Introduction

Course Rationale

State of the Planet

Although Earth is 4.6 billion years old, human beings have been around for just a small fraction of that time—about 250,000 years. In that time, somewhere between 60 and 110 billion people have lived on this planet, civilizations have come and gone, and Earth has continued to nourish and sustain life. Until recently, we have not paid a great deal of attention to the impact of human activity on the state of the planet, nor have we paid adequate attention to the needs of our fellow humans.

In recent years, people have watched with increasing concern as significant environmental changes have become more apparent. We are beginning to realize that these changes may be the result of human activity—and, even worse, that our future on Earth is no longer certain.

The 20th century was the beginning of global efforts to improve human quality of life by working toward collective social goals. For example, in 1948 the United Nations *Declaration of Universal Human Rights* marked a significant turning point in concern for the dignity of all human beings, and in the year 2000 the UN established the Millennium Development Goals to improve life for people across the globe.

Although some progress has been made, if we are to improve the human condition and sustain Earth for future generations, more work must be done. We cannot continue along the path we are on.

We need to change the way we live, reconnect to the natural world, develop an ethos based on ecological thinking and global concern, and teach our children to do the same.

In January 2016, the UN built on the success of the Millennium Development Goals by implementing the Sustainable Development Goals (SDGs), which address additional issues such as climate change, economic inequality, innovation, sustainable consumption, and peace and justice.

Millennium Development Goals	Sustainable Development Goals
- Eradicate extreme poverty and hunger - Achieve universal primary education - Promote gender equality and empower women - Reduce child mortality - Improve maternal health - Combat HIV/AIDS, malaria, and other diseases - Ensure environmental sustainability - Develop a global partnership for development	- No poverty - Zero hunger - Good health and well-being - Quality education - Gender equality - Clean water and sanitation - Affordable and clean energy - Decent work and economic growth - Industry, innovation and infrastructure - Reduced inequalities - Sustainable cities and communities - Responsible consumption and production - Climate action - Life below water - Life on land - Peace, justice and strong institutions - Partnerships for the goals
Source: www.undp.org/mdg/	Source: United Nations Development Program

Why Students Should Take this Course

Social studies examines human societies and the complex interactions among human beings living together in a shared world. This course provides a lens of ecological literacy through which students can study and understand the complex and often critical global issues that societies face today. Through this lens, students

- apply concepts related to sustainability
- learn about the interdependence of environmental, social, political, and economic systems
- develop competencies for thinking and acting as ecologically literate citizens committed to social justice

The overall purpose of this study is not to instill fear in the next generation, nor to make students feel guilty for problems that are the cumulative legacy of many generations of mistakes, recklessness, and, in some cases, deliberate neglect or exploitation. Rather, the intent is to help students understand that human societies and institutions can and should be renewed, beginning with matters of personal lifestyle, and extending through to collective, large-scale social change. The role of education in this change is vital—hence the importance of this course both as an instrument of critical understanding (seeking the truth) and as an instrument of hope (seeking to create a better future).

The Role of Education in Social Change

Education plays a crucial role in motivating and informing both personal and social change. With this in mind, this course is designed to help students acquire a critical awareness about global issues, to alert them to the need to be vigilant about the consequences of their decisions and actions, and to provide them with opportunities to take action for positive change.

This course consolidates learning across the disciplines and helps students develop competencies as citizens who are mindful of their place in nature and in society and who are willing to work together toward a sustainable future. The pedagogical approach is based on the principles of active democratic citizenship, ecological literacy, critical media literacy, and ethical decision making. Throughout the course, students examine the social, political, environmental, and economic impact of emerging issues on quality of life—locally, nationally, and globally. They are provided with opportunities to engage in inquiry, active experiential learning, dialogue, collaboration, reflection, and decision making. With a view to transforming life practices, this course includes the planning and implementation of a school or community-based action-research project.

> "Education is the point at which we decide whether we love the world enough to assume responsibility for it, and by the same token save it from ruin which except for renewal, except for the coming of the new and the young, would be inevitable. And education, too, is where we decide whether we love our children enough not to expel them from our world and leave them to their own devices, not to strike from their hands their chance of undertaking something new, something unforeseen by us, but to prepare them in advance for the task of renewing a common world."
>
> – Hannah Arendt

Course Overview

According to the report to UNESCO of the International Commission on Education for the 21st Century (2010), education must be organized around four fundamental types of learning for all people to be empowered as lifelong learners, capable of contributing to their communities now and in the future:

■ learning to know

■ learning to do

■ learning to be

■ learning to live together
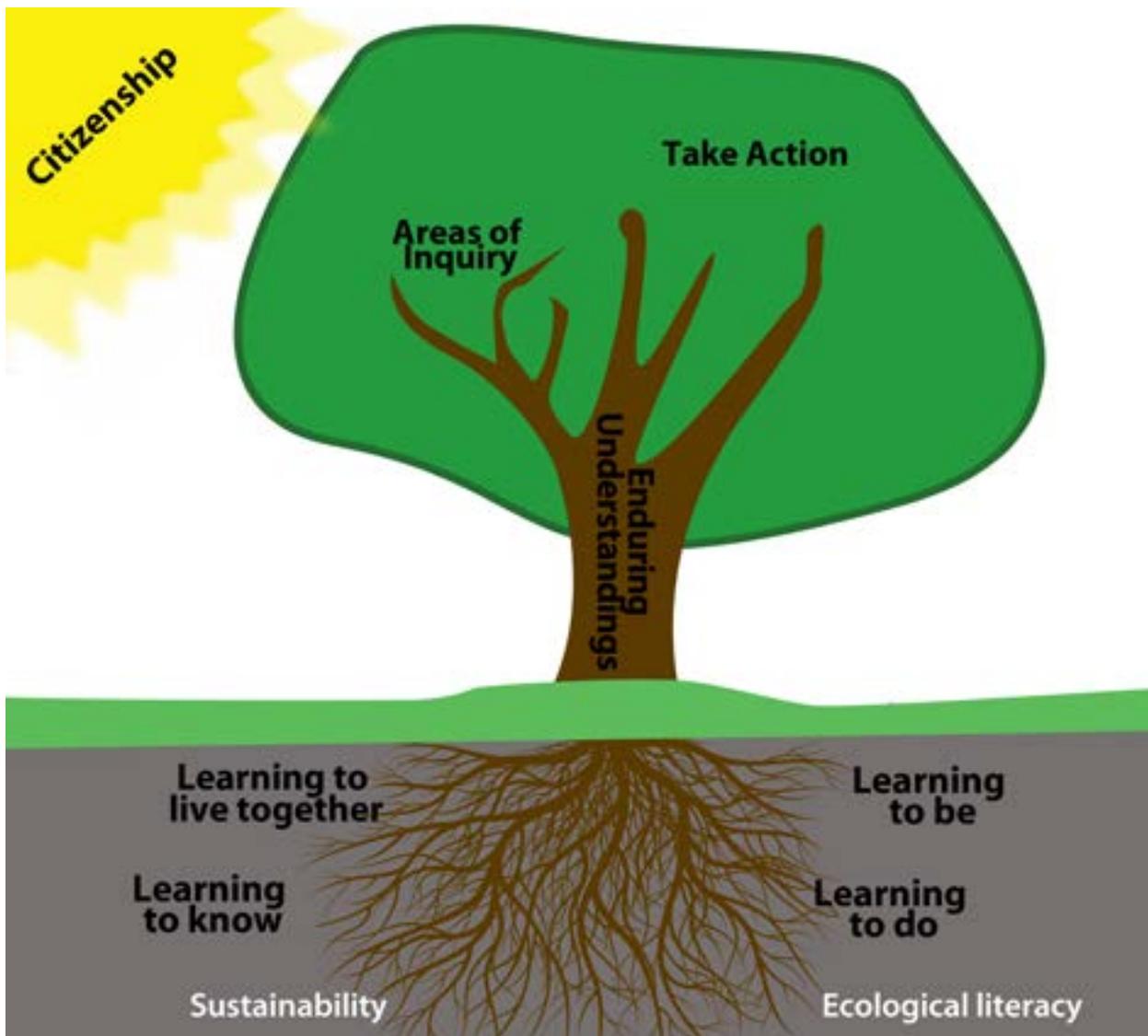
Grade 12 Global Issues: Citizenship and Sustainability

Learning to know

Acquire knowledge and understanding, and think critically about our complex and changing world.

- Develop ecological literacy through an understanding of the interdependence of society, the environment, and the economy.
- Be open to new ideas and divergent thinking.
- Seek knowledge from diverse sources and perspectives.
- Use creative, critical, and systems thinking to address complex questions.
- Conduct focused in-depth inquiry.
- Explore alternative approaches to issues without fear of challenging the status quo.
- Engage in long-term thinking, and articulate a vision for a sustainable future.

Learning to do

Learn to participate effectively in local, national, and global communities.

- Act responsibly towards self, others, and the environment.
- Be willing to let go and give back, and to make changes so as to live sustainably.
- Be an empowered and committed agent of change, willing to take a stand and engage in action for a sustainable future.
- Cultivate and share personal skills, talents, and gifts.
- Practise helpfulness and share hopefulness.
- Demonstrate care and respect through language and actions.
- Apply intuitive and innovative thinking and decision-making skills.
- Plan informed courses of action.

Learning to be

Build self-knowledge and be conscious of connections to nature and society.

- Appreciate the natural world and live by ecological principles.
- Be willing to contribute to the present and future well-being of all.
- Be introspective, reflective, and self-aware.
- Acquire a strong sense of self-knowledge and personal identity.
- Accept and express multiple identities, allegiances, and influences.
- Know how to be and how to live with others in shared spaces.

Learning to live together

Learn to live peacefully with others and to care for our common homeland.

- Respect Earth as a shared commons made up of complex and interconnected systems.
- Recognize the solidarity of all human beings and their dependence upon the planet.
- Respect diversity and value equity.
- Engage in intercultural dialogue and cultivate a widening circle of empathy and concern.
- Respect the inherent, inalienable, and universal nature of human rights.
- Be willing to collaborate, lead, and support.
- Resolve conflicts peacefully.

Enduring Understandings	Take Action
Our ecological footprint is exceeding Earth's capacity to sustain biodiversity and human life.	Minimize your ecological footprint, and live more responsibly (e.g., use fewer non-renewable resources; reduce waste; limit dependence on petrochemicals; seek sustainable and ethical food choices...).
Our decisions and actions matter; they have social, environmental, economic, and political consequences.	Recognize the consequences of your decisions, and take action as a citizen for a sustainable and just future for all.
Individuals, groups, governments, and corporations have the power to effect change and the responsibility to contribute to a sustainable future.	Be an ethical decision-maker, take a stand to support quality of life for all, and challenge the unethical and the unsustainable.
The media do not provide neutral reflections of reality; they affect our decisions and actions.	Evaluate the purposes of media, critically question information sources and our responses to media, and make decisions accordingly.
A global economic system that depends upon and perpetuates unrestrained consumerism is unsustainable.	Make consumption decisions that follow ecological and ethical principles, and be respectful of nature, self, and society in your actions.
Economic and technological development has contributed greatly to society, but often with harmful human and environmental consequences.	Assess the relative value and sustainability of economic and technological developments in order to make informed decisions.
Indigenous knowledge and world views offer alternatives to prevailing assumptions about how to live with one another within the environment.	Explore indigenous perspectives to extend the boundaries of the familiar and to challenge assumptions and practices.
Political systems distribute power, privilege, and wealth in different ways, some more justly than others.	Support democratic citizenship and be vigilant about political decisions that affect social, economic, and environmental conditions.
A just society respects human diversity and recognizes universal, equal, and inalienable human rights.	Be committed to universal human rights, regardless of gender, age, physical ability, sexual orientation, language, culture, religion, political beliefs, ethnicity, national or social origin, or status (e.g., property, birth, economic...).
There is no *them* or *over there*: we all belong to the human species, our concerns are interdependent, and we are part of the natural world.	Uphold the value of every person and strive to build community; act in ways that acknowledge human solidarity and the complexity and interrelatedness of all life.

