A guide to embedding education for sustainability in higher education courses

CENTRE FOR TEACHING & LEARNING

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Contents

FACULTY CO-CREATED RESOURCES

About this book

Purpose of this book

Welcome to our exploration of education for sustainability! This book delves into the concept of education for sustainability and its significance. We aim to illustrate the integration of sustainability principles into the curriculum of various academic disciplines.

We intend to offer introductory guidance for educators in order to intersect sustainability in their courses in a meaningful way through a toolkit, disciplinary perspectives, and best practices for embedding sustainability.

Recognizing that some faculty members are already significantly incorporating sustainability in their teachings, we also intend to provide information on the latest trends in literature supportive of continuing the work on education for sustainability.

How to use this book

Navigation

To move through the book, you can use the ‘Next’ and ‘Previous’ buttons located at the bottom corners of every page. To jump to a specific part or chapter, you can open the Table of Contents at any time by pressing the ‘Contents’ button in the top-left corner of this book.

Quick-start guide

If you are unsure where to start in embedding sustainability in your courses, the **Quick-start guide** is a good first step. We’ve laid out the main concepts in a step-by-step format, linked out to more detailed sections that you can explore at a later time.

h5p activities

This book features multiple h5p activities for more opportunities for interaction and learning. These activities are designed for you as the educator to learn about various concepts introduced in the book, but can serve a double purpose as a teaching tool directly embedded into Moodle. For example, the **change agent self-assessment tool** is a great tool to reflect on your own journey of becoming a **change agent**, and it can be used as a start-of-term survey for your students as well. You can copy and edit any h5p activities directly into Moodle by pressing the 'Reuse' or 'Embed' buttons in the bottom-left corner of the activities.

Text boxes

Throughout the book, we are making use of different types of text boxes to help draw your attention to important pieces of information. We explain the types and purposes below:

Summaries

Some text-heavy pages will feature a summary box at the top to help you glean the main focus of the chapter before diving in.

Summary text will be here.

Examples

Some chapters will feature example boxes to illustrate a concept in more detail.

Example

- Example will be here

Discipline-specific resources

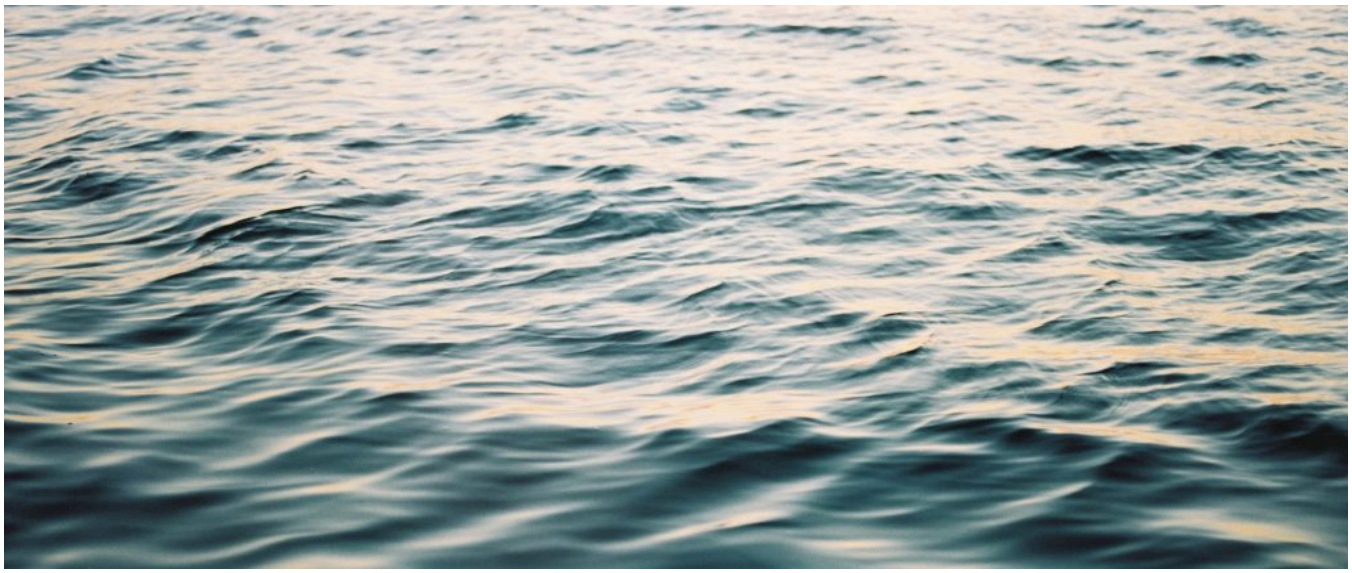
We've developed chapters that delve deeper into specific disciplines and curated resources such as pedagogical approaches, activities, and teaching tools that complement them. Currently, we have pages for **Mathematics & statistics** and **English**, and more discipline-specific resources that intersect with the **Intrapersonal competency**.

Acknowledgements

This book is the result of a collaborative effort between the staff of the Office of the Vice-Provost, Innovation in Teaching and Learning and the Centre for Teaching and Learning at Concordia University, including Florence Grüter, Josephine Guan, and Ariel Harlap. Special thanks to Maki Ishida for instructional design support for the h5p activities, and to Rachel Harris for support with CTL's authoring in Pressbooks.

Land acknowledgement

When you read these words, it is an opportunity to connect with your relationship to the land on which you are situated. This is an invitation for you to reflect on your relationship to its Indigenous and other peoples, the land, its waters, and all other living things.



Close-up view of dramatic shadows on surface waves of the Kaniatarowanenneh (St. Lawrence seaway) running through Tiothiá:ke (Montreal).

I/We would like to begin by acknowledging that Concordia University is located on **unceded Kanien'kehá:ka lands**. The Kanien'kehá:ka Nation is recognized as the custodians of the lands and waters on which we gather today. Tiohtià:ke/Montréal is historically known as a gathering place for many First Nations. Today, it is home to a diverse population of Indigenous and other peoples. We respect the continued connections with the past, present, and

future in our ongoing relationships with Indigenous and other peoples within the Montreal community.

Closeup of the bark of a tree in Tiothtiá:ke (Montreal).

You may discover more about Concordia's land acknowledgement, including its history, **at this webpage**.

Media attribution

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About the Centre for Teaching and Learning

The **Centre for Teaching and Learning** (CTL) at Concordia University provides support and resources to the teaching community. We use evidence-based approaches to support excellence, opportunity and inclusion for all the academic community.

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MLA: Centre for Teaching and Learning. *A guide to embedding education for sustainability in higher education courses*. *Concordia University*, 2024, **https://opentextbooks.concordia.ca/education-sustainability**. Accessed [today's date].

