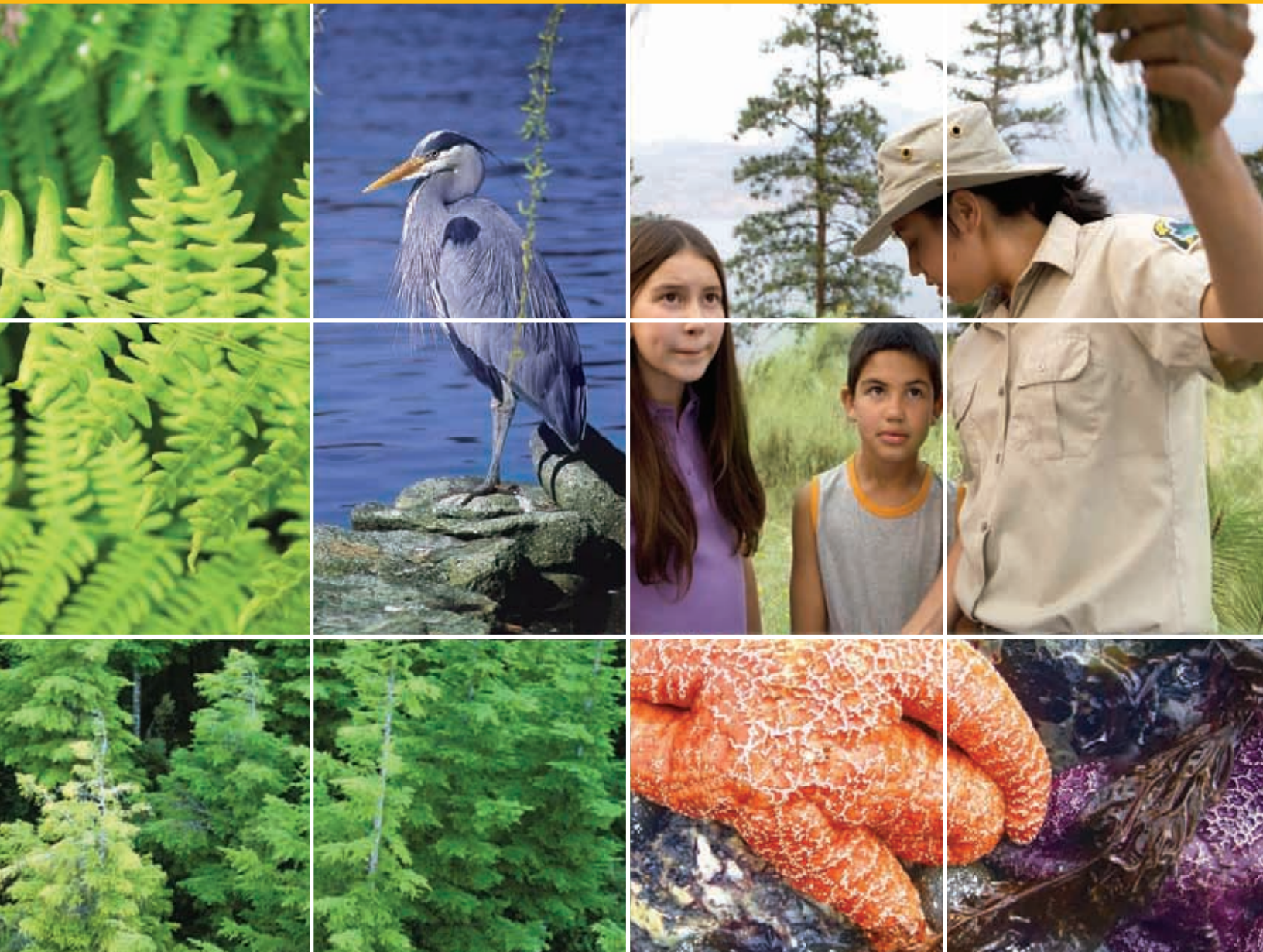


ENVIRONMENTAL LEARNING AND EXPERIENCE
AN INTERDISCIPLINARY GUIDE FOR TEACHERS



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INTRODUCTION AND BACKGROUND

Do you want to find a better way to organize your teaching and lesson planning?