Media * Consumerism * Environment * Poverty, Wealth, and Power * Indigenous Peoples * Peace and Conflict
Oppression and Genocide * Health and Biotechnology * Gender Politics * Social Justice and Human Rights

Pillars of Learning

The overarching goal of this course is the development of active democratic citizenship based on these four pillars, with a particular focus on ecological literacy and social justice. The following descriptors summarize the key competencies this course seeks to develop, organized under the four UNESCO pillars of learning.

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Enduring Understandings

- Our ecological footprint is exceeding Earth's capacity to sustain biodiversity and human life.

- Our decisions and actions matter; they have social, environmental, economic, and political consequences.

- Individuals, groups, governments, and corporations have the power to effect change and the responsibility to contribute to a sustainable future.

- The media do not provide neutral reflections of reality; they affect our decisions and actions.

- A global economic system that depends upon and perpetuates unrestrained consumerism is unsustainable.

- Economic and technological development have contributed greatly to society, but often with harmful human and environmental consequences.

- Indigenous knowledge and world views offer alternatives to prevailing assumptions about how to live with one another within the environment.

- Political systems distribute power, privilege, and wealth in different ways, some more justly than others.

- A just society respects human diversity and recognizes universal, equal, and inalienable human rights.

- There is no *them* or *over there*: we all belong to the human species, our concerns are interdependent, and we are part of the natural world.
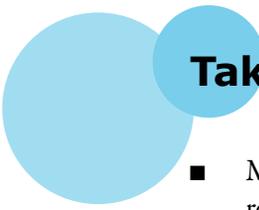
Take Action

- Minimize your ecological footprint, and live more responsibly (e.g., use fewer non-renewable resources; reduce waste; limit dependence on petrochemicals; seek sustainable and ethical food choices...).

- Recognize the consequences of your decisions, and take action as a citizen for a sustainable and just future for all.

- Be an ethical decision-maker, take a stand to support quality of life for all, and challenge the unethical and the unsustainable.

- Evaluate the purposes of media, critically question information sources and our responses to media, and make decisions accordingly.

- Make consumption decisions that follow ecological and ethical principles, and be respectful of nature, self, and society in your actions.

- Assess the relative value and sustainability of economic and technological developments in order to make informed decisions.

- Explore Indigenous perspectives to extend the boundaries of the familiar and to challenge assumptions and practices.

- Support democratic citizenship and be vigilant about political decisions that affect social, economic, and environmental conditions.

- Be committed to universal human rights, regardless of gender, age, physical ability, sexual orientation, language, culture, religion, political beliefs, ethnicity, national or social origin, or status (e.g., property, birth, economic...).

- Uphold the value of every person and strive to build community; act in ways that acknowledge human solidarity and the complexity and interrelatedness of all life.
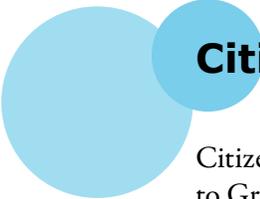
Citizenship as a Core Concept

Citizenship is the core concept of the Manitoba social studies curriculum from Kindergarten to Grade 12. Citizenship is fundamental to living in a pluralistic, democratic society and our complex and interdependent world. Social studies, as the study of people in relation to each other and the world in which they live, plays a particularly important role in education for citizenship.

Education for citizenship is not restricted to learning facts about Canadian society and the world. It involves more than conforming to the dominant world view about the meaning and implications of citizenship. Learners—students and teachers alike—are connected to diverse cultural, social, and interest groups in which a wide range of approaches to citizenship and civic engagement may coexist or even conflict. In order to build competencies as active democratic citizens,

> **"Students acquire the knowledge, understanding, and competencies necessary to live as active democratic citizens engaged in their local, national, and global communities."**

learners need to consider how their world view is shaped and think critically about the many factors that influence their decisions and actions. As students examine the issues of today's world, it is particularly important that they acquire ecological literacy and a sense of environmental responsibility. It is also essential that they cultivate the ability to engage in dialogue across a range of diverse perspectives.

Grade 12 Global Issues: Citizenship and Sustainability provides learners with opportunities to reflect upon diverse world views and perspectives as they conduct inquiry into issues that are crucial to living in a contemporary, connected, interdependent world. The course is intended not only to enrich learners' awareness of significant global issues, but to develop an ethos of concern as they come to understand their own capacities as contributing members of their local, national, and global communities. As they develop and practise the competencies of citizenship, students become able to envision and work toward a better future for all. They develop an ethos of engaged citizenship founded on the recognition of the importance of ecological principles as they address issues of social justice, economic sustainability, and quality of life on Earth.

Active Democratic Citizenship

An ethos of active democratic citizenship involves developing a set of coherent ethical principles upon which to base decisions and practices. Citizenship is a fluid concept that is subject to continuing change over time: its meaning is often contested, and it is subject to interpretation and debate. In the course of history, citizenship has been used both as a means of strengthening human solidarity and a means of excluding or maltreating groups or individuals while conferring superior privilege and power to others. An ethos of active democratic citizenship in the contemporary world is often referred to as global citizenship, since it is based not on nationhood or ethno-cultural exclusivity, but on a fundamental acceptance of the inherent, equal, universal and inalienable rights of all human beings.

However, the concept of global citizenship is a fairly recent phenomenon, and it too is subject to interpretation and debate. While some thinkers embrace global citizenship as a vision for a sustainable future for all, others argue that citizenship can only truly exist within the bounds

of a nation state; hence, the idea of global citizenship is either pure idealism or an imposition of Western liberal democratic ideology.

Regardless, our students live in a world where national boundaries and identities may not have the same meaning as they did for previous generations, and students today more easily see themselves as citizens of an interconnected global community.

Active democratic citizenship involves developing a widening circle of empathy so as to come to a sense of solidarity with all humanity. It involves a recognition and acceptance of a collective responsibility for the continued economic and social well-being of humans while preserving the environmental integrity of the planet. This course has been designed to help students develop ecological literacy, so as to understand the relationships that link environmental, economic, social, and political well-being. As students become conscious of their competencies as citizens, they are empowered by a sense of personal efficacy to address issues facing today's world.

This learning process may be seen as a process of moving from a sense of *me* to *we*—from passive to active, from detachment to engagement, from status quo to change, from indifference to concern, and, practically speaking, from consumer to citizen. Active democratic citizenship is an ethos motivated by concern for humanity, society, the planet, and the future, and is activated by self-empowerment. Students will devote considerable time throughout this course to examining personal and social values and the factors that influence their decision making. This reflection will take place in the context of recognizing our collective human responsibility for the well-being of future generations and our individual responsibility to contribute to a better future.
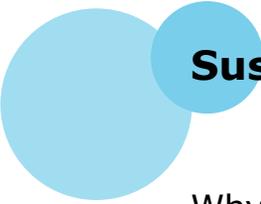
Sustainability

Why Sustainability?

Sustainability is a complex topic, and there is considerable disagreement as to what the concept means as well as how it should be pursued as a goal for human societies.

Understanding the meaning and implications of the concept of sustainability is an essential part of active democratic citizenship in the contemporary world, particularly for citizens of a developed and wealthy country such as Canada. The concept of sustainability is intricately woven into an ethos of responsibility: responsibility to future generations, environmental responsibility, economic responsibility, social responsibility, political responsibility, and responsibility to persons and groups that have been excluded from quality of life, well-being, or human rights and dignity.

"We cannot simply think of our survival; each new generation is responsible to ensure the survival of the seventh generation."

— Linda Clarkson, Vern Morrissette, and Gabriel Régallet

"Enough for everyone, forever."

— African Elder

A History of Sustainable Development

In 1987, the United Nations published the Brundtland Commission report entitled *Our Common Future*, a study of global concerns about social and economic inequities in the world. While acknowledging the importance of economic development, the report also declared an urgent need to adjust development to fit within the planet's ecological limits. It also introduced into international dialogue the term *sustainable development*, which it defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Global concern about the limits of development became more intense at the 1992 UN Conference on Environment and Development in Rio de Janeiro. Known as the "Earth Summit," it brought together a very large number of world leaders and resulted in two international agreements and a major action agenda on worldwide sustainable development. Since then, global interest in sustainability has continued to increase, and the concept has been broadened to include not only economic development, as determined by GDP (gross domestic product) and level of industrialization, but also social, political, and cultural elements that have an

"As a social goal … sustainability is fraught with unresolved questions. Sustainable for how long: a generation, one century, a millennium, ten millennia? Sustainable at what level: individual households, local villages, major cities, entire nations, global economies? Sustainable for whom: all humans alive now, all humans who will ever live, all living beings at this time, all living beings that will ever live? Sustainable under what conditions: for contemporary transnational capitalism, for low-impact hunters and gatherers, for some space- faring global empire? Sustainable development for what: personal income, social complexity, gross national product, material frugality, individual consumption, ecological biodiversity?"

— Timothy Luke

impact on quality of life, such as life expectancy and education. In other words, the sustainability initiatives became more concerned with ensuring quality of life for future generations and with the ecological limits of the planet to sustain this quality of life for all.
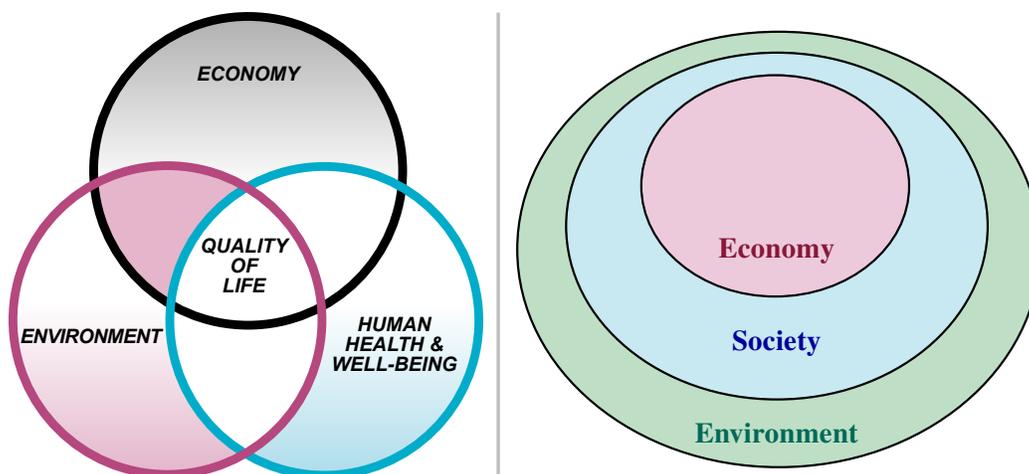
There are a variety of models and approaches to sustainable development, many of which are linked to political beliefs or ideologies. However, the generally accepted international view of sustainability is based upon the explicit recognition of the global interdependence of three fundamental components: environmental protection, economic well-being, and social justice. Education for a sustainable future, then, is education that empowers citizens to make actions and decisions that support continued quality of life for all human beings, now and in the future.

The engaged global citizen who seeks to be in, act in, collaborate in, and understand the world, therefore, needs to develop an enriched ecological literacy or a way of thinking that considers issues as part of an organic whole or a related set of interdependent systems. In the words of the UNESCO report *Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action* (1997), this new ethos is global in nature and in scope, and recognizes the critical issues at stake in today's world.