Accessibility statement

This resource has been designed using the following accessibility features:

- All images which are not decorative have authored alternative text. Decorative images have empty quotes.
- Infographics or complex diagrams have downloadable descriptive text in an MS Word file.
- Properly structured pages and use of headings.
- This book is available in PDF and for eReaders in EPUB and MOBI formats.
- Use of interactive (h5p) content types that have WCAG 2.1 AA support.

GETTING STARTED

In this section, we delve into the significance of sustainability in education and its pivotal role in shaping our collective future. We address fundamental questions such as **why learning about sustainability matters** and how it **benefits individuals, students, educators, and university communities alike**. We also showcase Concordia University's commitment to excellence in sustainability education and research.

Education for sustainability is not just about acquiring knowledge; it's about catalyzing change and empowering individuals to become agents of positive transformation. In the following pages, we offer insights into the essential attributes of **change agents and provide a self-assessment tool** to guide students and faculty members on their journey toward fostering sustainability.

Why learn about sustainability?

Sustainability stands as a pivotal global concern impacting individuals worldwide. Students are the next generation of leaders and decision-makers, and they will face complex sustainability challenges. They need to be ready. Universities assume a significant responsibility in equipping students accordingly. Concordia is meeting this challenge head-on, providing high-caliber education in sustainability alongside targeted research efforts as a next-generation university.

Sustainability is a critical global issue that affects everyone. There is an increasing recognition of the need to learn sustainability across all levels of education. Moreover, **there's a call to reimagine education**, breaking away from learning unsustainable ways of being and doing.

Universities play a significant role in shaping the future through education, research, and innovation. As such, they have a responsibility to promote sustainability to help create a more sustainable future. "Universities can take an active role as centres for both inquiry and action in local, regional, and global spaces" (Gruenewald, 2003; in Sipos et al., 2008).

Photo by Markus Spiske via Unsplash

Many future jobs will be sustainability jobs, and we need to prepare students for that. A report by Eco Canada (2021) shows that in 2019, "environmental workers were present in every Canadian region, industry and practically every occupation." This Updated Labour Market Outlook to 2025 predicts "about 37% of net hiring requirements (108K jobs) will be for core environmental workers—or those in roles that require environmental competencies" (Eco Canada, 2021, p. 7).

Sustainability is a multidisciplinary topic that can be integrated into various fields of study, including business, engineering, social sciences, natural sciences, fine arts and beyond. Whether it is circular economy practices reducing waste, renewable energy innovation for sustainable power solutions, community-based conservation efforts to preserve biodiversity, or ethical sourcing and fair labour practices in clothing production, the principles of sustainability infuse diverse sectors, influencing practices and fostering innovation.

Universities play a crucial role in shaping students into responsible and globally aware citizens who can tackle sustainability challenges both personally and professionally. At Concordia, this objective is central to our vision of becoming a next-generation university: sus-

tainability is one of our **nine strategic directions**. This imperative is also interwoven throughout the fabric of the other eight directions.

Sustainability permeates every aspect of campus life. Concordia is committed to transforming into a net-zero carbon campus by 2040. We are also strongly dedicated to the **Sustainable Development Goals (SDGs)** as endorsed by Concordia's President. Notably, we are the first Canadian university to voluntarily assess our performance on each SDG.

Photo by Jackie Hutchinson via Unsplash

All our efforts are integrated: the university's **Sustainability Action Plan**, launched in 2020, outlines a comprehensive road map for integrating sustainability on five fronts: food, waste, climate, research, and curriculum. One of the first steps leading to the plan was to craft a Concordia definition of sustainability: "a mindset and a process that leads to reducing our ecological footprint and enhancing social well-being while maintaining economic viability both on and off campus."

Concordia leads in sustainability research. For example, our **Volt-Age** program, supported by a significant $123 million investment, pioneers electrification research. Additionally, our

Next-Generation Cities Institute fosters collaboration across disciplines to drive sustainable urban development. In recognition of our efforts, Concordia was honoured with the prestigious **Canada Excellence Research Chair in Smart, Sustainable, and Resilient Cities and Communities**.

In addition to its focus on sustainability research, Concordia equally emphasizes education for sustainability. Several educational initiatives and offerings support sustainability objectives. The transdisciplinary **Loyola College for Diversity and Sustainability** exemplifies our commitment to interdisciplinary education, while partnerships with organizations like **Future Earth** and the UN enhance our global impact, notably co-leading the **Sustainability in the Digital Age (SDA)** initiative. Our **Leadership in Environmental and Digital Innovation for Sustainability (LEADS)** program empowers students to influence climate policies through unique skill development opportunities. Furthermore, initiatives like Canada's first **sustainable investing practicum** at the John Molson School of Business equip students with the tools to integrate sustainability into financial decision-making.

Concordia University offers a wide array of undergraduate, graduate, and professional certificate **programs** focused on sustainability, complemented by numerous **course options** for those interested in delving deeper into the subject. Faculty efforts in teaching sustainability are documented in a comprehensive **report** (2024), and Concordia has partnered with the United Nations Environment Programme to offer an interdisciplinary Massive Open Online Course titled "**Wicked Problems, Dynamic Solutions: The Ecosystem Approach and Systems Thinking**" to a broad audience.

Our commitment to sustainability is driven not only by institutional goals but also by student demand, with an overwhelming **89% of undergraduates** expressing support for sustainability in their curricula (CSU, 2021). By embedding sustainability across disciplines, Concordia ensures that all students graduate with the knowledge and skills to address pressing environmental and social challenges.

Benefits of learning about sustainability

Education for sustainability benefits everyone involved—students, educators, and the entire university community. It's a compelling reason to dive deeper into this essential area!

Learning about sustainability can provide **students** with valuable transferable skills, such as critical thinking, problem-solving, and teamwork. Sustainability issues are often complex and require a multidisciplinary or, better yet, transdisciplinary approach, which can provide students with opportunities to work collaboratively with peers from different disciplines and develop effective communication skills. Education for sustainability can involve experiential learning opportunities, promote real-world applications of sustainability concepts, and enhance students' learning experiences. Furthermore, students will improve their career prospects as employers increasingly value sustainability knowledge and skills. Not to mention students will be able to apply their new mindset to their personal lives after graduation, leading to a sustainable lifestyle.

Photo by ThisisEngineering via Unsplash

Faculty who integrate sustainability-related content into their courses will gain advantages from renewed pedagogical strategies. The subsequent **section that introduces education for sustainability** will explore in detail why and how to implement sustainability instruction, incorporating innovative **learner-centred approaches**. Faculty may discover their students exhibiting increased motivation and involvement in higher-level cognitive tasks during class. Ultimately, this integration of sustainability will enhance the relevance of subject matter in today's society by ensuring its contemporary alignment.

Photo by ThisisEngineering via Unsplash

By tackling sustainability challenges, universities not only pave the path for a more sustainable future but also enhance their reputation, potentially elevating their standing in international rankings. Here are some recent accomplishments for Concordians to celebrate. Let's join the forefront of this movement!