Do you want to be part of positive change from within the education system?

Do you want to empower your students to become environmentally responsible?

If you answered yes to any of the above questions, this document is for you. It is provided to assist British Columbia teachers of all subjects and grades to integrate environmental concepts into teaching and learning. Designed as a support framework to guide teachers in their education planning, the guide also aims to support the implementation of many of the Integrated Resource Packages (IRP's) and will be complemented by web resources to support environmental learning in diverse subjects like science, social studies and language arts. It is your guide to interdisciplinary practice — using the environment as an organizing theme.

This guide also builds on an earlier Ministry of Education document, *Environmental Concepts in the Classroom: A Guide for Teachers*, first published in 1995. This guide and the preceding document were developed from the belief that students should understand both how and why the environment has an impact on their daily lives, and what kind of an impact their daily lives have on the environment. This guide builds on this belief with an integrated approach towards environmental learning because so many school subject areas touch on environmental topics or experiences in some way. By emphasizing that the study of environment is not a unique subject area, it is hoped that students will come to understand how their actions affect both local and global environments.

Since the first B.C. framework document in 1995, there have been many developments in the field of environmental education. These developments have been informed by International agreements, such as the Kyoto Protocol, Montreal and Johannesburg Summits on Sustainable Development, and the more recent proclamation of the United Nations Decade of Education for Sustainable Development (2005-2014). This momentum has been accompanied by a great deal of research on how people learn in a variety of disciplines. Still, all environmental learning (whether it be in the form of Environmental Education, Ecological Education or Education for Sustainable Development) aims to integrate environmental thinking and ideas into students' everyday lives. In this way, it is hoped students will begin to realize how they can take personal responsibility and leadership in creating a more environmentally sustainable way of life.

This revised document offers a conceptual framework for introducing environmental learning in all classrooms, while providing several general principles of teaching and learning to guide teachers in designing integrated activities for a variety of learning contexts. The document provides a number of perspectives around which environmentally-focused lessons may be developed. These multiple and overlapping perspectives can help teachers to facilitate students' varied ideas about the environment. For example, students' beliefs about the environment could incorporate other forms of cultural knowledge, such as aspects of Traditional Ecological Knowledge (TEK), practised by the first peoples of an area or region of the province.



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WHY LEARN ABOUT ENVIRONMENTAL ISSUES?



There continues to be a growing concern about the state of the environment, yet we are often confused by the complexities of economic, ethical, political, and social issues related to it. Daily, there are references in the news media to environmental issues, such as global climate change, ozone depletion, dwindling resources, famine, disease, loss of biodiversity, pollution, and continuing job losses in many B.C. communities.



The environmental issues we face, both as individuals and within our broader society, are now so pervasive and ingrained within our cultural ways of being that we can no longer look to science and technology alone to solve these problems. As a consequence, environmental learning can and should include a sustained critique on dominant societal and industrial practices that often contribute to widespread and localized environmental problems.

We must also turn to ourselves as individuals and as educational professionals to make changes and develop a new ethic – a responsible attitude toward caring for the Earth. Working to integrate environmental learning within all subject areas promotes this change in attitude by providing students with opportunities to experience and investigate the relationships linking individuals, societies, and natural surroundings.



Education about, in and for the environment provides students with opportunities to learn about the functioning of natural systems, to identify their beliefs and opinions, consider a range of views, and ultimately make informed and responsible choices for themselves, their families and communities.