> "Sustainability is a concept which combines post-modern pessimism about the domination of nature with almost Enlightenment optimism about the possibility to reform human institutions."
> — Simon Dresner

> "Perhaps we are beginning to move towards a new global ethic which transcends all other systems of allegiance and belief, which is rooted in a consciousness of the interrelatedness and sanctity of life. Would such a common ethic have the power to motivate us to modify our current dangerous course? There is obviously no ready answer to this question, except to say that without a moral and ethical foundation, sustainability is unlikely to become a reality. "
> — UNESCO (1997)
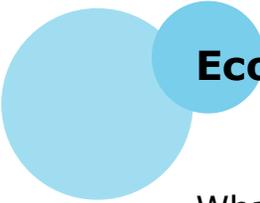
Ecological Literacy

What is Ecological Literacy?

Ecological literacy, or eco-literacy, is a term first used in the 1990s by American educator David W. Orr and physicist Fritjof Capra to introduce into educational practice the value and well-being of the Earth and its ecosystems. It is a way of thinking about the world in terms of its interdependent natural and human systems, including a consideration of the consequences of human actions and interactions within the natural context. Ecological literacy equips students with the knowledge and competencies necessary to address complex and urgent environmental issues in an integrated way, and enables them to help shape a sustainable society that does not undermine the ecosystems upon which it depends.

> "The great challenge of our time is to build and nurture sustainable communities— communities that are designed in such a way that their ways of life, businesses, economies, physical structures, and technologies do not interfere with nature's inherent ability to sustain life. The first step in this endeavor is to understand the principles of organization that ecosystems have developed to sustain the web of life. This understanding is what we call ecological literacy."
>
> – Fritjof Capra

Note: Students understand the natural systems that sustain life on Earth and apply the principles guiding ecosystems to help create sustainable human communities.

The following are core aspects of ecological literacy:

1. Principles of living systems
2. Design inspired by nature
3. Systems thinking
4. Ecological paradigm and the transition to sustainability
5. Collaboration, community building, and citizenship

1. Principles of living systems

According to Fritjof Capra, the ecological problems facing society are rooted in a lack of understanding of our place in the web of life. A key part of eco-literacy is reconnecting students to living systems—what educator Linda Booth Sweeney calls developing a "connected wisdom." Living systems are open, self-organizing systems that have the special characteristic of life and that interact with their environment through information and material-energy exchanges.

Examples of living systems include the human body, a forest, or a river, as well as human-created organizations such as communities or schools.

Connecting students to natural systems provides them with a deep sense of place and an understanding of their local environment. While students are immersed in experiences of the natural world as part of their classroom learning, they discover and study the principles guiding the functions of natural systems. Appendix A and Appendix B outline two different approaches to describing the principles of living systems, including their dynamic, complex, cyclical nature and their inherent interconnectedness. These principles come from the study of ecosystems and from a growing understanding of the way they have evolved over time. They also draw on the approaches of traditional and Indigenous societies, many of whom have thrived for centuries by applying these ecological principles.

2. Design inspired by nature

The guiding principles and characteristics of living systems serve as a basis for envisioning and designing sustainable communities. Beyond understanding natural systems, ecological literacy is about applying this understanding to the redesign of organizations, communities, businesses, and societies to align with ecological principles. The idea of "design inspired by nature" has become popular through concepts such as *biophilia, biomimicry,* or *biomimetics*, which involve examining and emulating natural models, systems, processes, and elements in order to solve human problems. According to David Orr, the goal of ecological design is to transform how humans act in the world to provide food, shelter, energy, materials, and seek their livelihood.

Ecological literacy asks what people know and how they should learn it, given the limits of Earth and its systems. It demands that human actions and design conform to how the world works as a biophysical system, and that societies be designed with future generations in mind.

3. Systems thinking

Ecological literacy is also guided by an understanding of systems, or systems thinking (sometimes called holistic or relational thinking). Because a system is a set of interdependent, interrelated parts that make up a complex and unified whole, it cannot be fully understood by analyzing its constituent parts. Ecological literacy involves applying a way of thinking that emphasizes relationships, connectedness, and context. For example, we can only understand a songbird by exploring both its own characteristics as well as its interactions with the watershed where it lives. Systems operate on multiple scales, with systems nested within systems. A watershed is a vibrant interplay among species from the tree to the bacteria in the soil. Systems thinking is necessary to understand the complex interdependence and often unpredictable dynamics of ecological systems, social systems, economic systems, and other systems on all levels. Ecologically literate students find connections in seemingly disjointed problems, perceive patterns instead of pieces, and design communities based on the interrelatedness of all life.

> "Science lessons about the water cycle or a food web are building blocks of ecological literacy because they reveal to the student how nature works. Likewise, a social studies unit on a human community (e.g., a family, neighbourhood, region, or country) or a geography lesson on resource management contribute to ecological literacy as soon as the dependence and impact of the human system/community/region on natural systems is acknowledged and explored as a vital part of the story."
>
> – Robert Steele (UNESCO)

Thinking systemically requires a number of "habits of mind," as outlined in Appendix C and Appendix D. These habits include seeing the whole of a system rather than snapshots of its parts, looking for patterns and connections, and uncovering and testing assumptions. This also involves a shift in perception, from a focus on parts to a focus on the whole or from discrete objects to relationships within a system. Two versions of these shifts in perception are captured in Appendix E and Appendix F and are at the heart of a broader shift in world view or paradigm.

4. Ecological paradigm and the transition to sustainability

Ecological literacy is partly aimed at triggering large-scale social change in how humans live on the planet. Teaching young people that we are part of the natural world is the basis for the shift to an ecological paradigm—a world view that places humans as embedded in ecological systems rather than perceived as separate, and that recognizes that there are global constraints to the amount of resources we can use and the amount of waste we can produce on a finite Earth. As Fritjof Capra (2012) notes, "in the coming decades, the survival of humanity will depend on our ecological literacy—our ability to understand the basic principles of ecology and to live accordingly." This shift to an ecological paradigm is part of a transition to sustainability—accounting for human well-being while substantially reducing poverty and conserving the planet's life support systems. Sustainability is not just about basic needs and human survival; sustainability is the process to create a vibrant society. Michael Stone of the Center for Ecological Literacy notes:

> A truly sustainable community is alive — fresh, vital, evolving, diverse, dynamic. It supports the health and quality of life of present and future generations while living within the limits of its social and natural systems. It recognizes the need for justice, and for physical, emotional, intellectual, cultural, and spiritual sustenance.

This is about the ethics guiding human society, including taking responsibility for the social and environmental consequences of our activities.

Daniel Goleman uses the term *ecological intelligence* to highlight the need for feedback about whether our activities are having a positive or negative impact on people and ecosystems. He makes the point that there is an urgent need for marketplace transparency and for greater human understanding of the ecological impacts of how we live. New information technologies provide a tool for assessing the sustainability of supply chains and the far-flung impacts of our choices. He notes that "we can, together, become more intelligent about the ecological impacts of how we live—and how ecological intelligence, combined with marketplace transparency, can create a mechanism for positive change." The exchange of information is only one aspect of this ecological intelligence. Goleman notes that we also need to draw on our social intelligence to coordinate and harmonize our efforts because of the complex global web of cause and effect.

"The dialogue about sustainability is about a change in the human trajectory that will require us to rethink old assumptions and engage the large questions of the human condition that some presume to have been solved once and for all. Genuine sustainability, in other words, will come not from superficial changes but from a deeper process akin to humankind growing up to a fuller stature."

– David W. Orr

"Ecological intelligence allows us to comprehend systems in all their complexity, as well as the interplay between the natural and man-made worlds. But that understanding demands a vast store of knowledge, one so huge that no single brain can store it all. Each one of us needs the help of others to navigate the complexities of ecological intelligence. We need to collaborate."

– Daniel Goleman

5. Collaboration, community building, and citizenship

Ecological literacy is about emphasizing collaboration and partnership as a hallmark of living systems and life. The ability to associate, create links, and draw on the collective distributed intelligence of many individuals is part of eco-literacy. Ultimately, sustainability is a community practice.

Ecologically literate students are also community builders and active citizens. An ecological education occurs both within the natural environment and in the local community where students can build relationships and apply their understanding in a real-world setting.

Ecoliteracy knowledge empowers students to help create a better society and make a difference. Studies have shown that combining civic engagement and ecological literacy creates leaders who are willing to participate as citizens in effecting positive change and engaging in creative solutions.
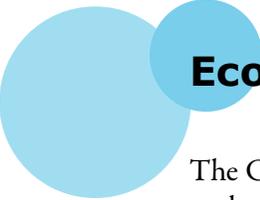
Ecological Literacy in a Global Issues Course

The Center for Ecoliteracy suggests the following principles for the integration of ecological literacy:

- Ecological literacy is not an additional concept or subject to be added to the content of the course. It may be seen rather as a perspective or a way of thinking through which any selected topic or issue may be viewed.

- It is useful to focus on guiding fundamental questions, which may recur and open up conceptual links across disciplines (e.g., science, geography, anthropology, politics, history, the arts, sociology, health).

- The conceptual links that tie subjects together help make learning more effective, since they lead to learning that is more readily applicable to the real world.

- Taking a hopeful, proactive approach and designing learning activities that engage students in potential solutions are important when teaching about environmental issues.

Core Competencies for Ecoliteracy

The Center for Ecoliteracy has developed a set of core competencies to help young people develop and live in sustainable communities. These competencies relate to the head (*learning to know*), the heart (*learning to be*), the hands (*learning to do*), and the spirit (*learning to live together*).

Head (Cognitive)

- Approach issues and situations from a systems perspective
- Understand fundamental ecological principles
- Think critically, solve problems creatively, and apply knowledge to new situations
- Assess the impacts and ethical effects of human technologies and actions
- Envision the long-term consequences of decisions

Heart (Emotional)

- Feel concern, empathy, and respect for other people and living things
- See from and appreciate multiple perspectives; work with and value others with different backgrounds, motivations, and intentions
- Commit to equity, justice, inclusivity, and respect for all people

Hands (Active)

■ Create and use tools, objects, and procedures required by sustainable communities

■ Turn convictions into practical and effective action, and apply ecological knowledge to the practice of ecological design

■ Assess and adjust uses of energy and resources

Spirit (Connectional)

■ Experience wonder and awe toward nature

■ Revere the Earth and all living things

■ Feel a strong bond with and deep appreciation of place

■ Feel kinship with the natural world and invoke that feeling in others

The Core Competencies of Ecoliteracy: © 2014 Center for Ecoliteracy

Teaching ecological literacy often involves the following:

■ Weaving ecological and systems approaches into the existing curriculum in a coherent way that builds student knowledge over time (Note: The focus should be on ecological concepts and their relationships to each other—both the big picture and the details—and to the active preservation of the ecosphere rather than incremental inclusion of ecological concepts.)

■ Building teacher capacity in the areas of ecology and systems thinking

■ Learning from nature through immersion in the real world (nature and communities) and a deep knowledge of particular places

■ Acknowledging that place-based and experiential outdoor learning is essential to the cognitive development, health, and well-being of children

■ Cultivating a sense of wonder, creativity, and compassion for nature and for community

■ Transforming the school into a living laboratory of buildings and processes that teach children about their interconnectedness to nature and their communities

■ Linking to higher education resources and schools that allow students to continue the development of their ecological literacy

A list of resources is included following the appendices to further support curriculum development. This is a relatively new field. It is a rich area to explore and take leadership in shaping ecological literacy and in nurturing the next generation of empowered students and sustainable communities.
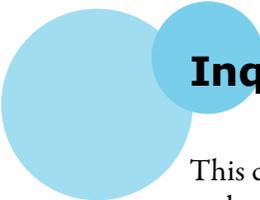
Inquiry Approach

This component is intended to guide student inquiry and may be adapted to respond to student needs, interests, and new or emerging issues of global significance.

