For example, students participate in community planting events, such as restoration plantings during World Environment Day.

Ecological sustainability; kaitiakitanga

Students consider approaches to ecological sustainability and what caring for the environment may mean. For example, students are actively involved in developing an ecologically sustainable plan for their school grounds.

Integrity; ngākau/tapatahi

Students develop an understanding and appreciation of integrity in relation to our interactions with one another and with all living things. For example, students develop a fair and responsible means of addressing those who litter and set up practices to keep their school litter free.

Respect; manaaki/āwhi

Students develop a greater understanding of the importance of respect for all living things and for those yet to come. For example, students are respectful of people, property, and the environment and show this in the activities they are involved in around the school and local community.

See also modelling what we value

From primary to tertiary and beyond

Students need to connect what they are learning in EfS with possible learning pathways. They also need to see how their learning in EfS is giving them skills for life and options for further education, as well as preparing them for possible careers.

Many primary school students are keenly aware of their environment, take part in environment-related actions, and are involved in making decisions about their environment.

These attitudes, skills, and experiences need to be built on during secondary education. At the very least, year 9 and 10 students need to be kept aware of the importance of the environment to their future lives and well-being.

In the senior secondary school, EfS can contribute to developing young adults with the skills to address sustainability issues, create entrepreneurial opportunities, and act for a sustainable future. EfS can also be a pathway to tertiary education and a range of careers.

Students need to be given good guidance about what subjects are required for tertiary courses that could interest them. The EfS teacher has a responsibility here, supported by the school's careers education programme and services.

Possible courses of study, including options for integrated learning, are described in more detail in the learning programme design section of this guide.

See integrating learning and external qualifications for many suggestions on how NCEA achievement standards from different subjects can be used to assess EfS learning.

Green jobs for a green future

Unlike the many short-term considerations that influence the workplace, the need for people who understand sustainability issues, and who have the skills and attitudes to contribute to solutions, is not going to go away any time soon.

Global trends suggest that government and, increasingly, private spending will prioritise green jobs, leading to a greener economy. The International Labour Organisation reports that in the European Community and the United States more jobs are becoming available in areas such as organic farming, sustainable forestry, renewable energy, water supply, retrofitting, resource recovery, and environmental tourism.

Increasingly, developers of major new buildings in New Zealand cities are asking their architects to design green buildings. Whether they are driven by personal values or demand for green office space makes little difference.

Workers will be needed in new green industries, in traditional green collar jobs (conservation, environmental management, sustainable urban planning and research), and in agriculture and horticulture, environmental law, medicine, engineering, design, architecture, and accounting.

An understanding of sustainability will be an advantage in any career, as well as enabling the individual to contribute to a sustainable future.

The Education for Sustainability website includes a downloadable poster on its Pathways in EfS page.

Training for a green career

Some examples of green careers and possible training:

Open space planner for a city council (parks planning in cities): Bachelor of Planning or Master of Planning, University of Auckland.

Sustainable transport co-ordinator for a council: BSc or BA majoring in environmental studies, Victoria University.

Fisheries officer: Bachelor of Applied Science (Biodiversity Management), Unitec.

Public health officer: Bachelor of Applied Science (Environmental Studies), AUT.

Park ranger: National Certificate in Conservation (Trainee Ranger), Nelson Marlborough Institute of Technology (one year).

Resource management adviser: Diploma in Environmental Management / Bachelor of Recreation Management, Bay of Plenty Polytechnic (two years) / Lincoln University.

Environmental lawyer: Bachelor of Law and Master of Law (Environmental), University of Auckland (four years for LLB and one year for MLB).

Learning programme design

EfS programmes need to be carefully planned if they are to achieve the desired outcomes. This section suggests how to go about this planning and provides examples of programmes.

Cross-curricular approaches to programme design

Good programmes are based on effective pedagogy

Any good programme depends on effective pedagogy. When planning, keep in mind the four mechanisms: connection, alignment, community, and interest (see Four mechanisms that facilitate learning in the social sciences):

Connection

Encourage students to use their own experiences as a point of comparison when learning about other people's experiences in different times, places, and cultures. The contexts and resources should make diversity visible and avoid biased and stereotypical representations. Students need to feel that what they are learning connects with and values their experiences.