In 2002, the Canadian government developed a broad vision for environmental learning in Canada through the development of the document *Framework for Environmental Learning and Sustainability in Canada*. This vision states that Canadians of all generations and from all sectors of society should be given opportunities to engage in environmental learning within and beyond the classroom walls, where critical questions can be asked and a sustained and meaningful dialogue can take place. The document states that *with increased awareness, knowledge, skills, attitudes, values, and motivation, Canadians can become more ecologically literate and act competently to build a sustainable future for humans and ecosystems*.

The Canadian framework also states that the vast majority of Canadians consulted felt that environmental learning *must be inextricably linked to values and ethical ways of thinking*. The document clearly states the idea that all learning should have value and that citizens, as they are engaged in the life of their communities, should be involved in the discussions, debates, and decisions that will shape their futures.

Educators can, and should, find ways to present environmental and sustainability concepts that will allow learners to draw their own conclusions about important environmental and societal issues.

EDUCATION, ENVIRONMENT AND SUSTAINABILITY

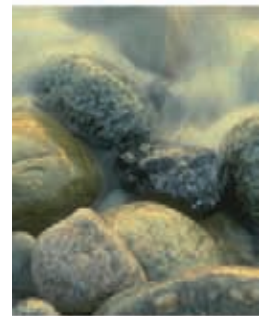
Environmental education aims to integrate concepts and principles of the sciences and social sciences, such as ecology, biogeography, sociology, environmental chemistry, environmental psychology, politics, and economics (to name only a few) under a single interdisciplinary framework. It can help students learn about how they are connected to the natural environment through traditional subjects and through direct experience in both natural and human designed systems like their school buildings. In the ecological view, students may come to know and understand that all human environments, societies and cultures are deeply embedded and dependent on natural systems, both for their development and their continued survival.

The term *Sustainability* is another important idea related to human integration and interaction with the environment. The idea of making sustainable choices, for example, might force us to look at issues like the scale of present day economic activity within a connected and increasingly global environment. In the original *Environmental Concepts in the Classroom* document, the idea of sustainability was seen to explore the relationship between social, economic and environmental factors *for the well-being of the human species*. Thinking about sustainability forces us to examine the ability of the environment to continue to provide for all species, both today and in the future. Some continued issues for consideration and discussion around the idea of sustainability include:

- stewardship;
- shared responsibility;
- short- and long-term consequences;
- waste management;
- socially responsible and ethical economics;
- conservation and restoration of the environment;
- energy and resource management;
- the relationship of technology and innovation to the environment;
- global awareness; and
- international responsibility.

The proclamation of the United Nations Decade of Education for Sustainable Development (2005-2014), states unequivocally that *there is no universal model of education for sustainable development*. There will be nuanced differences according to local contexts, priorities and approaches in how sustainability will be taken up. It further states that the underlying values that *education for sustainable development* of any kind must promote include the following:

- respect for the dignity and human rights of all people throughout the world and a commitment to social and economic justice for all;
- respect for the human rights of future generations and a commitment to intergenerational responsibility;



Environmental education can be described as a way of understanding environments, and how humans influence these environments.

- ☞ respect and care for the greater community of life in all its diversity, which involves the protection and restoration of the Earth's ecosystems; and
- ☞ respect for cultural diversity and a commitment to build a culture of tolerance, non-violence and peace, both locally and globally.



Direct experience with the environment is an important and vital way to learn.

As such, the UN proclamation represents a new vision of education, a vision that emphasizes a holistic, interdisciplinary approach to developing the knowledge and skills needed for a sustainable future, as well as the necessary changes in human values, behaviour, and lifestyles. These are principles that are also supported by British Columbia educators in this locally developed framework for environmental learning.

INTEGRATING ENVIRONMENTAL LEARNING PRINCIPLES

In this framework, the following principles work together to integrate environmental learning by connecting diverse subject areas for students from kindergarten to post-secondary levels. These principles are presented to assist teachers both in the design of instructional strategies and in the critical use of learning resources.