Inquiry is a complex process that grows out of constructivist pedagogy. It begins with the selection of a topic and the design of powerful questions that guide students as they select resources, gather and interpret information, build relevant knowledge and understanding, and share their findings and conclusions. Inquiry relies upon critical and divergent thinking. During the inquiry process, the role of a teacher shifts from covering content to becoming a guide and facilitator. Students are given the opportunity to generate their own questions, to set learning goals, to acquire and share enduring understandings, and to develop the decision-making skills that are part of active citizenship.

> Inquiry-based learning has its roots in the educational reform movements that began in the early 20th century and were guided by the work of Piaget, Vygotsky, Dewey, and other constructivists . Constructivists regard learning as an active process – a process where students construct understanding through problem solving and reflection.

Areas of Inquiry and Issue Selection

How many issues should be addressed in this course?

If students are to achieve a balance of breadth and depth in their understanding of global issues, they need to focus on a **minimum of three areas of inquiry** over the length of this course. The choice of issues within each are of inquiry is flexible. (Refer to the backgrounders on each area of inquiry for a broad list of suggestions of specific issues.)

Areas of Inquiry

- Media
- Consumerism
- Environment
- Poverty, Wealth, and Power
- Oppression and Genocide

- Health and Biotechnology
- Gender Politics
- Social Justice and Human Rights
- Indigenous Peoples
- Peace and Conflict

At the beginning of the course, teachers may choose to model the inquiry process through the collective study of one issue. Students will then conduct individual or group research in a minimum of three areas of inquiry. All students do not need to study the same issues but should have frequent opportunities to exchange new understandings and insights throughout the process. Each student or group of students will select one issue for their **Take Action** project.

Guidelines for Student Inquiry

- Cultivate an open, democratic learning environment, where students are encouraged to be curious and independent and to take risks.

- Use student-centred learning strategies such as brainstorming, discussion, concept maps, and graphic organizers, and observe student progress through classroom-based assessment techniques. These strategies will provide ongoing opportunities for teachers to assess prior knowledge, to deal with student misconceptions and difficulties, and to assess progress.

- Help students develop strong inquiry questions that move beyond the accumulation of facts to the investigation of issues, conceptual understanding, and the exploration of diverse perspectives.

- Encourage students to consult a variety of sources, to consider diverse perspectives, and to use critical-thinking skills in the selection and interpretation of information.

- Strive to address issues that have local, national, and global implications. Whatever the issue, provide opportunities for students to engage in learning at the local community level. Experiential understanding of issues though local engagement will help students understand broader, more abstract systemic global issues.

- Determine whether an inquiry will involve the whole class, small groups, or individual students. If the inquiry process is new to students, begin by having all students collaborate on one topic. This approach will allow teachers to model and guide the inquiry process. As well, students will learn from each other as they share their research, discuss their findings and conclusions, and are exposed to healthy dissent and diverse perspectives.

- Encourage students to think critically and engage in reflection throughout the learning process and to maintain a learning log or journal. This record could include conceptual maps, inquiry questions, information sources, reflections, interview notes, and details of their learning journey.

- Use multiple resources, including primary source material, and encourage academic rigour. Students should be exposed to multiple and contradictory viewpoints, and encouraged to seek their own position based on reliable information. Sources could include community members, specialists and academics, newspapers and journals, web-based sources, governmental and non- governmental agencies and organizations, business and industry, environmental and social action groups, and others.

- Encourage creativity and diversity in the methods of presentation.

- Assessment needs to be ongoing and take multiple forms including self- and peer assessment. Student progress should be monitored and tracked through the use of ongoing observation and discussion, and with anecdotal records and checklists.

Suggested Guiding Questions for Exploring an Issue

Significance and Scope

- Why does this issue matter? To whom?
- Who/what is affected by the issue? Who benefits? Who is harmed?
- When/where/how did this issue begin?

Evidence

- Have I used a variety of sources, including primary sources?
- How reliable are my sources?
- How do the media treat this issue?

A rigorous inquiry should address questions in each of these areas. Students may select some or all of the suggested guiding questions in each category, or they may generate new questions, as appropriate, for their topic.

Perspective

- How do perspectives differ on this issue (e.g., environmental, economic, political, social...)?
- Which perspectives are most defensible and why? Whose voices are not heard?
- What role do media play creating/perpetuating this issue?

Impact: Environmental, Social, Political, Economic

- What is happening at the local, national, and global level?
- What actions are being taken by citizens, governments, businesses, and other groups?
- What might be some of the short- and long-term consequences of these actions?

Connections

- How has this issue changed over time? What might be future concerns?
- How is this issue connected to other environmental, social, or economic concerns?
- Is this issue part of a larger trend or problem?
- How does this issue affect the environment? Economy? Society? Quality of life?
- Why does this issue continue to be a problem and for whom?

Reflection

- How do you feel about the issue now that you know more about it?
- How might this issue have been prevented? What could have been done differently?
- What questions do you still have?

Action/Praxis

- Who needs to do what? What can and should we do?
- What are the challenges/barriers/risks to action?
- What do I have to offer? How can I take action?
- How can I get others involved?
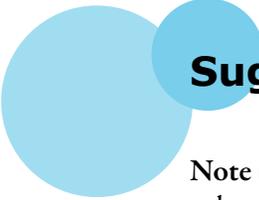
Suggested Topics by Area of Inquiry

Note to teachers and students: This is intended as a list of examples alone and is not an exhaustive list of possible inquiry topics. The selection of issues for inquiry should be flexible, should allow for new or emerging issues, and should be based upon student interests and access to reliable resources. Note that some topics may reappear in more than one area of inquiry, depending upon the entry point or approach to research. Student inquiry throughout this course must focus on issues in at least three of the ten Areas of Inquiry.

Area of Inquiry: Media

- concentration of ownership and convergence
- power and profit
- propaganda, social engineering
- bias in media
- critical analysis of media
- selection and omission of news items
- marketing and advertising strategies
- freedom of the press: regulation, ethics, legislation, and censorship
- public control and citizen journalism
- alternative media and social justice

- stereotypes
- psychological influence (e.g., objectification, sexualisation, body image, fear)
- violence
- rise of infotainment
- power and influence of advertising (e.g., pervasiveness, embedded messages, product placement)
- popular culture and social mores
- culture of consumerism and environmental consequences

Area of Inquiry: Consumerism

- consumer-based economies
- capitalism and free market economies
- citizen responsibilities and decision making
- corporate responsibilities and decision making
- culture of entitlement
- culture of credit
- culture of excess
- commodification of Indigenous cultures
- impact of branding, marketing, and advertising
- mass-media manipulation
- corporate sponsorship, product placement
- perceived/planned obsolescence
- lifestyle and health issues (e.g., obesity, chemical intolerances, allergies, illnesses, sedentary living)
- energy and natural resource depletion
- generation of waste
- petro-politics
- corporate and consumer greed
- sweatshops

Area of Inquiry: Environment

- healthy ecosystems, preservation of biodiversity
- water management and quality
- limited resources versus unlimited development/growth
- responsible resource extraction
- energy efficiency and alternative energy sources
- environmental and human disasters (e.g., prevention, response, individual and collective)
- environmental degradation and technological solutions
- sustainable cities, design, urban planning
- alternative transportation
- standard of living versus quality of life
- carrying capacity
- energy consumption, carbon footprint, travel and transportation alternatives, alternative energy sources
- stewardship and equitable sharing of natural resources
- economic and environmental refugees
- population increase, distribution, movement, migration, urbanization
- politics and economics of climate change (e.g., impact of industrialization, responsibilities of developed/less-developed economies, Kyoto Accord; Arctic sovereignty)
- Gaia hypothesis, systems thinking, interconnectedness of human and natural systems, living sustainably

Area of Inquiry: Poverty, Wealth and Power

- globalization: economic globalization, multinational and transnational corporations (e.g., control, regulation, erosion of government authority)
- global domination, military industrial complex, international arms sales
- organized crime
- technological advances
- forms of inequality/disparity: income, consumption, access to necessities of life (e.g., food, water, shelter, education, health, employment, safety)
- causes of inequality: colonialism, debt, unequal trade, economic policies (e.g., World Bank, IMF), natural and human causes of inequality/disparity

- bridging the gap between rich and poor countries: development assistance, debt relief, trade over aid, fair trade, rebuild fragile states/promote democracy, labour movements, community-based projects
- economic sanctions
- measuring poverty: absolute, relative
- causes: political, economic, natural
- forms of poverty: discrimination, marginalization
- effects of poverty: infant mortality, maternal health, child labour, working conditions, social vitality, income, basic needs, safety
- solutions/poverty reduction

Area of Inquiry: Indigenous Peoples

- ethno-diversity of world's Indigenous peoples
- the legacy of colonialism, colonization, and decolonization
- enculturation, assimilation, and cultural loss
- disappearance of Aboriginal women in Canada
- impact of development and globalization on Indigenous peoples, cultural homogenization, disappearance of Indigenous peoples and cultures (e.g. population decrease, illnesses)

- restitution and reconciliation processes
- Indigenous resurgence and development, circumpolar and other international Indigenous organizations
- international rights of Indigenous peoples
- preservation of traditional Indigenous cultures and languages
- commodification, falsification, and marketing of traditional Indigenous knowledge
- recognition of distinctive Indigenous world views and values

Area of Inquiry: Peace and Conflict

- nature and forms of conflict: international terrorism, transnational, and intrastate conflict, civil disobedience, terrorism, violent and non-violent revolutions, nuclear proliferation and deterrence

- agents of conflict: economic, military policies, military industrial complex, international arms sales and marketing

- ideology, religion; sources of conflict (e.g., human security, competition for land or resources, religion, racial or ethnic tensions, self-determination, political goals)

- ethical issues in war and military alliances

- impact of conflict: civilians, children, quality of life, environmental impact, economic impact

- intervention and conflict resolution: military, national security, government policies, citizen rights, multilateral intervention (e.g., UN), International humanitarian law (e.g., Red Cross, Red Crescent), reconstruction, international criminal courts, peace movements, pacifism, peacekeeping, peace building, diplomacy, counterinsurgency, policing, international development

- alternatives to war: economic sanctions, diplomacy, aid

Area of Inquiry: Oppression and Genocide

- forms of oppression: racial, cultural, ethnic and religious

- inequitable control of land or resources, xenophobia, perceptions of racial or cultural superiority, systemic racism (e.g., Apartheid, state-based exclusion, oppression, or violence)

- political oppression: state authority, dictatorship, enforcement (e.g., role of military, police, secret police), punishment, racial profiling/ discrimination, propaganda and dissemination of hatred, bureaucracy, racial laws

- abuse of power and genocide (e.g., Shoah – Holocaust, Holodomor, Bosnia-Herzegovina, Rwanda, Armenia, Darfur)

- compliance, blind obedience, denials of genocide, crimes against humanity, disregard for international conventions,

opportunism, ostracism, religion, peer pressure, stereotypes, supremacy, prejudice, ignorance, bystanders, propaganda, fear

- atrocities: concentration camps, exclusion, persecution, crimes against humanity, mass murder, deportation, extermination, genocide, Final Solution

- peace and reconciliation processes: dissent, state restitution/reparations, international tribunals, Righteous Among Nations (Yad Vashem), survivors, upstanders

Area of Inquiry: Health and Biotechnology

- science, technology and human health, economic implications of health care, controversial genetic research (e.g., embryonic and stem cell research, animal testing, patenting DNA, genetic intervention and modification, preservation of genetic material, genetic information privacy)

- longevity and life-preservation measures

- controversial medical interventions (e.g., plastic surgery, in vitro fertilization, euthanasia, abortion)

- epidemic and pandemic prevention and response, disease control (e.g., AIDS, virus control, immunization)

- birth control and maternal and child care, pharmaceutical industry (e.g., Big Pharma, marketing, testing, control)

- food and drug management and testing, alternative health practices, safety, control and marketing