The **Times Higher Education (THE) Impact Rankings** measure universities' contributions to the Sustainable Development Goals (SDGs). In 2023, we maintained our **position within the 101-200 range**, solidifying our place among the world's leading educational institutions.

Notably, our university ranks in the top 50 globally for two SDGs: 40th for Reduced Inequalities (SDG-10), and 44th for Sustainable Cities and Communities (SDG-11).

Twice, we achieved a **Gold rating** on the **Sustainability Tracking, Assessment, and Rating System**™ (STARS) developed by the Association for the Advancement of Sustainability in Higher Education (AASHE). This globally recognized self-reporting framework assesses various aspects of sustainability within universities.

The 2024 **QS's Sustainability Rankings** focussing on environmental, social and governance (ESG) challenges place Concordia in the global top 100 and 13th in Canada. Additionally, Concordia's **John Molson School of Business** is among the **Principles for Responsible Management Education (PRME) Champions** for 2024-25.

Becoming a change agent

In the realm of education for sustainability, learning goes beyond merely acknowledging environmental issues and their interconnectedness. It demands a deeper engagement with empathy, reflection, and personal connection to catalyze a shift in mindset. It is also about actively translating this awareness into meaningful action, fostering a sense of agency and empowerment while addressing potential **eco-anxiety**. Learning is ultimately about becoming a change agent.

In the context of education for sustainability, a change agent can be defined as an individual or group who actively works to initiate, facilitate, and drive positive and sustainable change within their communities, organizations, or broader society. They play a pivotal role in driving the transition towards a more sustainable and equitable world, working at the intersection of education, advocacy, policy, and action.

Whether it's through grassroots community initiatives, advocating for sustainable policies, or embracing eco-conscious lifestyles, individuals must assume roles as proactive advocates and leaders in the face of our complex global challenges. We and our students must evolve into change agents, equipped with the essential attributes and tools to drive sustainable solutions, leveraging our knowledge, values, and skills to address environmental, economic, and social challenges effectively.

As such, self-reflection is a critical step in this ongoing journey. The following interactive activity guides you and your students through a series of reflection questions to assess where you are on your journey. You are free to remix or embed this h5p tool directly into Moodle, or any other learning management system. Just click the 'Reuse' or 'Embed' buttons in the bottom-left corner of the activity. Please keep the attribution notes!

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://opentextbooks.concordia.ca/education-sustainability/?p=63#h5p-1

DISCOVERING EDUCATION FOR SUSTAINABILITY

In this segment, we aim to provide you with fundamental knowledge about education for sustainability. **What exactly does education for sustainability entail?** The first chapter offers an extensive and interactive introduction to this concept, which challenges traditional teaching methods that have led to unsustainable practices. It emphasizes the need for innovative approaches and curricular content for an educational paradigm shift.

The second chapter serves as a standalone evidence-based tool to assist you in integrating sustainability into your curriculum through six sequential steps. **This interactive quick-start guide** features illustrated examples of discipline-specific course design components such as learning outcomes, activities, and assessments that incorporate sustainability and exemplary approaches to do so. It also references inspiring frameworks and resources.

For educators well-versed in these concepts and methodologies, we've developed an **additional chapter highlighting current trends in academic literature.** We delve into key competencies in sustainability in this video presentation, showcasing the latest trends in sustainability educational literature. Furthermore, we shed light on the often-neglected domain of inner capabilities.

Lastly, the **fourth chapter introduces the Sustainable Development Goals (SDGs)**,a globally recognized framework for fostering sustainable development. We illustrate the learning outcomes associated with these goals and explore methods to align them with your course objectives. We provide a link to an outstanding resource developed by Aditi Garg at the University of Saskatchewan, where you can easily navigate to a specific SDG by clicking on its icon.

What is education for sustainability?

Traditional education has led to unsustainable practices. To address current crises, we need new teaching methods. This involves revising content and teaching styles to empower students to think, feel, and act differently. Education for sustainability includes understanding sustainability, enhancing socio-emotional skills and sustainability competencies, and promoting behavioural change. **Learner-centred** approaches are essential for this pedagogical shift.

Many contemporary social and ecological crises, including climate change, the widening gap between the rich and poor, and a significant proportion of the global population suffering from malnutrition, are perpetuated by individuals holding post-secondary education (Orr, 1991; UNESCO, 2006; in Sipos et al., 2008).

Continuing with the same educational model that contributed to these issues is unsustainable. It's imperative to break away from educating individuals who contribute to the degradation of the planet. Instead, we should explore unconventional approaches to education.

This means we need to rethink what we teach and how we teach it. We should focus on understanding how social, economic, and environmental issues are connected and on developing skills that promote lifelong learning.

In the words of David Orr, "it is not education that will save us, but education of a certain kind" (1991, p. 51).

On this page:

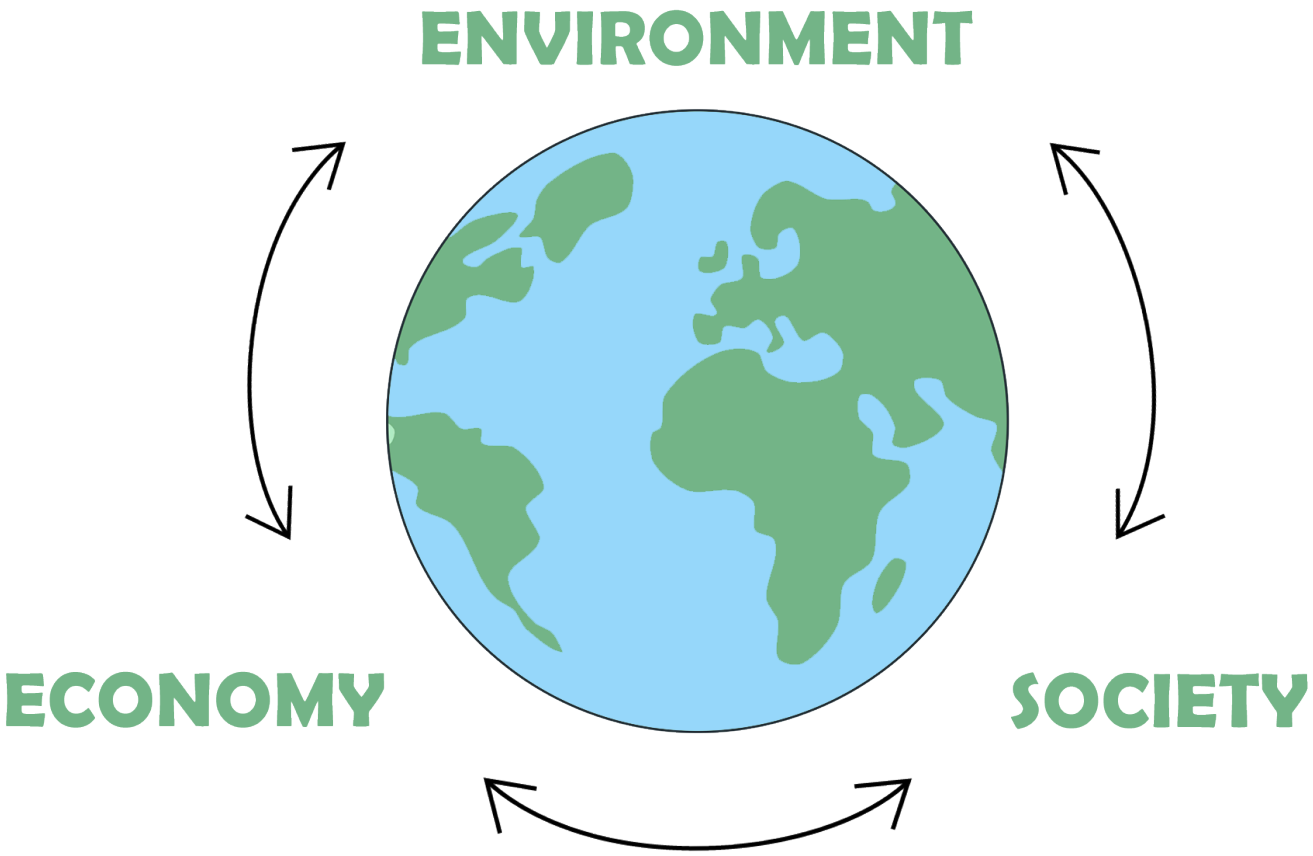
Rethink what we teach

When considering incorporating sustainability content in your teaching, you can explore various instructional objectives:

An interactive H5P element has been excluded from this version of the text. You can view it online here: ***https://opentextbooks.concordia.ca/education-sustainability/?p=227#h5p-2***

Discover what it means to be a **change agent and how students can self-assess here.**

Emphasizing the **Three Spheres (also known as Pillars) of sustainability** – *social*, *economic*, and *environmental* aspects – is crucial when embedding a sustainability lens into course content. Understanding responsible resource usage is just the beginning; we must also address challenges like social justice and economic growth. Achieving a balanced approach across these pillars is essential for addressing the **polycrisis** that we face. In STEM fields, adding a fourth pillar, technology, is beneficial, considering its impact on sustainability.



Three spheres of sustainability are interconnected and interdependent dimensions of a larger system. The question of sustainability is to consider how these relationships can be changed. Around the world illustration (modified) by Storyset.

This **external webpage** presents definitions and illustrations of each of the Three Pillars, along with potential actions that could be undertaken to achieve a more equitable utilization of each aspect.

These spheres are interconnected and interdependent dimensions of a larger system. Grasping this systemic view is vital, particularly for tackling issues like climate change. Students need to understand the complexity of sustainability and its holistic nature. Actions in one area can affect others, influenced by various mediating factors.

For example, technology impacts both the economy and the environment, as innovations can drive economic growth while also impacting ecosystems and natural resources. Laws and regulations can shape economic behaviour, protect environmental resources, and promote social equity. In media and communication channels, news coverage and social media campaigns may raise awareness about pressing sustainability issues, shaping public opinion, and influencing consumer behaviour.

Teaching students to critically analyze these influences can foster a systemic understanding of sustainability. Curricula should also emphasize the need to rethink relationship flows between the spheres. The question of sustainability is to consider how these relationships can be changed.

A holistic or systemic understanding will ultimately empower students to become informed and proactive agents of change in their respective fields and communities, facilitating the development of integrated solutions. Incorporating systems thinking into sustainability education is increasingly emphasized in current literature and practices, featured as one of the **sustainability key competencies.**

This brief video from UCLA (2021) provides a basic explanation of sustainability, emphasizing the importance of recognizing interconnectedness (or systems thinking), possibly through the Three E's framework, wherein the social sphere is now referred to as *Equity*. The Three Spheres concept is also known as the **Triple Bottom-Line framework.**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/education-sustainability/?p=227#oembed-1***

What is Sustainability? video Copyright UCLA.

Rethink how we teach

This other type of content implies using **learner-centred pedagogies**, empowering the learners to think, feel and do. In learner-centred pedagogies, student learning experiences emphasize active, critical and transformative learning instead of passively absorbing information.

Some pedagogical approaches common to teaching sustainability include:

Critical reflection supporting transformative learning	Focuses on questioning assumptions and developing new perspectives. Increases understanding of sustainability's complexities and encourages deep self-examination to foster profound personal growth.
Action-oriented pedagogy	Emphasizes hands-on experiences where students take action, make decisions, or solve problems in real or simulated contexts. Empowers students towards concrete measures and to consider the tangible consequences of such actions.
Experiential pedagogy	Encourages students to actively engage with sustainability issues and to reflect on their learning process. Activates learning through direct experience, reflection, and conceptualization. The Office of Experiential Learning has a multitude of resources to guide educators on how to embed experiential learning in courses.
Interactive pedagogy	Focuses on communication and collaboration between students and with the educator serving as a facilitator. Activates learning through knowledge sharing and interaction while enhancing understanding and retention.
Inter- and trans-disciplinary learning	Integrates knowledge across disciplines towards a more holistic understanding. Students incorporate frameworks and concepts from multiple disciplines to examine sustainability's interconnectedness, while developing comprehensive problem-solving skills.
Problem-orientation approaches (e.g., problem-based learning)	Focuses on real-world problems to drive learning. Leads students to tackle sustainability challenges, developing critical thinking and problem-solving skills. If your issue focuses on the Greater Montreal Area, CityStudio can support you.
Participation, peer-learning, and collaboration	Emphasizes active involvement and teamwork. Students learn from peers, fostering diverse perspectives and collective action. For guidance on how to form groups, consult our Active Learning resources.
Place-based and Project-based learning	Connects learning to local contexts and real-life projects. Students address sustainability issues in their community through projects, promoting practical application. They engage in land-based activities to ignite their sense of place or love for it. You might consider consulting CityStudio to help connect you with community partners, or the Indigenous Decolonization Hub for resources on land-based pedagogy.

According to Sipos et al. (2008), additional relevant pedagogies supportive of education for sustainability are:

Critical emancipatory pedagogy	Empowers individuals to challenge oppression and dominant narratives, foster critical thinking, promote social justice and societal transformation. Enables students to examine root causes of environmental issues, such as social inequalities, promoting system thinking.
Environmental education	Increases awareness of the natural world and human-environment interconnections, fostering responsibility and sustainable behaviours. It cultivates empathy for nature and comprehension of interconnected systems, empowering students to make informed decisions and champion sustainability within their lives and communities.
Pedagogy for eco-justice and community	Expands environmental education to include social justice principles like environmental racism and community-driven activism, fostering student agency. Students develop a holistic sustainability approach, considering social equity and inclusivity, and learn to empower communities in advocating for their rights.
Traditional ecological knowledge	Provides holistic wisdom passed down by Indigenous communities through generations, encompassing deep understanding of ecosystems, sustainable practices, and cultural and spiritual beliefs. Students grasp a holistic understanding of interconnected environmental issues, fostering reciprocal respect and love for nature.