Facilitating environmental education in the learning of all subjects, rather than isolating it, models for students how the environment is connected to their daily lives and relationships within their communities. The principles of environmental learning are organized into two related areas:

- ☞ principles for teaching and learning of direct experience, critical reflection and negotiation; and
- ☞ describing and summarizing the organizing principles for learning environmental concepts.

This organization demonstrates the interdisciplinary nature of environmental concepts, while showing a progression for the development of ideas that can lead students towards a deeper engagement with environmental learning.

TEACHING AND LEARNING PRINCIPLES

It is generally recognized that teaching could be described as both art and science. Environmental learning considers multiple models for teaching and learning, as well as teachers' own pedagogical content knowledge to form a unique blend of disciplinary knowledge combined with teachers' knowledge about specific learning contexts.

While some guiding principles can be helpful, they are only a starting point. New and experienced teachers will develop their own 'teaching style' that reflects their current experiences and ideas about teaching and learning.

It is acknowledged that direct experience with a concept or problem, followed by opportunities for *observation*, *reflection* and *negotiation* leading to further inquiry, presents the richest form of learning.

Direct Experience

Direct experience with the environment, both individually and in groups, is an important and vital way to learn about sustainability. These opportunities must be provided for the studies to be relevant, because they help provide students with a deeper understanding of natural systems and the impact humans have on those systems. Direct experience then allows students to challenge other cultural perspectives regarding environmental problems and examine them critically.

Critical Reflection and Negotiation

For direct experience to be relevant to students, the development of critical and reflective capacities is also important. When students are given adequate time to reflect on their learning, they evaluate their own experiences against the experiences of others. Central in this process is allowing students to negotiate among multiple perspectives or ideas about environmental problems. Negotiation involves actively seeking out differences in opinions and looking for common ideas or themes around specific issues.

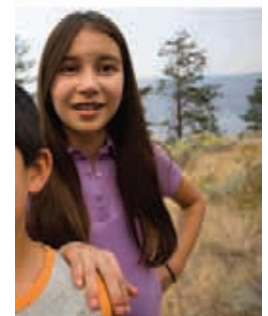
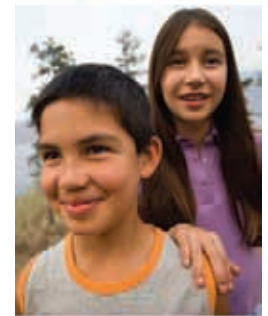
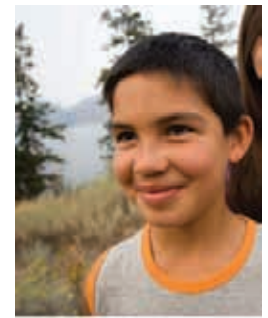
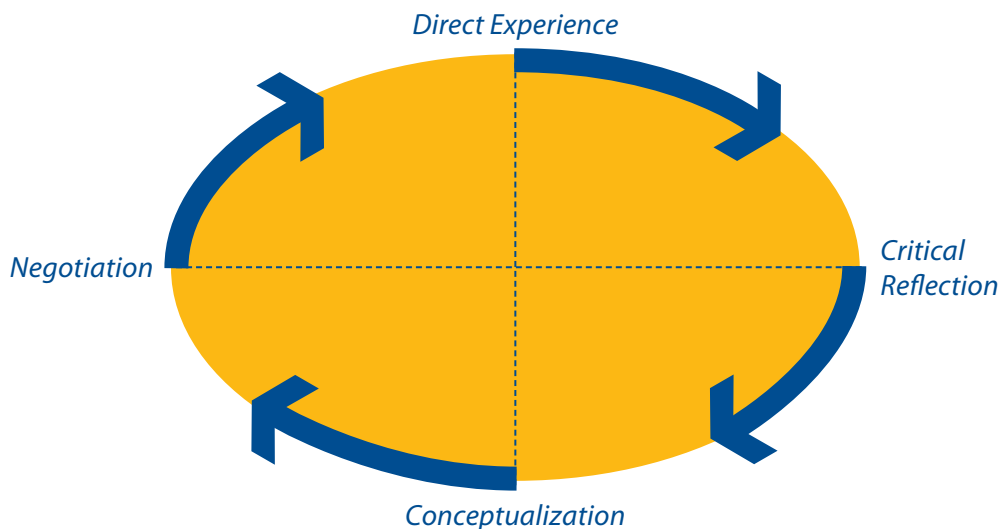
Experiential Learning

A view of teaching and learning that incorporates the direct experience, critical reflection and negotiation as a foundation for the learning process has been summarized in a model described as the *experiential learning cycle*.