Area of Inquiry: Gender and Identity

- feminism and views of gender roles

- worldwide gender equity issues, education of women, eco-feminism, women and power, women and the economic system, female health, maternal health, access to birth control and abortion, domestic labour, child-rearing, child care, female poverty

- cultural relativism versus rejection of oppressive cultural practices (e.g., female genital mutilation, honour killings of women, women's dress restrictions—hijab, burqa, niqab, limitations on female rights and freedoms, mitations on female rights and freedoms)

- hetero-normativity, masculine/feminine gender role stereotypes

- same-sex marriage, homophobia

- sexual marketing, prostitution, human trafficking and slave trade, sex tourism, pornography, sexualization and abuse of children

- body image, female sexual stereotyping, the marketing of sexuality, impact on human relations

Area of Inquiry: Social Justice and Human Rights

- universal human rights (e.g., ethnicity, race, culture, class, religion, sexual orientation, gender, abilities)

- economic disparities, poverty, quality of life

- access to food, water, health care, education, employment

- child exploitation, human trafficking and slave labour

- action for human rights

- forms of activism (e.g., the power of one, resistance to oppression, civil disobedience, conscientious objectors, boycotts, protests, grassroots movements, local community groups, citizen action groups, social networking and mobilization for change, popular culture and the arts)

- labour movement and unions, strikes, non-violent revolution

- Indigenous rights and self-determination

- crime and punishment, penal systems and economic implications, ethical treatment of prisoners

- environmentalism and environmental organizations

- ethical treatment and human use of animals

- eco-activism

- NGOs and international collaboration, role of governments in international aid (e.g.,

- CIDA, disaster relief, the economics of aid)
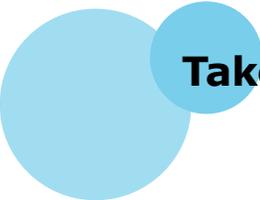
Take Action — *Praxis*

Praxis
In Pedagogy of the Oppressed, Paulo Freire defined praxis as "reflection and action upon the world in order to transform it." (p. 36)

Take Action is the experiential learning or praxis component of this course. The Brazilian educational philosopher Paulo Freire defined praxis as "reflective action intended to transform the world." Developed in the political context of 1960s Latin America, Freire's pedagogical theory was based on collective action toward freedom through literacy, dialogue, and critical consciousness. In the context of this Grade 12 Global Issues course, praxis engages students in work with their peers in order to apply their learning and contribute to a more equitable and sustainable planet in which quality of life is improved for all.

Moving from Critical Consciousness to Praxis

Take Action shifts learning from the theoretical to the experiential by providing an opportunity for students to engage in practical community-based projects. The goal is to move students from awareness through questioning, inquiry, and dialogue to critical consciousness and, ultimately, to *praxis*—engagement in informed reflective action for positive change.

Successful Take Action projects will make a difference in the lives of students and their communities. In order for this to happen, projects need to be student-initiated, collaborative, and goal-oriented. Projects also need to be meaningful to students and related to issues they believe are important, relevant, and personally significant. The focus and scale of the projects should be flexible and they should accommodate student concerns, needs, and abilities. Students should be free to plan small- or large-scale projects with a local, national, or global scope. They may choose to work in a small group to take on personal projects that focus on making sustainable lifestyle choices; other students may decide to undertake larger scale, long-term projects that involve community members. Whatever the nature and scope of Take Action projects, students will have opportunities to become mindful, hopeful citizens who appreciate the power of collaboration and who contribute to a more equitable and sustainable world.

Among Grade 12 students, as in the general population, there will be a wide range of approaches to citizen action and engagement. Students should be encouraged to determine their own level of social action by challenging themselves to explore areas where they can be most effective in making personal, community, and societal change.

Westheimer and Kahne (2008) identify three approaches to citizenship, which may be seen as a sort of continuum of citizen engagement:

■   the personally responsible citizen

■   the participatory citizen

■   the social-justice oriented citizen

The characteristics of each type of citizen are summarized in the table "Kinds of Citizens" on the following page.

As students learn about global issues and have opportunities to engage in meaningful action, they develop a critical consciousness of the world and the status quo. They come to see where there is a need for change and to understand that, as citizens, they can make a real difference in their communities and in the world. As they build an understanding of the many ecological, social, and ethical links between local issues and planetary issues, they come to build a more holistic or relational way of thinking that is based on the shared concerns and interdependence of human beings. The more opportunities students have to reflect and act upon issues that concern them, the greater the likelihood they will move along the citizenship continuum towards a social justice orientation, and the more likely they will become agents of systemic change.

Kinds of Citizens

	Personally Responsible Citizen	Participatory Citizen	Justice Oriented Citizen
Description	■ Acts responsibly in his/her community ■ Works and pays taxes ■ Obeys laws ■ Recycles, gives blood ■ Volunteers to lend a hand in times of crisis	■ Active member of community organizations and/or improvement efforts ■ Organizes community efforts to care for those in need, promote economic development, or clean up environment ■ Knows how government agencies work ■ Knows strategies for accomplishing collective tasks	■ Critically assesses social, political, and economic structures to see beyond surface causes ■ Seeks out and addresses areas of injustice ■ Knows about democratic social movements and how to effect systemic change
Sample	■ Contributes food to a food drive	■ Helps to organize a food drive	■ Explores why people are hungry and acts to solve root causes
Core Assumption	■ To solve social problems and improve society, citizens must have good character; they must be honest, responsible, and law-abiding members of the community.	■ To solve social problems and improve society, citizens must actively participate and take leadership positions within established systems and community structures.	■ To solve social problems and improve society, citizens must question, debate, and change established systems and structures when they reproduce patterns of injustice over time.

Kinds of Citizens: Westheimer, Joel, and Joseph Kahne. "What Kind of Citizen? The Politics of Educating for Democracy." *American Educational Research Journal* 41.2 (Summer 2004). 237–269.
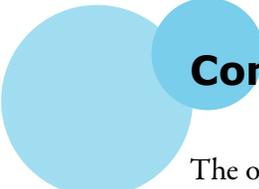
Consumer to Citizen

The over-arching goal of this course is to help students grow in their capacities as ecologically literate, social justice–oriented citizens. This growth should naturally include a shift away from a consumerist world view to one of citizenship.

 Consumerism is a thriving force in our society, supported by the powerful tools of marketing and advertising. O'Reilly and Tennant (2010) regard advertising as the most ubiquitous force in modern culture. Students are exposed to advertising at every turn and, just like many of the adults in their lives, may embrace consumerism both as a way of life and as a measure of *quality of life*. Only recently have we as a society begun to address the tensions between consumerism and citizenship and to recognize the disastrous and far-reaching impact of unchecked consumerism on the environment—and it may already be too late to reverse the damage we have inflicted upon the planet.

Every issue explored in this course provides an opportunity for student collaboration and growth—either within the general program of study or within the Take Action component. However, this growth will not be automatic. It is critical that students be given time and encouragement to

- reflect deeply upon issues they study
- consider diverse perspectives
- make connections between global issues and personal decisions and actions
- engage in proactive decision making
- take a stand on important issues
- engage in personal and collective action to effect change and contribute to improved quality of life

The mindful selection of issues for study is an important part of this growth process. Students need to investigate real issues—those that reveal the need for personal and social change—and then apply their learning by making changes in their personal life decisions. This process will help them in two important ways. Students will

- develop critical consciousness of the economic, social, cultural, ecological, and political factors that influence decision making
- understand how personal decisions and actions can have far-reaching consequences

Over time, students increasingly will be able to initiate and carry out desired changes in their own lives. Perhaps most importantly, they will also understand that hopefulness and optimism grow out of the knowledge that working collaboratively with others is the best way to challenge accepted practices and actually effect change. This process of becoming critically aware agents for change may mean a profound shift in values and attitudes for some students—moving from a world view based on consumerism to one that is focused on citizenship.

General Characteristics of Take Action Projects

Projects *may* be

- ongoing over the term or year, or a culminating activity
- new projects or they may build upon existing initiatives in the school or community

Projects *must*

- reflect student interests, abilities, and talents
- be collaborative (working with other students in the course or school, or with community members)
- make links between local and global issues
- involve student inquiry and be supported by research
- allow for diversity—each student determines his or her level of activism and the type of contribution he or she is best able to make

- be anchored in at least two of the components of sustainable development (i.e., a sustainable environment, a just economy, and a healthy society)
- include a dimension of personal lifestyle and decision making, so as to include more sustainable practices in their daily lives
- include a learning log for reflection and self-evaluation

Projects will vary according to students' interests and particular strengths or abilities. Where possible, students should be encouraged to

- network with local experts and community resource persons for advice and direction
- help raise community awareness through promotional campaigns and/ or community meetings
- approach local politicians and community leaders for assistance in their cause and petition them for change

- organize actions and activities that involve other students in the school and community members
- provide regular progress updates to the class
- find alternative and creative means of sharing information with their peers and community members

Time Allotment

The suggested time allotment for Take Action projects is a maximum of 25% of the course time. Teachers need to decide how much in-class time will be used to support students as they plan, carry out, and share reflections and progress on their projects. These decisions will be based on the needs, interests, and abilities of students, but it is generally expected that students will spend a significant percentage of the allotted time outside of class.

Existing Projects

Many students who will be interested in taking this course may already be engaged in—and busy with—existing school or community action projects. These existing projects may fulfill the action portion of the Take Action component. However, students would still be expected to fulfill the assessment requirements of this course component, as described below.

Communicating Results

Throughout the planning, research, and implementation phases of the Take Action project, students should have frequent opportunities to learn from each other through dialogue and by having opportunities to make formal or informal presentations to the class. They should also be encouraged to use various media to communicate their learning with others, (e.g., blogs, wikis, and online journals; video documentaries; information booths; presentations and updates at school assemblies; student-written plays and other artistic productions; workshops, forums and webcasts; team or community consultations, etc.).

Assessment of Take Action Projects

As noted earlier, the time allotted to Take Action projects is recommended to be a maximum of 25% of the course time. It is also recommended that this action component comprise 25% of the overall grade for this course.

Students and teachers should collaborate to determine assessment criteria prior to beginning project work. Methods of assessment should fit the needs of the students and nature of the project. The main areas of assessment should include

- project goals and outline
- action plan
- research and inquiry questions
- learning log
- evidence of community involvement or partnerships
- ongoing progress reports
- execution/results of the project
- communication of learning to peers, school, community, as appropriate
- final presentation and/or summative report

Assessment should be ongoing and include opportunities for student reflection, self-assessment, and peer assessment, as well as community member input where appropriate. A classroom- based assessment approach, including assessment *for* learning, *as* learning, and *of* learning, will help encourage students to reach their potential. Early and frequent performance reviews, including the provision of descriptive feedback, will help students learn and grow, and will greatly improve the outcomes of their projects. Peer and self-assessment will help students cultivate learning strategies and guide them as they take action to achieve their project outcomes. The Learning Logs will provide opportunities for students to engage in reflection and self-assessment of their learning experiences.

Legacy Projects

Some projects may live on long after students have graduated. The student initiators of legacy projects may choose to continue their involvement with the school and project after they graduate.

Alternatively, the project may be picked up and continued by students in successive years. Legacy projects may even become part of wider community initiatives and take on a life of their own in making the world a better place.

Life Assignment (This course is just the beginning.)

This course alone cannot solve the ills of the world. Ideally, students who complete the course will regard it as an important beginning point in their lives. If teachers approach this course with the spirit in which it has been designed, they will inspire students to embrace the notion of citizenship for social justice as a way of life, to consciously live their lives as agents of change in order to make a positive contribution to the community, and to help ensure a sustainable future for all.