Alignment

Activities and resources need to be aligned so that students are able to develop understandings of the key concepts and all four aspects of sustainability: environmental, social (including political), cultural, and economic. The aims of the programme should be made transparent to students. Learning opportunities should not be pre-programmed to the extent that they cannot be changed in response to assessment, and they should provide opportunity for students to revisit important content and processes. Assessment should focus on assessing valued learning, including action competence.

Community

Programmes should be designed to develop students' interaction skills and use practices that include different abilities and levels of contribution. Tasks and experiences that require student–student interaction are best. Wherever possible, students should be involved in making decisions about their own learning. Students need to be given the opportunity to identify possible roles for themselves, to think critically, and to participate in authentic actions for sustainability.

Interest

Programmes should deliberately offer learning experiences that are sensitive to students' differing interests, motivations, and responses and provide a variety of experiences that become anchors for learning and recall. Local contexts can engage students with the community as well as provide bridges to global issues.

Questions to ask when planning your programme

- How much teaching time is available once holidays and other interruptions have been accounted for?

- What will be my primary resources?
- What community expertise can I help my students access?
- What EOTC experiences can I plan for? What risk management requirements will I need to meet?
- How can I ensure students are able to explore sustainability contexts in detail and produce significant outcomes?
- Is my programme aligned with valued learning? Will my students be able to see connections between the different aspects of sustainability?
- How am I planning for reflection and feedback?
- Have I considered possible synergies, for example, giving a speech (English) on a sustainability theme or subject (EfS)?
- How am I planning to revisit concepts and/or explore them in different contexts?
- Am I planning a fair workload for students? For example, do major assessments fit reasonably into the school year?
- Is my programme manageable in terms of my workload? For example, have I spread the timing of internal assessments across levels?
- How am I ensuring that students get the careers information they need?

Possible structures

EfS programmes can be structured in a variety of ways, for example, as linked courses over three full years, as one-year courses, or as short (modular or one-semester) courses. A programme should be flexible enough to allow for students to begin studying EfS at any year level.

Year planner

A year planner should include:

- when modules of work will start and end
- when assessments are due (or the final date for gathering evidence)
- how the work fits around inevitable interruptions to the school year
- possible dates for field trips, visiting speakers, and so on.

To see how one school set up a year's programme, see

EfS Sample Course Outline Level 2 (PDF, 90 KB)

and

A Course in Sustainability Education for Level 2 (PDF, 729 KB)

Unit plans

When planning a unit, consider:
Key concepts and ideas
Learning objectives
Values
Key competencies
Applied contexts
Specialist vocabulary/terminology

Resources
Assessment (diagnostic, formative)
Assessment for qualifications

A Possible Three-Year Programme (PDF, 124 KB)

Cross-curricular approaches to programme design

Sustainability is about the interrelationship between people and the environment. Students are best able to explore this relationship if they are offered learning experiences that:

- link the four key aspects of sustainability (environmental, social, cultural, and economic)
- make use of global, national, and local contexts
- are relevant to the students' interests and concerns
- relate to the appropriate curriculum levels.

Ideally, teachers and students are able to work across learning areas. Teachers will need time to meet and plan together. A level of flexibility may need to be introduced into the quite restrictive timetables that operate in most schools.

Possible models

Some ideas:

- Teachers from different learning areas plan EfS learning across the curriculum, then teach their sections of the plan within their specialist areas. EfS could provide a curriculum focus for either a year group or the whole school.
- Teachers from different learning areas, for example, from English, mathematics and statistics, science, and social studies, plan schemes of work around a common theme, with teachers and students making explicit connections between social and environmental aspects.
- Focus learning in literacy and numeracy on suitable EfS content, explored through an inquiry on a sustainable issue including action based on that inquiry. (A school in Auckland developed an integrated unit called Saving Pasifika for English, social studies, and science, with a particular focus on literacy achievement in year 9.)
- Teachers from different learning areas develop a programme that can be taught using a team approach. Assessment opportunities from EfS and other subjects are offered, and students make choices based on their needs.
- A school collapses its timetable for a limited period (three days to two weeks) or a specified time each week. Students and teachers use a range of skills and knowledge to inquire into a sustainability issue and implement an action. This approach can involve the students from a single year group or from across the whole school.