The model was created from a broad range of cognitive science research. It is further supported by experiential and social-constructivist views about teaching. Methodology typical to a learning cycle approach includes: choosing a concept and appropriate experience to be taught, and having students explain their experience and evaluate their ideas against others' conclusions, as well as with their direct experiences.

In this model, environmental knowledge is not to be viewed as stable, and often can be conditional as our developing knowledge grows from exposure and experience. In the learning cycle model, teachers emphasize thinking, understanding and self-managed learning for their students.

Figure 1: Experiential Learning Cycle Model



Students are viewed as constructors of their own knowledge rather than reproducers of others' knowledge. Further ideas related to this approach towards learning are described in the following section.

Suggestions for Practice

The following are useful to consider in the design of learning experiences for students, as learning should:



Encourage the integration of subjects/multidisciplinary approaches

Environmental education may be viewed to be an example of cross-curricular or integrated learning.

Encourage critical reflection on a range of perspectives

Education provides a range of perspectives and viewpoints. It is important to provide the tools to think critically and to analyze issues from multiple perspectives.

Examine issues for their currency and authenticity

In the study of issues and concerns related to the environment, it is important to stay current and have students engage with issues relevant to their communities.

Acknowledge Aboriginal perspectives

In learning about environmental issues, the First Peoples Traditional Ecological Knowledge (TEK) of specific landscapes, regions or ecologies can be an important component of culturally appropriate and responsive, environmental education.

Acknowledge other perspectives

B.C. is a multicultural province, and there are diverse perspectives on the environment, other than those of Euro-Canadians. It is important that other cultural and religious perspectives are acknowledged, respected and analyzed in terms of their implications for issues.

Consider the place of action

It is important for students to understand the variety of ways in which action can take place and the consequences of those actions on the environment.

Consider issues from both local and global perspectives

While the majority of environmental education activity will be focused locally, there is great need for a global perspective. Actions taken at a local level have global ramifications that should also be considered when making decisions.

Occur within a context of hope

Thinking and communicating about the environment sometimes focus on extreme “doom and gloom” scenarios for the future of the planet. Teachers should encourage a more positive outlook and focus on the challenge and excitement of exploring solutions to complex problems.

Encourage humility

One aspect of the human world view that has contributed to many of our environmental problems is the idea that nature should be controlled by humans. Humility can help us understand how we can live in balance with nature and how individual actions can make a difference.



Responsible action is also seen as integral to, and a consequence of, environmental education.

PRINCIPLES FOR CONCEPTUALIZING 'ENVIRONMENT'

While direct experience, critical reflection and negotiation provide unique opportunities for learning, engaging with multiple perspectives on the environment can help to expand and inform students' understanding of the environmental issues.

As a way of focusing discussions about the environment, key principles are presented here (see Figure 1 for a representation of how this connects to experiential learning). Through a consideration of these principles for environmental education, you, as teachers, will come to understand that experiential programs can examine the complexity of natural systems. Human interaction with these systems and the effect on these systems is also examined. You will also learn that holistic forms of environmental education can help your students to develop a sense of respect and appreciation for the natural world. An *aesthetic* appreciation, along with a scientific understanding of nature, encourages students to learn and act to protect and sustain the environment. This, in turn, can contribute to self-awareness and personal fulfilment.