Below are examples of common activities, pedagogical tools and resources that can initiate discussions relevant to various fields of study. For further examples and applications, please refer to the **section on disciplinary perspectives**.

- Simulation and role play, fishbowl exercises
- Forecasting and backcasting, utopian/dystopian storytelling
- Critical and reflective thinking through discussions or reflective journals
- Real-world case studies and collaborative projects
- Carbon footprint calculators or simulators (e.g., Enroads)
- Geographic information systems

Quick-start guide for embedding sustainability

This guide is intended to offer support to educators interested in integrating sustainability education into their course. The six steps below will take you through an evidence-based process to **sustainability-inclusive courses**.

On this page:

Choose your focus

Select a sustainability topic or a Sustainable Development Goal (SDG) that aligns seamlessly with your course content.

- Start small and incrementally, closely relating to core course content, to prevent overwhelm for yourself and students.
- Use the UNESCO Education for Sustainable Development Goals (SDGs – Learning Objectives—if you wish to tie your course content to global sustainability initiatives like the SDGs.
- Address one or more of the three pillars of sustainability—*Environment, Society* and *Economy*. Introducing a fourth pillar, *Technology*, might engage fields within STEM.
- Connect sustainability issues relatable for students, focusing on real-world issues they encounter daily.

Plan how students engage

Consider the following instructional objectives when embedding a sustainability lens into your course:

Engage the Cognitive Domain	Deepen awareness of the three pillars of sustainability and their interdependencies.
Engage the Affective (Socio-emotional) Domain	Emphasize inner capabilities like self-awareness, self-reflection, and respect for all life forms. Foster effective communication and negotiation skills with diverse individuals worldwide.
Engage the Behavioural Domain	Equip students with action competencies to become **change agents** and sustainable decision-makers. Encourage active engagement as a means to reducing **eco-anxiety**.
Engage the Sustainability Competencies	Highlight sustainability competencies applicable in academic and professional settings: Systems thinking, Futures thinking, Values thinking, Strategies thinking, Implementation, Interpersonal, Intrapersonal, Integration competencies. Refer to existing frameworks listed in the Resource section below for key competencies.

Write student-friendly learning outcomes

Ensure your chosen sustainability focus is reflected in your learning outcome(s).

- Specify desired proficiency levels for student knowledge, values, and skills. Connect them back to the instructional objectives in step 2. Consider how you can allow your students to think, feel, and do.
- Write measurable and observable learning outcomes. For further information, please refer to this Teaching Academy guide on writing learning outcomes.

An example of a student-friendly learning outcome with a sustainability lens explained:

Example: Engineering

Learning Outcome: By the end of the course, students can discuss the application of engineering theories and methodologies in solving practical problems, such as structures design or electrical systems development, while demonstrating awareness of personal perspectives and their potential influence on design decisions within broader societal contexts.

- The **instructional objectives** encompass **both affective and cognitive domains**. Through discussion, students practice effective communication and negotiation skills, employing their cognitive abilities to comprehend how engineering theories inform solutions. By showcasing awareness of personal perspectives and their potential impact on decisions, students cultivate inner capabilities such as self-awareness, bridging affective exploration with cognitive development.
- This learning outcome addresses both **technological and social aspects** of sustainability. Discussions explore issues like accessibility, safety, and equity, aiming for solutions that improve communities' quality of life. Engineers, recognizing personal biases such as cultural, gender, or socioeconomic biases, discuss applications that mitigate unintended consequences and promote equitable outcomes.
- Additionally, students identify structures and electrical systems that optimize resources and reduce project costs, falling within the **economic pillar**, while integrating environmental considerations, preserving natural resources and ecosystems. By interrogating this relationship with all the pillars of sustainability, students are engaging the **cognitive domain.**

Did you know? About 55% of Concordia faculty provide students with opportunities to **take action** towards achieving the SDGs in their courses, as per **our recent mapping exercise at Concordia (2024)**. Let's inspire more student action!

Here's a sample learning outcome focusing on the **behavioural domain:**

Example: Environmental Studies

By engaging in literature review and critical analysis, students evaluate the multifaceted impacts of environmental issues, develop criteria to assess their severity, and formulate potential mitigation strategies. Based on this, students create a policy brief aimed at relevant stakeholders, including government officials, NGOs, and industry leaders, for dissemination and advocacy.

Revamp or create modules or lessons

- Redesign module(s) or lesson(s) around sustainability-focused learning outcome(s) defined in step 3.
- Develop a culminating project or assignment that promotes the sustainability-focused learning outcome(s), ensuring it enables students to demonstrate their learning effectively.
- Create new or revise teaching resources and activities to ensure students understand the specific content and can practice/perform the newly acquired skills.
- Align assessment methods and teaching resources to the sustainability-related learning outcome(s).
- Plan feedback opportunities to deepen student learning and align teaching materials with Universal Design for Learning practices as much as possible.

Here is an example of a redesigned learning activity and assessment for the previous Engineering learning outcome:

Example: Engineering

- **Learning outcome:** By the end of the course, students can discuss the application of engineering theories and methodologies in solving practical problems, such as structures design or electrical systems development, while demonstrating awareness of personal perspectives and their potential influence on design decisions within broader societal contexts.
- **Learning activity:** *Case Study Analysis and Group Discussion.* Students analyze real-world engineering case studies in groups, identifying engineering theories, personal biases, and societal impacts. Groups engage in facilitated discussions to share findings, serving as peer feedback.
- **Assessment:** *Group Presentations and Societal Impact Report.* Groups present their case study, considering technical feasibility (structural analysis, material selection, cost-effectiveness, and environmental impact assessment) and societal impacts (economic, political, cultural, or environmental factors). Additionally, students write an individual Societal Impact Report, reflecting on personal or societal influences on design decisions, such as cultural background, personal values, and ethical considerations.

Adapt to a learner-centred approach

Shift from traditional teaching methods towards encouraging students to critically engage with the topic using scenarios, contexts, and examples that are relatable to them. Plan collaborative, **learner-centred** activities to increase student engagement with sustainability topics and develop a growth mindset.