What other schools have been doing

Northland College year 10 classes have two weeks of EfS every term. Alfriston College allots three-day time periods in which students can choose to explore the sustainability of the local community. At Lynfield College, a two-week authentic sustainability rich task is part of the school's junior programme. Auckland Girls' Grammar offers senior environmental science courses at levels 1, 2, and 3 and global studies in social sciences courses at levels 2 and 3, with a selection of assessment opportunities. There is also an envirogroup open to the whole school. The students who have participated in it state that the actions carried out by the group support the learning in their senior classes.

You may find these helpful:

Developing An Integrated EfS Programme at Your School (PDF, 75 KB)

Sample Unit Plan for An Integrated EfS Programme, with Options for Assessment (PDF, 105 KB)

Case Study: An EfS Project Involving Kaikorai Valley College and Neighbouring Schools (PDF, 84 KB)

The section Integrated learning and external qualifications identifies some of the many ways that learning in EfS can be assessed using achievement standards from other learning areas.

Resources

- Assessment and professional support
- Resourcing ideas
- Ministry of Education websites
- Other government agency websites
- Other websites

Assessment and professional support

Assessment Online

- This key community covers assessment in the classroom, effective use of evidence, and reporting to families and whānau. It offers news, assessment tools and resources, research, a glossary, FAQ, and related links.
- The linked site Consider the evidence promotes 'evidence-driven decision making for secondary schools' and supports secondary educators in making best use of evidence to improve student achievement.
- For a view of how assessment can best serve learning, see Directions for Assessment in New Zealand, a report by Michael Absolum, Lester Flockton, John Hattie, Rosemary Hipkins, and Ian Reid (also available as a Word or PDF file).

Education Review Office

In 2007, ERO published three reports on schools' effectiveness in the collection and use of assessment:

- The Collection and Use of Assessment Information in Schools
- The Collection and Use of Assessment Information in Schools: Good Practice in Primary Schools
- The Collection and Use of Assessment Information in Schools: Good Practice in Secondary Schools

The New Zealand Qualifications Authority (NZQA)

- Follow links to the National Qualifications Framework, NCEA, and subject achievement standards.
- Further information on assessing with unit standards can be found on the NZQA website. Some assessment resources are also available.

TOP

Resourcing ideas

The following references will help you to plan teaching and learning activities for this subject.

AnyQuestions.co.nz

Students can go to this website to find useful, accurate, online information. Librarians from all over New Zealand are available each weekday between 1 pm and 6 pm to help students search online. To use AnyQuestions, students must be attending a New Zealand primary, intermediate, or secondary school or being home schooled.

The National Library of New Zealand Curriculum Services

Curriculum services has ‘over a million resources that support teaching programmes’, including books and audiovisuals (videos/DVDs). Schools pay only return courier costs on borrowed items. Schools can also interloan music, books, and serials from the National Library’s general collections. A freephone advice service is offered on 0800 542 5463. See the website for contact details for the regional offices in Auckland, Palmerston North, and Christchurch.

Social Sciences Online

This site provides pages specific to the following senior subjects: business studies, classical studies, economics, geography, history, and senior social studies (see links under 'Senior secondary' on the landing page).

Social sciences online also provides PDFs of titles in the Ministry of Education series Building Conceptual Understandings in the Social Sciences (BCUSS). (These are listed in 'Featured content', right navigation.)

- Approaches to building conceptual understandings
- Approaches to social inquiry
- Being part of a global community
- Belonging and participating in society

Although the BCUSS series is designed to help teachers of levels 1–5, it is strongly recommended to senior social science teachers.

Te Kete Ipurangi

TKI hosts an Education for Sustainability website to support education for sustainability, which should be a starting point when looking for resources. See also the social sciences community. Teachers are also encouraged to visit other TKI communities, such as the ICT community and Software for Learning.

TOP

Ministry of Education websites

Ka Hikitia – Managing for Success: The Māori Education Strategy 2008–12

Ka Hikitia is a five-year strategy that aims to transform and change the education sector, ensuring that Māori are able to enjoy education success as Māori.

Key Competencies Online

This companion site to the New Zealand Curriculum online website offers specific guidance to school leaders and teachers on integrating the key competencies into the daily activities of the

school and its teaching and learning programmes.

The New Zealand Curriculum Online

As well as the HTML version of The New Zealand Curriculum, this interactive site offers a variety of support and strategies, news updates, digital stories of schools' experiences, and archived material relating to development of the curriculum.