As educators, we need to facilitate students' understandings of what constitutes responsible action toward the environment and help students to act responsibly in their personal lives.

These actions are influenced by belief systems and personal limitations (both physical and cultural) so student actions can take many forms.

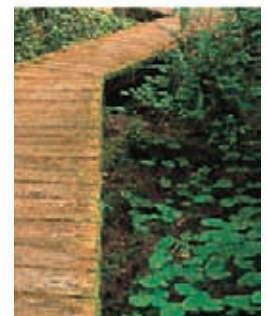
You should encourage your students to make decisions based on an understanding of the issues, as well as their personal values, and the sometimes conflicting values of other community members.

The principles for organizing and conceptualizing environmental education then include:

- 🍃 a consideration of complexity (complex systems);
- 🍃 aesthetics (or aesthetic appreciation);
- 🍃 responsibility (responsible action and consequences of action); and
- 🍃 the practice of an environmental ethic.

The mnemonic and metaphor of *C.A.R.E.* (Complexity, Aesthetics, Responsibility and Ethics) can be used to describe the various forms environmental knowledge can take. *C.A.R.E.* demonstrates the interdisciplinary nature of environmental concepts, while showing a progression of the development of ideas that can lead towards deeper engagement with environmental learning in all of its forms (see Figure 2). This guide continues with a consideration of each of these types of environmental learning.

Figure 2: Use 'CARE' to deepen environmental learning



The study of environmental issues can enable students to develop what has been described as an environmental ethic.

Complexity

Life on Earth depends on, and is part of, complex systems.

Environmental education addresses the study of complex systems in two ways. First, it examines the complexity and interrelatedness of natural systems, and how humans interact with and affect those systems. It also looks at human-created systems, both those that are built and those that are part of our social fabric.

For example, when students investigate the water cycle, a food web, or photosynthesis, they are studying a natural system.

When they investigate government and politics, economics and the evolution of societies, or highway and sewage systems, they are studying human-created systems. These investigations help students understand the complexity of systems and the links between them. Knowledge from a broad range of scientific disciplines contributes to a well-rounded understanding of environmental issues. However, there must be an awareness that knowledge is not static and that theories can change. Knowledge from the sciences, economics, politics, law, and sociology are vital to the study of complex systems and human interactions.

Through studying cultural systems and global issues, students may begin to see the relationships between the environment and human rights, justice, race and gender equity. Other cultures in the world present diverse perspectives on ways of valuing and relating to natural and human-created environments.

In developing a thorough understanding of systems, students can examine the origins and impact of their present worldview and analyse the implications of new information and changing societal values. Concepts for student consideration and discussion include:

- 🍃 an ecosystem, or a social system, is caused by the collective interactions of individual parts that require holistic investigation;
- 🍃 individual components serve unique functions in all complex systems. The loss or degradation of any single component may cause a decline in the viability of the system;
- 🍃 the planet's resources are finite. Humans are dependent on materials and energy supplied by the global ecosystem;
- 🍃 different cultures observe natural systems through various philosophical, technological, and social points of view. Throughout time, cultures have interacted with the environment in different ways;
- 🍃 the pace of technological change and the distribution of scarce resources can have a profound impact on society and the environment; and
- 🍃 the organization of societies in the past and present, and the laws that govern them, have implications for environmentally and socially sustainable development.

Aesthetics

Environmental awareness enables students to develop an aesthetic appreciation.

Aesthetics deals with beauty, artistic expression, and our physiological responses to these. Environmental education helps students to develop an aesthetic sense of respect and appreciation for the natural world through study, physical challenges, and other experiences in nature.



An aesthetic appreciation, along with other understandings of nature, encourage students to learn and act to protect and sustain the environment, and can also contribute to self-awareness and personal fulfilment. Further, outdoor studies and activities in physical or outdoor education can help develop students aesthetic appreciation. Aesthetics also has an internalized component strongly related to what we personally value in nature.