Research in sustainability education advocates for these pedagogical approaches:

Critical reflection supporting transformative learning	Focuses on questioning assumptions and developing new perspectives. Increases understanding of sustainability's complexities and encourages deep self-examination to foster profound personal growth.
Action-oriented pedagogy	Emphasizes hands-on experiences where students take action, make decisions, or solve problems in real or simulated contexts. Empowers students towards concrete measures and to consider the tangible consequences of such actions.
Experiential pedagogy	Encourages students to actively engage with sustainability issues and to reflect on their learning process. Activates learning through direct experience, reflection, and conceptualization. The Office of Experiential Learning has a multitude of resources to guide educators on how to embed experiential learning in courses.
Interactive pedagogy	Focuses on communication and collaboration between students and with the educator serving as a facilitator. Activates learning through knowledge sharing and interaction while enhancing understanding and retention.
Inter- and trans-disciplinary learning	Integrates knowledge across disciplines towards a more holistic understanding. Students incorporate frameworks and concepts from multiple disciplines to examine sustainability's interconnectedness, while developing comprehensive problem-solving skills.
Problem-orientation approaches (e.g., problem-based learning)	Focuses on real-world problems to drive learning. Leads students to tackle sustainability challenges, developing critical thinking and problem-solving skills. If you have an issue focused on Tiohtiá:ke / Greater Montreal Area, CityStudio can support you.
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Apply success factors for teaching sustainability

Research demonstrates the following key elements for highly effective sustainability teaching and learning:

- **Keep it light.** Incorporate success stories into sustainability discussions to prevent climate anxiety and maintain engagement.
- **Think outside the silo.** Foster interdisciplinary learning by inviting guest speakers from a range of disciplines and consulting professionals during field trips.
- **Reflect on impact.** Ask students how they can use what they are learning to make the world a better place, combining increased agency with a reflection on quality of life.
- **Empower students.** Let students analyze empirical data for themselves, helping them understand the complexity of issues.
- **Promote community engagement.** Facilitate collaborative, real-world problem-solving projects so students can support each other and help their communities become more sustainable.
- **Incite action!** Integrate actionable elements to connect course material with students' personal lives and promote reflection while taking action.

Resources

Sustainability competencies frameworks

The following frameworks may be helpful models to understand sustainability competencies and successfully connect them to your course.

- GCSE Proposal Statement on Key Competencies in Sustainability
- Key competencies in sustainability: a reference framework for academic program development
- ASU's 6 Key Competencies in Sustainability
- Learning to transform the world: key competencies in education for sustainable development

Integrating course content

- Education for Sustainable Development Goals: Learning objectives: This guide for education professionals details practically how to work on achieving the United Nation's Sustainable Development Goals (SDGs) through the use of Education for Sustainable Development (ESD). It identifies learning objectives and suggests topics and learning activities for each SDG.
- Concordia's Library Research Guide for Sustainability: This page offers sustainability research resources to students, staff, and faculty. It includes databases, books, films, and journals, as well as online tools and resources to help you in your sustainability research.
- InTeGrate Teaching Materials: Search this curriculum repository for classroom-ready peer reviewed teaching materials per sustainability topic or academic subject. Includes lesson plans for various disciplines but especially strong on geosciences and STEM.

Latest trends in education for sustainability

In this overview of the latest trends on sustainability in educational literature, we delve into essential competencies crucial for addressing the climate crisis and promoting sustainability. As highlighted by leading frameworks and institutions, the emphasis extends beyond knowledge transfer to nurturing **change agents** equipped with a holistic skill set. From systems thinking to interpersonal skills, this presentation encapsulates the evolving discourse on sustainability education. Additionally, it explores the often-overlooked realm of inner capabilities, underlining the intricate interplay between personal transformation and systemic change.

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/education-sustainability/?p=49***

Transcript for*Latest trends in educational literature on sustainability video (docx).*

Sustainable development goals

The **17 Sustainable Development Goals (SDGs)** came into effect on January 1, following a historic United Nations Summit in 2015 during which all UN member states adopted the agenda. The SDGs are an urgent call-to-action for global collaboration, which recognizes that social and environmental challenges are complex and intertwined. This framework of goals and targets for achieving sustainable development is now utilized globally.

To learn more about the SDGs and to gather inspiration on how it might connect to your course, you may wish to browse through **this excellent resource developed by Aditi Garg** at the University of Saskatchewan. In this resource, specific steps to integrating the SDGs are built into reflection questions for educators.

You can also navigate directly to a specific SDG by clicking directly on its icon below:

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

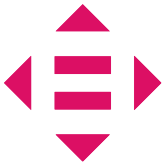
6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

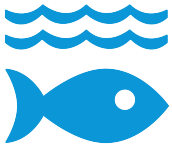


11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER



15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

Writing learning objectives for the SDGs

The United Nations Educational, Scientific and Cultural Organization **(UNESCO) has developed learning objectives** for the SDGs that include **sustainability competencies** and **instructional objectives** discussed earlier in the Quick-start guide. This helpful resource also suggests topics and lists examples of pedagogical approaches and activities that align with the specific SDG.

For example, if you choose to focus on **Goal 1 – No Poverty** within the **behavioural domain**, some learning objectives could be:

Example learning objectives from UNESCO

- The learner can plan, implement, evaluate and replicate activities that contribute to poverty reduction.
- The learner can publicly demand and support the development and integration of policies that promote social and economic justice, risk reduction strategies and poverty eradication actions.
- The learner can evaluate, participate in and influence decision-making related to management strategies of local, national and international enterprises concerning poverty generation and eradication.
- The learner can include poverty reduction, social justice and anti-corruption considerations in their consumption activities.
- The learner can propose solutions to address systemic problems related to poverty.

Aligning existing learning outcomes with SDGs

You may wish to align your sustainability learning outcomes closer to your existing course or program outcomes. In that case, the recommended step is to assess which SDG from above relates the closest to your existing learning outcome and use language from the SDG to enhance it. Following is an example from the University of Saskatchewan.

Example: Math

Original learning outcome: Support a position or decision relevant to self, family, or community by analyzing statistical data, as well as considering other factors. (Math Foundations 20, Saskatchewan)

+

SDG Outcome: Learners will be able to communicate issues of health, including sexual and reproductive health, and preventative strategies. (Goal 3 Health and Well-being)

=

SDG + Math Outcome: Learners will be able to support a position regarding health to community by analysing and communicating statistical data.

SUSTAINABILITY COMPETENCIES

This section offers an evidence-based exploration of the key competencies in sustainability, elucidating their role in education for sustainability. You might observe how these competencies can be compared to academic or even professional skills, thereby enhancing the connection with your discipline. We spotlight a specific framework while alluding to alternative models for your consideration.

In the second chapter, we take a closer look at the **intrapersonal competency**. You'll discover definitions specific to this competency, along with common pedagogical approaches, sample learning outcomes, and assignments designed for various proficiency levels. Additionally, we offer curated learning sequences spanning various fields of study to facilitate the integration of the intrapersonal competency into curricula. Our goal is to inspire faculty to embrace and incorporate this content into their courses.