Take Action Project Examples

Sustainable Environment

- *Reduce Your Carbon Footprint:* Research the impact of lifestyle and consumer choices in Manitoba and elsewhere in the world (e.g., drinking bottled water; eating meat; driving gas-powered vehicles; buying non fair-trade coffee/chocolate...). Choose an issue and change personal lifestyle habits. Organize campaigns and actions for more widespread community change. Convince a local grocery store (or national chain) to stock local produce in season and more fair trade products; persuade peers and community members to get rid of the car, help make "Walk or Take Your Bike to Work or School" an everyday event instead of an annual one.

- *Water Conservation: Wetlands or River Bank Study and Clean-up:* Monitor and record observations about water quality and the presence of wildlife. Contact and work with experts from universities, colleges, or the Manitoba Department of Sustainable Development. Research information about water in the local community and in other areas of the world. Learn about other student-led projects such as Ryan's Well, and find ways to contribute to existing projects, or create a new project, participate in, or initiate an ongoing adopt-a-river project.

- *Community Garden:* Investigate the implications of bio-engineering, mono-cultures, food transportation, and other issues related to food production and consumption. Visit an organic farm and learn about sustainable practices. Create and maintain a school or community garden, share the produce with peers and food banks, or sell it to raise funds to help maintain the garden. Learn about what's going on in other Canadian and American cities where small and large movements are turning abandoned factories, public property, and donated land into gardens. Find ways to extend the garden into and around the community. Enlist local businesses, school boards, and private individuals to donate land for more gardens, and convince more people (like senior citizens) to join the project. (This would be an excellent legacy project.)

Just Economy

■ *Poverty:* Examine the reality of poverty in the local community and find sustainable ways to help people in the local community. Organize a breakfast program or regular food bank drives in the school, make a commitment to long-term assistance at a local food bank, and convince other students to do the same. Offer cooking lessons using nutritious foods in a local community centre or organize an excess food delivery service between local restaurants and soup kitchens. Write to or meet with local politicians and other people of influence to discuss the issues and to make a case for changes in policies and practices.

■ *Workers' rights:* Start local by conducting a survey to determine how many students in the school division have part-time jobs, and the conditions, rights, and benefits of those jobs (or lack thereof). Expand that survey to include members of the community; find out what rights workers have in the local area. Going farther afield, research conditions for various jobs in Canada and other places in the world. Learn some history by exploring the history of unions and gains made for workers' rights in Canada and other places in the world. Find out what happened during the Winnipeg 1919 General Strike. Share information with peers and make them aware of their rights.

■ *Rights of the child:* Initiate a project related to the rights of the child. Research children's rights, including laws (e.g., Canadian Charter of Rights and Freedoms, United Nations Rights of the Child), and practices that contravene rights (e.g., child labour, sexual exploitation). Learn about existing projects related to children's rights such as Ryan Hreljac's *Ryan's Well* and Craig Kielburger's *Free the Children*. Develop a campaign around a theme such as child labour to teach students throughout the school and community members about how we all contribute to the problem through our consumerism. Create strategies to convince local businesses to change their practices to become more respectful of children's rights (e.g., awareness of product origin, refusal to sell products that exploit child labour).

Community and Society

■ *Anti-consumerism:* Use the resources of organizations and social movements such as Ad Busters, The Story of Stuff, the Freegans, Voluntary Simplicity, Buy Nothing Day, No Logo, Slow Food, 100-mile diet, Greenpeace, and other anti-consumer organizations to learn about mass-media manipulation and issues related to consumerism. Plan a project to share ideas, take action, and organize activities to raise critical awareness among peers and community members (e.g., Turn off Television Week; anti-fashion shows; community café events; recycled art projects; Henry David Thoreau readings or events; local music or art festivals...).

■ *Connecting with seniors:* Improve the lives of isolated seniors. Make regular and sustained visits to senior centres that include purposeful activities and include them in school events (e.g., organize a seniors' prom; plan a jazz band tour of senior centres).

■ *Be a mentor or role model:* Organize a tutoring or participation program with students in an Early or Middle Years school. Make use of personal talents in sports, writing, music, theatre, visual arts, etc., by sharing those talents with young people.

Take Action: Outline

Phase 1: Planning phase

- Define topics of interest and determine a focus for inquiry and action.
- Develop a plan for inquiry and action, including goals and intended outcomes, required resources, partnerships, team members/tasks (if a collective project), time allotment, feasibility, communication, and sharing plan.
- Identify inquiry questions to guide research: *what will we need to know and be able to do in order to carry out this project?*

Phase 2: Research phase

- Determine inquiry questions and gather data from a variety of sources.
- Maintain a Learning Log.
- Create materials for sharing with peers and community members, as required.

Ongoing: Review and adjust planning

- Throughout the inquiry process, engage in ongoing dialogue with your teacher and other students in the class for feedback and to share learning and motivate others.
- Enlist the support of community mentors or guides as required, and meet regularly.

Phase 3: Implementation phase

- Execute action plan: review and modify as required.
- Establish timeline, time allocation, budget, and material requirements, and review as needed.

Phase 4: Reflection and assessment

- Create a summative report or presentation to share with the class/school.
- Create legacy project: produce a synopsis of the project for next year's class and/or to enlist students in earlier grades to take over the project the following year.
- Solicit feedback from community members.
- Solicit press support or coverage where appropriate.
- Communicate results with the larger community.

Phase 5: Life assignment

- Be an agent of change; contribute to the community; live sustainably.

Student Suggestions

These ideas were gathered from Manitoba students at the *Social Justice: Educating for ACTion* Conference, November 18–19, 2010, in Winnipeg, Manitoba.

Getting started on a project

- Take baby steps...start with what's easy, but think big.
- Take on things that get you excited.
- Involve as many other students as possible; start a school committee.
- Find an interested teacher to help you.
- Learn about what others are doing about the issue, near and far. Connect with them to share ideas.

Student Suggestions

These ideas were gathered from Manitoba students at the *Social Justice: Educating for ACTion* Conference, November 18–19, 2010, in Winnipeg, Manitoba.

Communicating with others about your project

- Share what you know with others—paper or electronic newsletter to school, community members, and others.
- Set up "soap-box speakers" in the hallways and make sure the speakers are passionate.
- Use whomever you can for their talents—even if they aren't part of the project. Ask artists to create posters; ask charismatic students, teachers, community members, or local celebrities to be spokespersons.
- Make videos and post them on YouTube.
- Create bulletin board displays in the school.
- Show videos to the school. Set up a booth at lunch.
- Play songs with messages to interest and engage people (during lunch or school activities).
- Share ideas at other schools. Have students from other schools share their ideas.
- Hold creative events in public places (school or community).
- Put up a big sheet of paper in the school or community and have people sign a pledge for the cause.
- Use multiple and creative ways to share information, such as electronically, on paper, and through events.

Project ideas

- Project topics need to be both local and international.
- Topics should connect with real people at a distance.
- Potential topics could include micro loans, war-affected children, or AIDS awareness.
- A project could be based on the World Vision program that provides a chicken or goat to a village.
- Students could take part in Halloween for Hunger and go door-to-door on Halloween for food donations.
- Bring back alumni who've achieved things or are involved in social action.
- Use music/entertainment and food.
- Provide interactive information sessions where possible instead of delivering information.
- Don't give up. It's okay if your first attempt doesn't work. Just try something different and learn lessons.

Fundraising

- Bring a dollar for day (wearing a hat/blue jeans/pyjamas).
- Walk for water /coats for kids /kick balls for kids.
- Don't just raise money and send it to needy people far away (that's slacktivism, not activism).
- People like "give and get," so give them something when you ask for their money (e.g., root beer floats for Haiti).
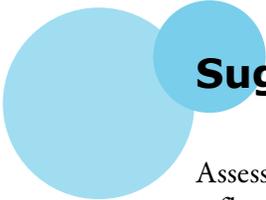
Suggested Assessment and Evaluation Model

Assessment in this course should be ongoing and should include opportunities for student reflection, self-assessment, and peer assessment. The Take Action component of the course may also include opportunity for community member input. (See Take Action for specific details about assessing this component of the course.)

A classroom-based assessment approach, including assessment for learning, as learning, and of learning, will help students to reach their potential and ensure academic rigour. Early and frequent assessment tasks, including descriptive feedback, will help students learn and grow, reflect on their learning, and make significant links between research and practical lifestyle applications.

Teachers may opt to create a class wiki, blog, or other form of social media as a means of facilitating the ongoing exchange of ideas throughout the course. The following model proposes guidelines for assessment of learning, and suggests a wide variety of assessment tools and strategies. These tools may range from quizzes or tests to article analyses, electronic portfolios, learning journals, research reports, case studies, role plays, interviews and simulations, debates, audiovisual, or multimedia presentations or other performance tasks.

Inquiry / Process	Issue selection and generation of guiding questions, inquiry planning, engagement in dialogue, ongoing learning log, peer and self-assessment	25%
Inquiry /Product	Written, oral, and multi-media tasks, communication of inquiry results	25%
Critical Understanding	Understanding of issues and key concepts; evidence of Enduring Understandings; competencies of citizenship and ecological literacy	25%
Take Action/Praxis	Planning of research-action project, implementation, communication, and evaluation of results	25%

Examples of Assessment Tasks

Category and Value	Descriptor	Suggested Tasks
Inquiry/Process 25%	Issue selection and generation of guiding questions, inquiry planning, engagement in dialogue, ongoing learning log, peer and self-assessment	■ Annotated bibliography ■ Reflection or response journal ■ Synthesis or reflection question response ■ Analysis of diverse perspectives ■ Analysis and interpretation of data ■ Discussion, position statement ■ Interviews ■ Selection of sources ■ Pre- and post-inquiry reflection
Inquiry/Product 25%	Written, oral, and multi-media tasks, communication of inquiry results	■ Oral defence of thesis statement ■ Persuasive speech ■ Case study ■ Visual or multimedia creation/ presentation ■ Musical or dramatic production/ presentation ■ Simulation, role-play ■ News report or editorial writing ■ Political cartoon creation ■ Position paper ■ Debate or deliberation
Critical Understanding 25%	Understanding of issues and key concepts; evidence of Enduring Understandings; competencies of citizenship and ecological literacy	■ Mind map, concept map, graphic organizer, or flow chart ■ Issue analysis ■ Media deconstruction ■ Take-home exam, prepared question exam, written or oral test, quiz ■ News report or editorial analysis/ comparison ■ Audiovisual, photographic, musical, dramatic analysis/comparison ■ Hypothesis statement ■ Critical thinking tasks (e.g., construct a theory about the main point of an article based on its title; write a two-line response to an article...)

Category and Value	Descriptor	Suggested Tasks
Take Action/Praxis 25% *Teachers may decide to accord 10% to a "legacy project" or ongoing action commitment.*	Planning of research-action project, implementation, communication, and evaluation of results	■ Meeting organization; meeting facilitation ■ Project work plan ■ Project proposal ■ Risk analysis ■ Self- and peer assessment of project plan and results ■ Community feedback and evaluation of project
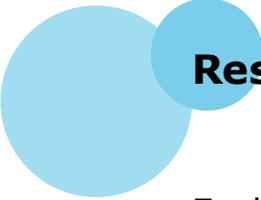
Resources

Ecological Literacy

Print

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Stone, Michael K., and Zenobia Barlow (eds.). *Ecological Literacy: Educating Our Children for a Sustainable World*. San Francisco, CA: Sierra Club Books, 2005.

Orr, David W. *Ecological Literacy*. New York, NY: SUNY Press, 1991.

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Capra, Fritjof. *The Hidden Connections: A Science for Sustainable Living*. New York, NY: Anchor Books, 2002.

Capra, Fritjof. *Uncommon Wisdom*. New York, NY: Simon and Schuster, 1988.