Pasifika education

This has been created to enable all of those involved with Pasifika education to find information quickly and easily, including policy, initiatives, publications, research results, and services and funding.

Secondary middle leaders

This site is designed to assist secondary middle managers to work with their departments to implement The New Zealand Curriculum. It explores various aspects of effective pedagogy.

Te Marautanga o Aotearoa

This site includes an English translation of the main sections of the draft marautanga. Only learning levels 1, 4, and 6 have been translated in the learning areas.

Te Tere Auraki

This Ministry of Education professional development strategy focuses on improving outcomes for Māori students in English-medium schools. This strategy supports four main projects: Te Kotahitanga, Te Kauhua, Ako Panuku, and Te Mana Kōrero.

TOP

Other government agency websites

BES (Iterative best evidence synthesis) programme

BES is a collaborative knowledge-building strategy designed to strengthen the evidence base that informs education policy and practice in New Zealand. See in particular: Effective Pedagogy in Social Sciences/Tikanga ā Iwi Best Evidence Synthesis Iteration [BES] (2008).

Climate change information New Zealand

This site offers information about New Zealand's emissions, emissions trading, projected impacts, international negotiations and obligations, and overall approach to climate change.

Department of Conservation

The department provides information and resources to support conservation education programmes in schools, including field trips and activities. Specific resources for level 2 have been developed, including one at Mt Cook Aoraki. This is targeted at geography but includes an assessment activity for AS90811. See also the Waitaki unit. This has a biology angle about endangered species.

Landcare Manaaki Whenua

This environmental research centre specialises in sustainable management of land resources optimising primary production, enhancing biodiversity, increasing the resource efficiency of businesses, and conserving and restoring the natural assets of our communities. The website includes a comprehensive education section.

Ministry for Primary Industries Manatū Ahu Matua

Ministry for the Environment Manatū mō te Taiao

The 2003 report Ecological Footprints of New Zealand and Its Regions calculates the 1997–98 ecological footprint of New Zealand and its regions. It assesses New Zealand's sustainability performance against two criteria – the amount of land 'appropriated' by each person to support their consumption (ecological footprint per capita) and whether we're living within the carrying capacity of the land we have available.

National Institute of Water and Atmospheric Research (NIWA)

NIWA is New Zealand's leading provider of atmospheric and aquatic science. The website includes research, educational material, publications, maps, FAQ, teachers' and students' sections, and links to the various NIWA national centres and information about the Intergovernmental Panel on Climate Change (IPCC).

Statistics New Zealand

Search for sustainability or population or explore the schools corner.

TOP

Other websites

The following websites have been recommended as helpful by teachers. They have not been extensively reviewed or checked for quality.

New Zealand organisations

Environmental Monitoring and Action Project (EMAP)

EMAP combines the delivery of the National Waterways Project and the GLOBE programme. EMAP provides an overview of environmental monitoring activities throughout New Zealand and endeavours to bring schools, local authorities, research institutions, and others together to facilitate students monitoring their local region in an environmental education context. The project is funded through the Ministry of Education LEOTC (Learning Experiences Outside the Classroom) fund.

Enviroschools Foundation

The foundation is a charitable trust that provides support and strategic direction for a nationwide environmental education programme. The Foundation's vision is to foster a generation of

innovative and motivated young people who instinctively think and act sustainably.

Forest and Bird

Forest and Bird works to preserve New Zealand's natural heritage and native species. They also co-ordinate hands-on restoration projects and educate people about environmental issues through their children's club, Kiwi Conservation Club, publications, and public awareness campaigns.

Global Focus Aotearoa

Greenpeace New Zealand

Greenpeace has campaigned on many environmenatal issues over the years. This website is its New Zealand portal.

LEARNZ

LEARNZ runs virtual field trips in May and October. This website includes background resources, student activities, teacher support, and curriculum ideas, and it prepares students for the field trips in the weeks leading up to the virtual field experience.

TOP

New Zealand Association for Environmental Education

NZAEE is a non-profit organisation working to promote and support environmental education, lifelong learning, and sustainable behaviour throughout New Zealand/Aotearoa. It provides information on a wide variety of environmental issues for individuals, schools, community groups, and businesses.

New Zealand Centre for Ecological Economics (NZCEE)

NZCEE conducts research with Massey University and Manaaki Whenua Landcare Research as collaborative partners and works closely with Market Economics Ltd. The aim of the research is to explore how the quality of the New Zealand environment can be maintained and enhanced while still allowing the economy and people of New Zealand to prosper.