A comprehensive framework of key competencies

> "Advancing transformations towards sustainability calls for change agents equipped with a new set of competencies" (Redman & Wiek, 2021, p 1).

Several scholars have explored the key competencies necessary for sustainability, with Wiek et al. (2011) providing an initial framework that achieved broad recognition. Expanding on this foundation and following a systematic review of pertinent literature, Redman and Wiek (2021) formulated a unified framework of eight competencies for advancing sustainability transformations, applicable across disciplines and alongside disciplinary, general, and other professional competencies as shown in the following diagram. The definitions of the eight key competencies are listed below.

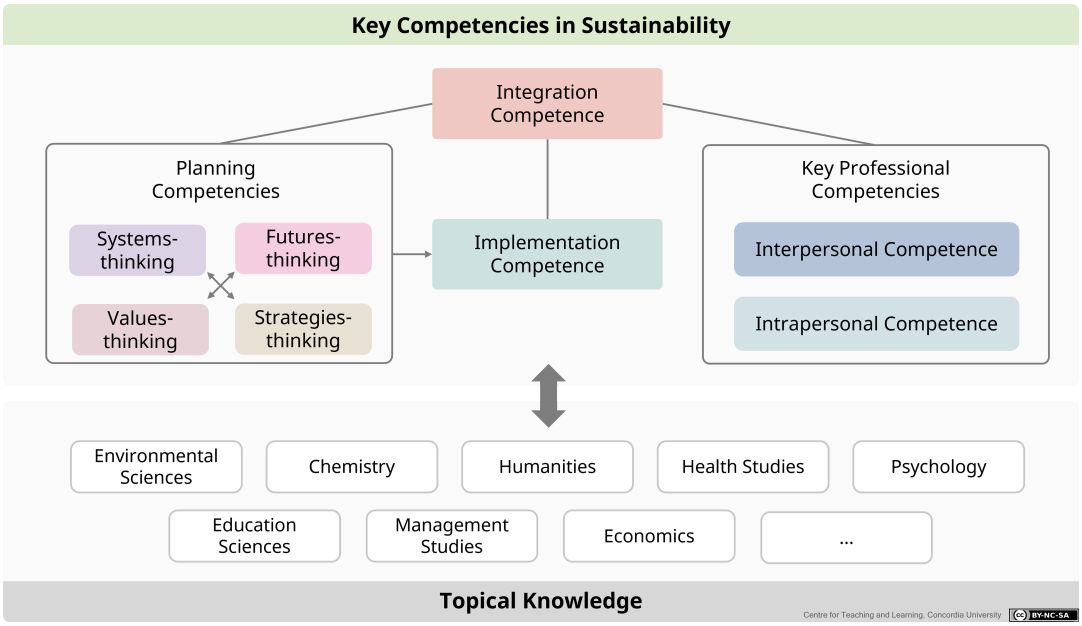


Diagram illustrating the relationship between the 8 key competencies in sustainability and how they relate to Topical Knowledge. Adapted from Brundiers et al., 2021 and Redman & Wiek, 2021.

Text description of diagram *key competencies in sustainability (docx)*

An interplay of competencies

The key competencies framework is not meant merely to be a checklist, but rather a comprehensive integration of all essential competencies to advance education for sustainability. “Systems-thinking, futures-thinking, values-thinking, and strategies-thinking enable crafting sustainability action plans that yield sustainability outcomes if successfully implemented (which requires implementation competence). Inter- and intra-personal competencies (key professional competencies) enable that planning and implementation is undertaken in collaborative and self-caring ways—key factors for success. Finally, integration competence enables a coherent combination of collaborative and self-caring planning and implementation efforts, using established procedures for sustainability problem-solving” (Redman & Wiek, 2021, p. 5).

Definitions of sustainability competencies

In the following table, each key sustainability competency is described as per Aaron Redman and Arnim Wiek (2021, p. 6).

Competency	Definition	Related verbs
Systems-thinking	Ability to apply modelling and complex analytical approaches to analyze complex systems and sustainability problems across different domains (environmental, social, economic) and across different scales (local to global), including cascading effects, inertia, feedback loops, and other system dynamics and to analyze the impacts of sustainability action plans (strategies) and interventions (how they change systems and problems).	Understand, identify, describe, and analyze sustainability challenges and problems, complex issues, effects, relationships, impacts, patterns, structures, unintended consequences, feedback loops, context, interactions, etc. across different domains (environmental, social, economic), scales (local to global), and perspectives (interdisciplinary), etc.
Futures-thinking	Ability to carry out or construct simulations, forecasts, scenarios, and visions to anticipate future states and dynamics of complex systems and sustainability problems, and to anticipate how sustainability action plans (strategies) might play out in the future (if implemented).	Anticipate, foresight, envision, craft, analyze, and evaluate long-term future consequences, scenarios (multiple futures), and visions regarding intergenerational equity, future generations, uncertainty, etc.
Values-thinking	Ability to identify, map, specify, negotiate, and apply sustainability values, principles, and goals to assess the sustainability of current or future states of complex systems, to construct sustainability visions for these systems, and to assess the sustainability of action plans (strategies) and interventions.	Identify, assess, negotiate, reconcile, reflect on, map, and apply sustainability principles, morals, norms, ethics, goals, integrity, justice, conflicts, tradeoffs, etc.
Strategies-thinking	Ability to construct and test viable strategies (action plans) for interventions, transitions, and transformations toward sustainability.	Design, create, develop, and test transformative, innovative, viable, feasible interventions, transitions, strategies, action plans, solutions, etc. considering barriers, inertia, path dependence, carriers, assets, etc.
Implementation	Ability to put sustainability strategies (action plans) into action, including implementation, adaptation, transfer and scaling, in effective and efficient ways.	Implement, enact, adapt, manage, transfer, and scale action plans, strategies, change plans, intervention plans, governance initiatives, etc.
Intrapersonal	Ability to avoid personal health challenges and burnout in advancing sustainability transformations through resilience-oriented self-care (awareness and self-regulation).	Reflect, motivate, have respect for, be responsible, be empathetic, and self-care for identity, commitment, feelings, burnout, personal boundaries, limits of capacity, etc.
Integration	Ability to apply collective problem-solving procedures to complex sustainability problems to develop viable sustainability strategies (action plans), and successfully implement them, in collaborative and self-caring ways.	Develop, apply, promote, and make decisions to advance sustainability by using viable, equitable, and inclusive solution processes, procedures, frameworks, schemes, etc.