Aesthetic values may explore explicit value shifts, such as those found when examining a natural setting for the development of a park or a residential development. The idea that nature has fundamental worth from an aesthetic point of view is one example of a value shift. Different types of value shifts are also possible in environmental aesthetics and environmental criticism in the arts; however, these often concentrate on cultural expressions of our interaction with nature.

Finally, aesthetic experiences provide insight and enrich human interactions with the environment by allowing students to:

- ❏ develop an understanding of the aesthetic qualities that exist in the environment;
- ❏ develop skills and sensitivity to the application of aesthetic criteria when considering environmental matters; and
- ❏ develop the ability to formulate, apply, and communicate personal aesthetic criteria for assessing environmental issues.

Concepts for student consideration and discussion include:

- ❏ direct experiences in natural surroundings provide opportunities to develop respect and appreciation for living and non-living things;
- ❏ aesthetic appreciation encourages a sense of the uniqueness and beauty of the planet;
- ❏ appreciation of nature is an impetus for many forms of creative expression;
- ❏ individuals and cultures vary in the degree to which they value nature for its own sake and for its ability to serve human needs;
- ❏ lifestyles, arts, and religions can be indicators of their perception of, and relationship with, their environment; and
- ❏ respect for the land and all living things can encourage the maintenance of a healthy environment, providing benefits for everyone.

Responsibility

Human decisions and actions have environmental consequences.

Studies about the environment provide opportunities for students to explore the environmental impact of decisions and actions made at personal, community, societal, and global levels. Studies in geography, history, technology, and other arts and sciences can help students develop awareness of diverse cultural perceptions and interpretations of the environment.

Through the study of human impact on the environment, students can explore and develop positive approaches to long-range environmental concerns. Exploring and addressing global issues, such as militarism and war, the inequitable distribution of wealth and resources, food production, and transportation are essential to establishing a sustainable society. A focus on decisions and actions in other cultures and locations contributes to questions about how to live more sustainably here in British Columbia.



The histories of all societies reflect the interactions of individuals and groups with their environments.



Concepts for student consideration and discussion include:

- 🍃 the preservation of viable ecosystems is a basic value for every society;
- 🍃 First Nations practise of Traditional Ecological Knowledge can illustrate alternative views on how humans have interacted with their environments;
- 🍃 consideration of all species for future generations is essential to preserve the integrity of the ecosphere;
- 🍃 the language used by a culture unconsciously reproduces its moral values;
- 🍃 some human actions have significant and cumulative impacts on the environment; and
- 🍃 growth in population and resource consumption is exponential. Most contemporary societies produce wastes, consume resources, and/or add to their population at rates that cannot be sustained.

Responsible action is integral to, and a consequence of, environmental education.

In light of what we know about past decisions around environmental issues, it is vital for students to decide what currently constitutes responsible action towards the environment and then begin to practice it. Concepts for student consideration and discussion include:

- 🍃 there are consequences and responsibilities for any action or inaction;
- 🍃 actions are influenced by belief systems and personal limitations, both physical and cultural; and
- 🍃 responsible action requires an understanding of factors that influence the environment and those that regulate, influence, or govern human interaction with the environment. These include the law, government and politics, civic responsibility, the decision makers, and those who influence them.

Ethics

The study of the environment enables students to develop an environmental ethic.

Supporting students to take responsible action requires an examination of values. Environmental education provides an opportunity for students to question cultural assumptions that lead to social conflict and environmental crises. The questioning process can create new visions and possibilities, but it is also important for students to realize that issues and crises are often the result of our value systems.