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Hoelscher, David W. "Cultivating the Ecological Conscience: Smith, Orr, and Bowers on Ecological Education." M.A. thesis, University of North Texas, 2009. Available online at http://digital.library.unt.edu/ark:/67531/metadc12133/m1/

Websites

Second Nature: Education for Sustainability
Second Nature works with educators to help make the principles of sustainability fundamental to every aspect of higher education. This site provides "climate guidance" tools as well as information on its leadership network of leading higher education presidents who are making bold commitments in response to climate change and towards sustainability.
www.secondnature.org/

SEPN: The Sustainability and Education Policy Network
> SEPN is an international network of researchers and organizations advancing sustainability in education policy and practice.
> http://sepn.ca/

Frijof Capra
> "Fritjof Capra, Ph.D., is a scientist, educator, activist, and author of many international bestsellers that connect conceptual changes in science with broader changes in worldview and values in society."
> www.fritjofcapra.net/

Videos

Ecological Literacy: Part 1
> "Fritjof Capra introduces the new scientific understanding of life and the role of ecological literacy in building and nurturing sustainable communities." (Credit: Center for Ecoliteracy)
> www.youtube.com/watch?v=vohcled-kto

Ecological Literacy: Part 2
> "Fritjof Capra describes how school gardens can reconnect children to the fundamental patterns and processes of nature that sustain life." (Credit: Center for Ecoliteracy)
> www.youtube.com/watch?v=7RZ-_C3sIt4

Ecological Literacy: Part 3
> "Fritjof Capra discusses the basic principles of ecology and the need for ecological literacy to be the most important part of education at all levels." (Credit: Center for Ecoliteracy)
> www.youtube.com/watch?v=7RZ-_C3sIt4

Systems Thinking

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Meadows, Donella. *Leverage Points: Places to Intervene in a System*. Hartland, VT: The Sustainability Institute, 1999.

Meadows, Donella. *The Global Citizen*. Washington, DC: Island Press, 1991.

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Sweeney, Linda Booth, and Diana Wright (eds.). *Thinking in Systems*. White River Junction, VT: Chelsea Green Publishing, 2008.

Websites

Linda Booth Sweeney

Linda Booth Sweeney is an educator and author who has created numerous accessible educational materials and programs that promote systems literacy (i.e., a deeper understanding of living systems).
www.lindaboothsweeney.com

The Systems Thinker

"The Systems Thinker works to catalyze effective change by expanding the use of systems approaches." This site provides access to free articles so as to expose this work to as wide an audience as possible.
www.thesystemsthinker.com/

The Resilience Alliance

"The Resilience Alliance is a research organization that focuses on resilience in social-ecological systems as a basis for sustainability."
www.resalliance.org

Society for Organizational Learning

The Society for Organizational Learning facilitates connections among organizations, businesses, and individuals through organizational learning so they can access the tools and community support they need to address the complex and evolving issues we face as a planet.
www.solonline.org

Creative Learning Exchange

The Creative Learning Exchange is intended to help K–12 educators develop "Systems Citizens" who use "systems thinking, system dynamics, and an active, learner-centered approach to meet the interconnected challenges that face them at personal, community, and global levels."
www.clexchange.org/

The Waters Foundation

This site offers useful systems-thinking tutorials for K–12 education.
www.watersfoundation.org/webed/

Design Inspired by Nature

Print

McDonough, William, and Michael Braungart. *Cradle to Cradle: Remaking the Way We Make Things*. New York, NY: North Point Press, 2002.

Benyus, Janine. *Biomimcry: Innovation Inspired by Nature*. New York, NY: Harper Collins, 1997.

Wilson, Edward O. *Biophilia*. Cambridge, MA: Harvard University Press, 1986.

David W. Orr. *The Nature of Design: Ecology, Culture, and Human Intention*. Oxford, UK: Oxford, 2002.

Websites

AIGA's Living Principles for Design
> "The Living Principles for Design were borne out of the design profession's need for an aspirational and actionable framework for integrated sustainability—a common point of reference to which all designers can refer."
> www.livingprinciples.org/

Inhabitat
> "Inhabitat.com is a weblog devoted to the future of design, tracking the innovations in technology, practices and materials that are pushing architecture and home design towards a smarter and more sustainable future."
> http://inhabitat.com/

The Designers Accord
> "The Designers Accord was created in late 2007 as a five-year project to mainstream sustainability in the global creative community."
> www.designersaccord.org/

Centre for Child Honouring
> Child Honouring is a global movement that seeks to create sustainable, peacemaking societies by honouring children and has produced a Covenant for Honouring Children.
> http://childhonouring.org/

Sense of Place

Print

Louv, Richard. *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. New York, NY: Algonquin Books, 2005.

Websites

Wendell Berry
> Wnedell Berry is an American novelist, poet, cultural critic, farmer, and environmental activist. This site cites his many published works.
> www.wendellberrybooks.com/

Richard Louv
> "Richard Louv is a journalist and author who has helped launch an international movement to connect children and their families to nature. He is co-founder and Chairman Emeritus of the Children & Nature Network, an organization helping build the international movement to connect people and communities to the natural world."
> http://richardlouv.com/

Other Resources in Environmental Education

Print

Appelhof, Mary. *Worms Eat My Garbage*. Kalamazoo, MI: Flower Press, 1997.

Appelhof, Mary, Mary Frances Fenton, and Barbara Loss Harris. *Worms Eat Our Garbage: Classroom Activities for a Better Environment*. Kalamazoo, MI: Flowerfield Enterprises, 1993.

Payne, Binet. *The Worm Café: Mid-Scale Vermicomposting of Lunchroom Wastes*. Kalamazoo, MI: Flower Press, 2003.

Cronin, Doreen. *Diary of a Worm*. Harry Bliss (illustrator). New York, NY: HarperCollins, 2003.

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Grant, Tim, and Gail Littlejohn (eds.). *Teaching about Climate Change: Cool Schools Tackle Global Warming*. Toronto, ON: Green Teacher, 2001.

Gutman, Dan (ed.). *Recycle This Book: 100 Top Children's Authors Tell You How to Go Green*. New York, NY: Yearling, 2009.

Tradewell, Kelly. *Earth Issues: Our Lifestyles and the Environment: An Environmental Education Manual for Children Grades K through 5*. Cowichan Valley Regional District (CVRD) Engineering Services, 2006.
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Websites

Learning for a Sustainable Future
"LSF's innovative methodologies help educators to engage their students in addressing the increasing complex economic, social and environmental challenges of the 21st century. LSF's professional development workshops, tools, classroom resources and funding help teachers enrich their students' education through active, experiential and interdisciplinary learning."
http://www.lsf-lst.ca/en/projects/teacher-resources

UN Decade of Education for Sustainable Development (2005¬–2014)
"The UN Decade of Education for Sustainable Development sought to mobilize the educational resources of the world to help create a more sustainable future."
http://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade-of-esd

UNESCO Teaching and Learning for a Sustainable Future: A Multimedia Teacher Education Programme
"Teaching and Learning for a Sustainable Future, a UNESCO programme for the United Nations Decade of Education for Sustainable Development, provides professional development for student teachers, teachers, curriculum developers, education policy makers, and authors of educational materials."
www.unesco.org/education/tlsf/

Giraffe Heroes Project
The Giraffe Heroes Project has nominated over 1,300 people to be included in its database of real heroes—that is, real people who have "stuck their necks out" for the common good.
www.giraffe.org

Eco-Kids
"EcoKids offers free learning activities and resources for Canadian teachers, students, parents and communities to engage in environmental action. EcoKids is designed to inspire children to become life-long environmental stewards through nature connection and play."
www.ecokids.ca

Global Footprint Network Ecological Footprint Calculator
> Students can use this calculator to find out how many planets it would take to support their lifestyle.
> www.footprintnetwork.org/resources/footprint-calculator/

Natural Resources Canada Teachers' Tools
> This site provides useful energy and environmental materials and resources to engage K–12 students.
> http://www.nrcan.gc.ca/energy/efficiency/kidsclub/teachers-tools/13790

Girl Guides of Canada. Explore Water with Holly Heron.
> This activity booklet, provided by Girl Guides of Canada, includes experiments that are suitable for Grades 1–3.
> http://infohouse.p2ric.org/ref/03/02429.pdf

Green Teacher Magazine
> The quarterly Green Teacher magazine "offers perspectives on the role of education in creating a sustainable future, practical articles and ready to use activities for various age levels, and reviews of dozens of new educational resources."
> www.greenteacher.com/

The Groundwater Foundation
> This site fosters awareness of the need for clean groundwater and provides useful K–12 resources for educators.
> http://www.groundwater.org/kids/

One Simple Act – Alberta (Grades 1–6)
> "The choices we make at home, at work and at school all add up to make a big difference. Together we can have a big impact on Alberta's environment."
> http://www.onesimpleact.alberta.ca/

Re-Energy.ca
> "With re-energy.ca, students of all ages use detailed construction plans to build working models of wind turbines, solar ovens, hydroelectric generators, and biogas generators."
> www.re-energy.ca

Resources for Rethinking
> "Exemplary classroom resources reviewed by teachers for teachers."
> http://r4r.ca/en/

The Story of Stuff
> This 20-minute video explains the cradle-to-grave, production-to-disposal cycle of your "stuff."
> www.storyofstuff.com/
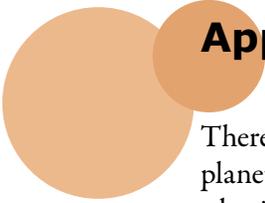
Appendix A: 12 Living Systems Principles

There are living systems on all scales, from the smallest plankton to the human body to the planet as a whole. When we understand what constitutes a living system, we see that a family, a business, even a country are also living systems. Here is a partial list of principles related to understanding living systems:

Interdependence: A relationship in which each partner affects and often needs the other.

System Integrity: What a system has when all the parts and processes essential to its ability to function are present.

Biodiversity: the variety, complexity, and abundance of species that, if adequate, make ecosystems healthy and resilient.

Cooperation and Partnership: The continual process in which species exchange energy and resources.

Rightness of Size: The proportions of living systems—their bigness or smallness and their built- in limitations to growth—that influence a system's stability and sustainability.

Living Cycles: A cycle is a circular process that repeats over and over, frequently returning to where it began. The water, lunar, sleep, and other cycles sustain life, circulate resources, and provide opportunities for renewal.

Waste = Food: When waste from one system becomes food for another. All materials in nature are valuable, continuously circulating in closed loops of production, use, and recycling.

Feedback: Circular processes that create growth or decay by amplifying change (reinforcing feedback) or foster stability by counteracting or lessening change (balancing feedback).

Nonlinearity: A type of behaviour in which the effect is disproportionate from the cause.

Emergent Properties: Behaviour that arises out of the interactions within a specific set of parts: the health of an ecosystem or a team's performance, for example.

Flux: The continual movement of energy, matter, and information that moves through living systems. Flux enables the living or "open" system to remain alive, flexible, and ever-changing. The sun, for instance, provides a constant flux or flow of energy and resources that feeds all living organisms.

The Commons: Shared resources—such as air, water, land, highways, fisheries, energy, and minerals—on which we depend and for which we are all responsible.

Other key concepts related to living systems include *autopoesis*, *cognition*, and *learning*, *networks*, *the first and second law of thermodynamics*, *stocks and flows*, *exponential growth*, *carrying capacity*, and *ecological footprint*.

Appendix B: Center for Ecoliteracy – Ecological Principles

Creating communities that are compatible with nature's processes for sustaining life requires basic ecological knowledge. Center for Ecoliteracy cofounder Fritjof Capra says we need to teach our children—and our political and corporate leaders—the following fundamental facts of life:

- Matter cycles continually through the web of life.
- Most of the energy driving the ecological cycles flows from the sun.
- Diversity assures resilience.
- One species' waste is another species' food.
- Life did not take over the planet by combat but by networking.

Nature's Patterns And Processes

Understanding these facts arises from understanding the patterns and processes by which nature sustains life. In its work with teachers and schools, the Center for Eco-literacy has identified several of the most important of these: networks, nested systems, cycles, flows, development, and dynamic balance.