Rural Source

This education programme for sustainable agriculture is run by the Agriculture Industry Training Organisation (ITO). It gives teachers and students access to books, websites, magazines, videos/DVDs, and online resources that support agriculture and horticulture curricula at secondary school level, including materials on sustainable agriculture and crop management.

Sir Peter Blake Trust

The trust aims to help New Zealanders make a positive difference to the planet through activities that encourage environmental awareness and action. In partnerships with the Ministry of Education and NIWA, it administers the Sir Peter Blake Environmental Educator Award, and the

Sea and Learn hands-on science shipboard education programme, and also supports young New Zealanders to attend the United Nations Environment Programme International Children's Conference on the Environment, which is held every two years.

Sustainable Living Trust

This national organisation provides resources for community education but has available teaching resources designed specifically for use in a level 2 NCEA classroom, which can be requested through the site.

Trade Aid

The Trade Aid home page links to such things as shop locations, educational resources, trading partners, food for thought, or details of how to get involved. A number of school resources are aimed at junior level, such as two units on environmental justice, but other material may be relevant for senior classes.

Transition Towns Aotearoa

This social networking site links the various groups and organisations around New Zealand transitioning toward a post-peak-oil future.

World Vision New Zealand

World Vision provides an educational experience for students about world issues. A variety of resources includes Internet connections, simulation games, posters, and NCEA internal assessments with teacher resource folders. Most of these are free to download, while others can be purchased online.

WWF New Zealand

WWF New Zealand promotes positive action to reduce the impacts of climate change, campaigns to stop dolphins and seabirds being caught by fishers, and educates the next generation about the importance of managing our precious environment more sustainably.

Advocacy

Change Agency Education and Training Institute

This agency is an independent activist education initiative working in the Australia-Pacific region to help people achieve social and environmental change. The resources include interesting readings, workshop tools, and key ideas for taking action that support development of key competencies. The agency's byline is 'listen deeply, reflect critically, strategise effectively, make change happen'.

Club of Rome

This independent, not-for-profit organisation aims to act as a catalyst for global change.

Friends of the Earth

This website links to a large variety of downloadable resources, many of which bring together

social justice and environmental issues.

TOP

Future scenarios

This site offers a variety of scenarios about possible responses to peak oil and climate change. There is a great deal of reading but also an illuminating photo gallery. The information is from the perspective of a highly committed 'green' – David Holmgren, co-originator of permaculture.

GreenChoices

GreenChoices is about the choices we can make in our everyday lives to protect our environment, providing simple, direct information on green alternatives, which make a real, lasting difference.

International Geosphere-Biosphere Programme

This site includes an excellent education section with resource books on climate change and a downloadable executive summary.

Stop Climate Chaos Coalition

This site provides information and offers challenges for climate change action.

Untouched World™ Charitable Trust

The Untouched World™ Charitable Trust's activity is centred on education, environmental, social, cultural, and community issues aimed at providing young adults with a unique learning experience, developing life skills to maximise their potential, and inspiring them to lead the way in achieving a sustainable future.

Climate change

Breathing earth

This interactive site shows a map of the world and estimations of the impact of each country on climate change. The main limitation is that it uses population and carbon emission data sets from 2002 and 2005.

CarboNZero

This site describes various events, organisations, and individuals meeting the carbon challenge. Through this programme, people can buy and sell carbon credits.

Climate change education

This site is supported by the American-based action group Focus the Nation and Climate Change Education.org, a group from the University of California, Berkeley. It is a portal site dedicated to education on climate change, offering a variety of K–12 resources, both interdisciplinary and subject specific, together with links to videos, experiments, and other sites of interest.

Gateway to the UN system's work on climate change

News and reports from the UN.

Teaching Climate Change

This site has been compiled by teachers and university academics, who work in the field of climate change. It provides modules in a number of learning areas, for example, the social sciences and science. The modules, which are designed for students in years 9–11, aim to develop critical thinking skills about the issue of climate change.

TOP

Ecological footprints

Disposable Planet

A six-part BBC series on sustainable development.

Earth Day

This American site currently offers calculators for three countries - the United States, Canada, and Australia.