Students should be encouraged to make decisions based on an understanding of the issues, as well as their own values and the values of community members. Knowledge of philosophical and critical thinking tools, such as perspective analysis, argument analysis, and message deconstruction, provides a means to assist with the decision-making process and other disciplines. Some issues for an analysis of values could include:

- | | |
|--|------------------------------|
| 🍃 economic growth and sustainable development; | 🍃 pollution; |
| 🍃 land ownership; | 🍃 violence in society; |
| 🍃 business ethics; | 🍃 the role of the media; and |
| 🍃 consumption patterns and lifestyles; | 🍃 population control. |
| 🍃 technological change; | |

Concepts for student consideration and discussion include:

- 📄 actions are generated by belief systems or sets of values;
- 📄 value systems can change over time;
- 📄 the formation of values occurs in stages;
- 📄 how the environment is affected by specific actions is a scientific question, but the choice of what action to take is a question of ethics and of cultural, religious, and/or personal values;
- 📄 human quality of life is influenced by environmental quality;
- 📄 humans must recognize their responsibility to future generations;
- 📄 societal attitudes toward the environment are influenced by mass media coverage and perspectives; and
- 📄 print and electronic media have commercial implications and contain ideological and value messages that have social and political implications.

The development of an environmental ethic in students is perhaps a culminating goal for environmental learning in that it requires an understanding of all of the previous forms of environmental concepts described. Understanding the complexity of their daily interactions, while also recognizing the aesthetics of their environment, will help students take active responsibility in moving toward change. When this happens, an environmental ethic can become part of the moral fibre of their identities.

SUMMARY OF ENVIRONMENTAL LEARNING PRINCIPLES

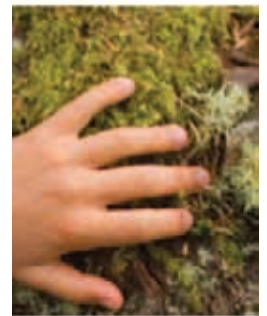
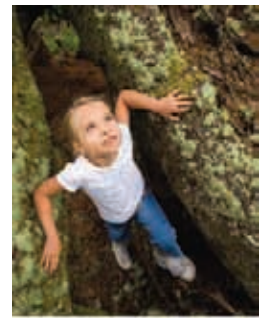
This document has described how environmental education is a way of understanding environments, and how humans participate in and influence these environments. In using the term 'environmental learning', we refer to a range of approaches to environmental issues, including environmental education, ecological education and education for sustainable development. All of these forms aim to integrate concepts and principles of the sciences and social sciences under a single interdisciplinary framework.

In the ecological view, students may come to know and understand more deeply that all human environments, societies, or cultures are all deeply dependent on natural systems, both for their development and, ultimately, their survival. In this framework, we present numerous principles for organizing teaching practices related to the environment. These principles are organized into two areas.

First, the widely supported principles for the teaching and learning of direct experience, critical reflection and negotiation are related and described in the form of the Experiential Learning Cycle model.

Second, the organizing principles for environmental concepts are summarized and described. The principles demonstrate the interdisciplinary nature of environmental concepts, while showing a progression in the development of ideas that lead towards deeper engagement with environmental learning in all of its forms.

Students are assisted by the organizers of Complexity, Aesthetics, Responsibility and Ethic (CARE) to guide their developing ideas about the environment. We hope that this document is useful to teachers in their important task of incorporating environmental themes into teaching and learning.



ACKNOWLEDGEMENTS



This guide is supplemented by websites that outline curriculum links with the B.C. Ministry of Education Integrated Resource Packages, provide lesson ideas, and identify educational resources. For further information please see:

BC Working Group on Sustainability Education
www.walkingthetalk.bc.ca

Environmental Educators Provincial Specialist Association
www.bctf.ca/eepsa

Many people contributed their expertise to this document. The project was headed by David Zandvliet (Simon Fraser University) and Richard Kool (Royal Roads University) and facilitated by Pierre Gilbert, Wael Afifi, Adrienne Gnidec and Richard V. DeMerchant from the Ministry of Education (Education Standards Branch). Many thanks to the hundreds of B.C. teachers and informal educators who gave us their ideas and feedback during the 16-month consultation process that preceded the completion of this framework. In addition to these contributors, we would like to thank the following individuals who contributed ideas or gave their feedback:

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