Networks

All living things in an ecosystem are interconnected through networks of relationships. They depend on this web of life to survive. For example, in a garden, a network of pollinators promotes genetic diversity; plants, in turn, provide nectar and pollen to the pollinators. (Could we have some human systems examples here for each pattern?)

Nested Systems

Nature is made up of systems that are nested within systems. Each individual system is an integrated whole and—at the same time—part of larger systems. Changes within a system can affect the sustainability of the systems that are nested within it as well as the larger systems in which it exists. For example: Cells are nested within organs within organisms within ecosystems.

Cycles

Members of an ecological community depend on the exchange of resources in continual cycles. Cycles within an ecosystem intersect with larger regional and global cycles. For example, water cycles through a garden and is also part of the global water cycle.

Flows
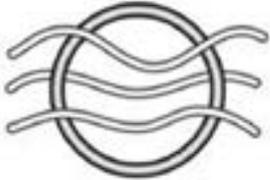
Each organism needs a continual flow of energy to stay alive. The constant flow of energy from the sun to Earth sustains life and drives most ecological cycles. For example: Energy flows through a food web when a plant converts the sun's energy through photosynthesis, a mouse eats the plant, a snake eats the mouse, and a hawk eats the snake. In each transfer, some energy is lost as heat, requiring an ongoing energy flow into the system.

Development

All life — from individual organisms to species to ecosystems — changes over time. Individuals develop and learn, species adapt and evolve, and organisms in ecosystems coevolve. For example: Hummingbirds and honeysuckle flowers have developed in ways that benefit each other; the hummingbird's color vision and slender bill coincide with the colors and shapes of the flowers.

Dynamic Balance
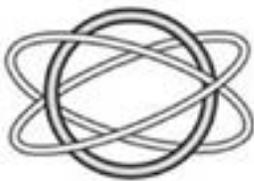
Ecological communities act as feedback loops, so that the community maintains a relatively steady state that also has continual fluctuations. This dynamic balance provides resiliency in the face of ecosystem change. For example: Ladybugs in a garden eat aphids. When the aphid population falls, some ladybugs die off, which permits the aphid population to rise again, which supports more ladybugs. The populations of the individual species rise and fall, but balance within the system allows them to thrive together.
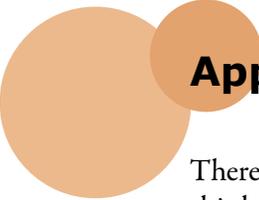
Appendix C: Habits of Systems Thinkers

There is no one pedagogy, book, or computer program that will help us become better systems thinkers. Instead, the complexity of our worlds demand that we develop "habits of mind" (to borrow Art Costa's term) to intentionally use systems principles to understand the complexity of everyday situations and to design for desired futures.

The 12 Habits of Mind – a systems thinker…

■ Sees the Whole: sees the world in terms of interrelated "wholes" or systems, rather than as single events, or snapshots;

■ Looks for Connections: assumes that nothing stands in isolation; and so tends to look for connections among nature, ourselves, people, problems, and events;

■ Pays Attention to Boundaries: "goes wide" (uses peripheral vision) to check the boundaries drawn around problems, knowing that systems are nested and how you define the system is critical to what you consider and don't consider;

■ Changes Perspective: changes perspective to increase understanding, knowing that what we see depends on where we are in the system;

■ Looks for Stocks: knows that hidden accumulations (of knowledge, carbon dioxide, debt, and so on) can create delays and inertia;

■ Challenges Mental Models: challenges one's own assumptions about how the world works (our mental models) — and looks for how they may limit thinking;

■ Anticipates Unintended Consequences: anticipates unintended consequences by tracing loops of cause and effect and always asking "what happens next?"

■ Looks for Change over Time: sees today's events as a result of past trends and a harbinger of future ones;

■ Sees Self as Part of the System: looks for influences from within the system, focusing less on blame and more on how the structure (or set of interrelationships) may be influencing behaviour;

■ Embraces Ambiguity: holds the tension of paradox and ambiguity, without trying to resolve it quickly;

■ Finds Leverage: knows that solutions may be far away from problems and looks for areas of leverage, where a small change can have a large impact on the whole system,

■ Watches for Win/Lose Attitudes: is wary of "win/lose" mindsets, knowing they usually makes matters worse in situations of high interdependence.

12 Habits of Mind: Reproduced from *Connected Wisdom: Living Stories about Living Systems* by Linda Booth Sweeney (SEEDS Publishers, 2009).

Appendix D: Habits of a Systems Thinker

Seeks to understand the big picture	Observes how elements within systems change over time, generating patterns and trends	Recognizes that a system's structure generates its behavior
Identifies the circular nature of complex cause and effect relationships	Makes meaningful connections within and between systems	Changes perspectives to increase understanding
Surfaces and tests assumptions	**Habits of a Systems Thinker**	Considers an issue fully and resists the urge to come to a quick conclusion
Considers how mental models affect current reality and the future	Uses understanding of system structure to identify possible leverage actions	Considers short-term, long-term and unintended consequences of actions
Pays attention to accumulations and their rates of change	Recognizes the impact of time delays when exploring cause and effect relationships	Checks results and changes actions if needed: "successive approximation"
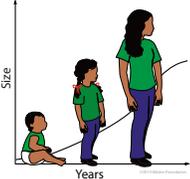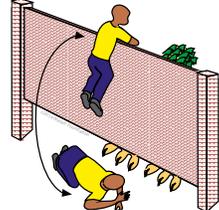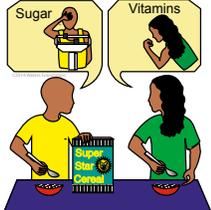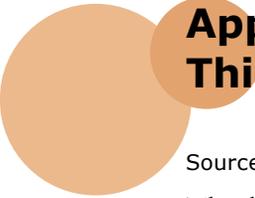
Appendix E: Center for Ecoliteracy – Systems Thinking: Shifts in Perception

Source: http://www.ecoliteracy.org/nature-our-teacher/systems-thinking

Thinking systemically requires several shifts in perception, which lead in turn to different ways to teach, and different ways to organize institutions and society. These shifts are not either/or alternatives, but rather movements along a continuum:

From parts to the whole

With any system, the whole is different from the sum of the individual parts. By shifting focus from the parts to the whole, we can better grasp the connections between the different elements. Instead of asking students to copy pictures of the parts of a honeybee, an art teacher takes her class to the school garden, where they draw bees within the context of their natural setting.

Similarly, the nature and quality of what students learn is strongly affected by the culture of the whole school, not just the individual classroom. This shift can also mean moving from single-subject curricula to integrated curricula.

From objects to relationships

In systems, the relationships between individual parts may be more important than the parts. An ecosystem is not just a collection of species, but includes living things interacting with each other and their nonliving environment.

In the systems view, the "objects" of study are networks of relationships. In the school or classroom, this perspective emphasizes relationship-based processes such as cooperation and consensus.

From objective knowledge to contextual knowledge

Shifting focus from the parts to the whole implies shifting from analytical thinking to contextual thinking. This shift may result in schools focusing on project-based learning instead of prescriptive curricula. It also encourages teachers to be facilitators and fellow learners alongside students, rather than experts dispensing knowledge.

From quantity to quality

Western science has often focused on things that can be measured and quantified. It has sometimes been implied that phenomena that can be measured and quantified are more important—and perhaps even that what cannot be measured and quantified doesn't exist at all. Some aspects of systems, however, like the relationships in a food web, cannot be measured.

Rather, they must be mapped. In the classroom, this shift can lead to more comprehensive forms of assessment than standardized tests.

From structure to process

Living systems develop and evolve. Understanding these systems requires a shift in focus from structure to processes such as evolution, renewal, and change.

In the classroom, this shift can mean that how students solve a problem is more important than getting the right answer. It may mean that the ways in which they make decisions are as important as the decisions.

From contents to patterns

Within systems, certain configurations of relationship appear again and again in patterns such as cycles and feedback loops. Understanding how a pattern works in one natural or social system helps us to understand other systems that manifest the same pattern.

For instance, understanding how flows of energy affect a natural ecosystem may illuminate how flows of information affect a social system.

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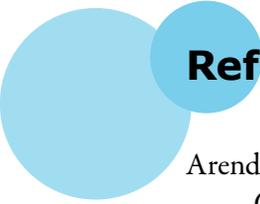
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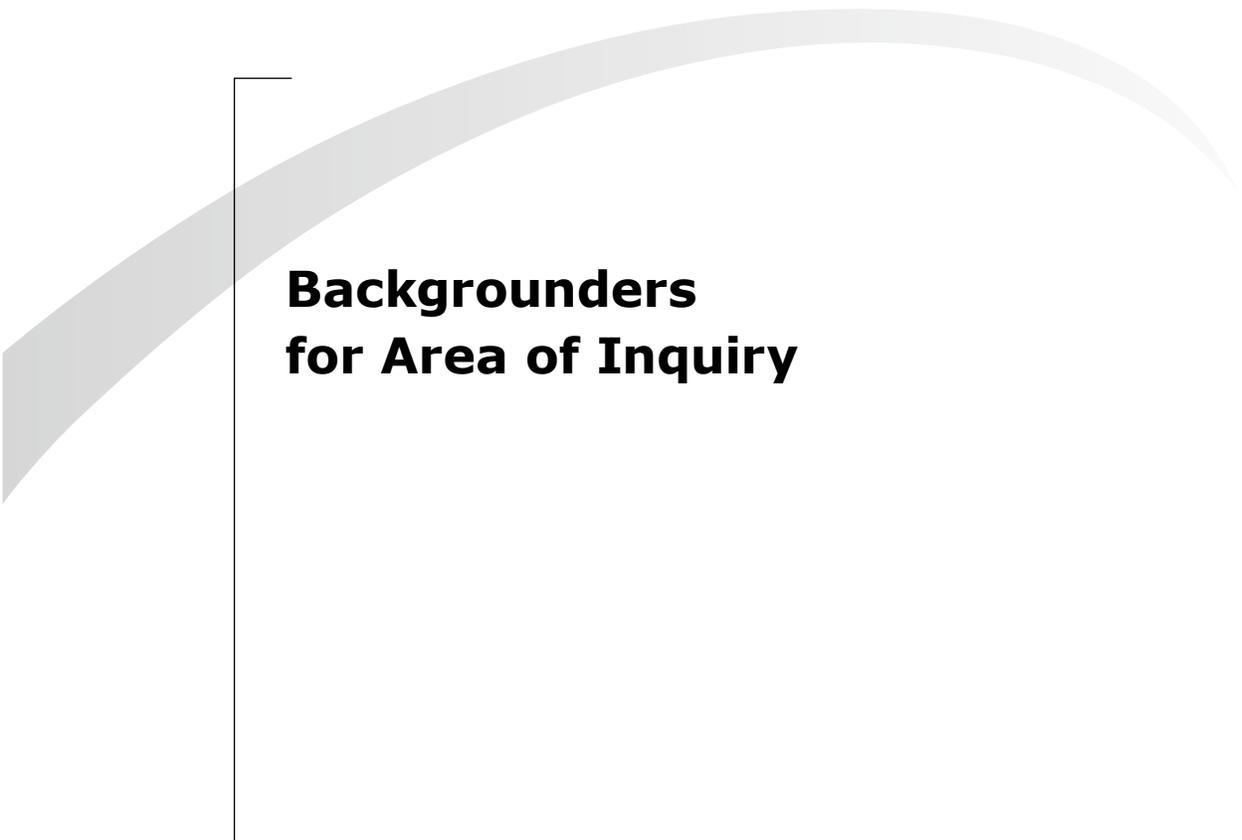
Backgrounders
for Area of Inquiry