Greendex (National Geographic)

The Greendex is a quantitative consumer study of 17 000 consumers in a total of 17 countries (14 in 2008), who were asked about such behaviour as energy use and conservation, transportation choices, food sources, the relative use of green products versus traditional products, attitudes towards the environment and sustainability, and knowledge of environmental issues.

Redefining Progress

This American-based public policy thinktank is dedicated to smart economics. They work to find solutions that ensure a sustainable and equitable world for future generations.

Food and gardening

Earthday Network

The Earthday Network works in partnership with the United States Green Building Council (USGBC) and the Clinton Foundation with the aim of greening all of America's K–12 schools within a generation.

Garden Organic UK

This comprehensive site advocates for gardening in schools and provides a wealth of information on how to get started and the links that can be made to curriculum (UK) outcomes. This site includes stories from schools involved with the programme.

Kitchen Garden Foundation

This Australian site advocates for edible gardens in school but also provides resources for schools

wanting to develop integrated programmes around food growing. The programmes develop numerous competencies among children and build understanding of the importance of food culturally as well as economically.

Organic Pathways

Part of the Organic Garden City Trust, this Christchurch group was set up in 1997 to support schools to set up an edible garden.

TOP

Population

Population Growth over History

(The University of Michigan's Global Change Curriculum)This site includes an interactive map, which shows how rapidly population has grown in the past 200–300 years. The lecture paper covers the following topics: how fast the human population has grown , what the world's population is likely to be in the future, the forces responsible for population, the 'demographic transition', and what we can learn from models of future population growth.

World Population Awareness

The goal of this website is to preserve the environment and its natural resources for the benefit of people today and future generations. It offers discussion papers and statistical information that focus on population growth and excessive consumption. This site could be a useful resource for students investigating population issues and wanting opinion pieces.

World Population Trends

This site offers a comprehensive selection of statistical data on every nation in the world, illustrated by wallcharts, graphs, and tables. Themes include mortality and migration, fertility and family planning, and population and development.

Urban sustainability

Carfree.com

This website supports the book Carfree cities. This organisation aims to remove cars from central cities to make them safe and pleasant for pedestrians and to build communities where walking, cycling, and public transport predominate. See also Worldcarfree.net (below).

Megacities Project

This transnational, non-profit network of leaders from government, business, non-profit and grassroot groups, academia, and the media share innovative solutions to the problems they face in common.

SmartGrowth Online

This site outlines how cities can redevelop to outsmart sprawl. It is American based, but much of

what is discussed is relevant to New Zealand.

Sustainable Cities

This small organisation, based in Canada, tackles the challenges of urban sustainability. Sustainable Cities is a think tank and active peer-learning network covering 38 cities in 14 countries. There are many useful links to research and actions that may be useful for the classroom.

United Nations Human Settlements Programme: UN-HABITAT

This international agency provides support for urban change – they have many projects on the go that cover such topics as cities and climate change, social inclusion, and water and sanitation.

Worldcarfree.net

Worldcarfree.net is a clearinghouse of information from around the world on how to revitalise our towns and cities and create a sustainable future. This site offers resources for teachers, students, and other engaged citizens.

Youth support and action

Celsias

Good magazine

A New Zealand guide to sustainable living.

Green generation (Earth day network)

Just focus

Resurgence

TakingItGlobal

This is the largest online community of youth interested in global issues and creating positive change.

Yes!

This American-based site offers both subscription and free access, and provides searchable resources for students undertaking research.

TOP

Print publications

Crawford, J. H. (2002). Carfree cities. Utrecht: International Books.

Cubitt, S., Irvine, R., & Dow, A. (1999). Top tools for social science teachers. Auckland: Pearson

Educational.

Sterling, S. (2001). Sustainable education: Re-visioning learning and change. Bristol: Schumacher.

Sweeney, L. B. (2001). When a butterfly sneezes: A guide for helping kids explore interconnections in our world through favorite stories. Waltham, MA: Pegasus Communications.

Suzuki, D. (2003). The David Suzuki reader: A lifetime of ideas. London: Allen and Unwin.

Tyler Miller, G. Jnr (2001). Living in the environment: Principles, connections, and solutions. Florence, KY: Brooks Cole.

Webster, K. (2004). Rethink, refuse, reduce … Education for sustainability in a changing world. Shrewsbury: FSC Publications.

Whitehead, D. (2004). Top tools for teaching thinking. Auckland: Pearson Educational.