Different frameworks of sustainability competencies

Various authors (Brundiers et al., 2023; Giangrande et al., 2019; Redman & Wiek, 2021; UNESCO, 2017;) have identified essential skills that students must acquire to confront sustainability challenges, each generating their inventory of abilities and proficiencies required to become catalysts for change. There is considerable overlap among these models, prompting the development of resources aimed at comprehending and contrasting them. Notably, efforts are underway (**Global Council for Science and the Environment**, **Association for the Advancement of Sustainability in Higher Education**) to explore the connections between the key competencies promoted by the Global Council for Science and the Environment (GCSE) and UN's skill sets designed to advance the **Sustainable Development Goals (SDGs).**

To access more frameworks on sustainability competencies, please visit these links:

- GCSE Proposal Statement on Key Competencies in Sustainability
- Key competencies in sustainability: a reference framework for academic program development
- ASU's 6 Key Competencies in Sustainability
- Learning to transform the world: key competencies in education for sustainable development

To dive into latest trends in education for sustainability, **please access this chapter.**

Intrapersonal competency

As a first step into the key competencies in sustainability framework, we are highlighting the intrapersonal competency by diving deeper into the typical pedagogical approaches it requires, some sample learning outcomes and assignments, and a list of curated learning sequences per broad area of study.

We hope to inspire faculty to infuse education for sustainability content into their courses where applicable. A recent **report** on *Mapping Sustainability in the Curriculum Survey* (2024) showed that at Concordia, intrapersonal themes are underrepresented, although 75% of responding faculty expressed a desire to incorporate classwork on attitudes, values, and self-reflection skills. This chapter will provide some tools to do exactly that, addressing inner capabilities which are crucial for behavioural change.

What is the intrapersonal competency?

The intrapersonal competency, also known as the self-awareness competency, is defined by Brundiers et al. (2023, p. 15) as "the ability to consciously and proactively engage as a **change agent** for sustainability. This involves the ability to be aware of one's own emotions, desires, thoughts, and behaviours as well as one's positionality in society and one's own role in the local community and (global) society. Building on this, the intrapersonal competency involves the ability to reflect and act on that self-awareness and to regulate, motivate, and continually evaluate one's actions and improve oneself, drawing on and developing emotional intelligence".

In other words, the intrapersonal competency revolves around '"our abilities to be aware of and be able to operationalise our inner landscape" (Giangrande et al., 2019). The authors emphasize the importance of acknowledging stressful, conflicting, or paradoxical situations, while also highlighting attributes such as compassion and empathy. The authors further identify key qualities like **presencing**, self-awareness, managing stress, deriving meaning, connecting with oneself, fostering inner peace, maintaining mental well-being, and engaging in self-reflection.

On this page:

Pedagogical activities

Role play for self-reflection

An effective teaching method that fosters interpersonal competencies involves acting out different roles and thinking about one's own thoughts and feelings. Role play as a teaching strategy is rooted in several theories, including Kolb's (1984) experiential learning theory (Greenleaf Brown & Chidume, 2023), as role play and reflection can be connected to the first stages of Kolb's Experiential Learning Cycle, namely experiencing and reflecting. Role play has also been used to develop mindfulness and soft skills needed in the clinical setting (Khan & Sheikh, 2021, in Greenleaf Brown & Chidume, 2023).

Creating or mimicking real-world experiences adds personal relevance to academic content, demonstrating to students why the information is important to them (Elmi, 2020). Beyond enhancing academic success, these hands-on activities help develop self-awareness (such as recognizing strengths, identifying biases, and building self-confidence) and self-management skills (like attention to detail, reflection, and perceptiveness) (Elmi, 2020). These inner capabilities, leading to increased emotional intelligence (Elmi, 2020), can thus be fostered by role play.

In education, **role play**, as defined by the **Derek Bok Center for Teaching and Learning at Harvard University**, involves students assuming unfamiliar roles to enact case-based scenarios. This method helps to grasp complex concepts and foster a deeper understanding of diverse viewpoints. For instance, in role-switching exercises, students adopt various personas to understand different perspectives and motivations (Roa & Stupans, 2012). By immersing themselves in others' roles, students enhance their ability to empathize and gain perspective, leading to increased self-reflection and awareness. It helps students reflect on their actions: they think about what's important to them, understand different viewpoints, and develop a deep understanding of how to live well. They might also think about their experiences, notice their biases, attitudes, and how they fit into society. This thinking can

help people understand how their actions affect global issues like sustainability and change how they use resources based on what they learn.

Other activities to enhance self-awareness

Aside from role play, some additional pedagogical activities that will foster intrapersonal competencies could be:

- Contemplative practices including mindfulness
- Debates, fishbowl exercises and discussions
- Reflexive activities (such as questioning, journaling, reflective writing)
- Storytelling (see also Sandenoro et al. 2012)
- Visualization activities (du Plessis, 2015 in Jaakkola et al., 2022)
- Improvisational group exercises, focusing on mind, body, feelings, and intuition (du Plessis, 2015 in Jaakkola et al., 2022)
- Art-based and creative practices, including sensorial materials for an embodied experience (Jaakkola et al., 2022)
- Prospective writing, embodied and performative exercises conducted in playful, safe and non-judgmental learning environments (Grocott and McEntee, 2019, in Jaakkola et al., 2022)
- Anonymous posts (e.g., on forums), inviting students to reflect on how they personally relate or feel
- Introspection exercise – metacognitive engagement with self through inward -looking questions

Cultivating the *'Being'* dimension

Related to the intrapersonal competency, the *Being* dimension of the Inner Development Goals is defined as the "relationship to Self-Cultivating our inner life and developing and deepening our relationship to our thoughts, feelings and body help us be present, intentional and non-reactive when we face complexity" (Stålne and Greca, 2022, p.19).

The **Inner Development Goals toolkit** promotes mindfulness practices as "the capacity to attend intentionally to present-moment experience, with an attitude of openness, curiosity, and care" (Stålne and Greca, 2022, p. 58). These practices often consist of structured activities like seated meditation, mindful movement, and the 'body scan,' alongside casual practices that cultivate awareness in daily tasks—taking moments to pause and respond thoughtfully

instead of acting out of habit or impulse. Additionally, there's a growing incorporation of exercises focused on kindness and compassion.

Another type of exercise described in the toolkit relates to **acceptance commitment therapy / training (ACT)**, a psycho-therapeutic intervention that mediates improvements in individuals' psychological flexibility' (Stålne and Greca, 2022, p. 61). An additional example of reflexive thinking would be the ***Meet Yourself at 90* exercise**. This guided exercise prompts readers to imagine themselves at your 90th birthday party. This can help with **presencing** and prioritizing life goals.

Example learning outcomes

Let's dive into the details of the intrapersonal competency by looking at specific examples of what students should learn. We'll cover outcomes for different skill levels—beginner, intermediate, and advanced—and different levels of thinking according to Bloom's taxonomy. These examples, organized by theme or discipline, provide a glimpse into how students can develop and apply intrapersonal skills throughout their education.

Human Rights

Introductory level

- **Understand**: Identify fundamental human rights and their impact on personal well-being.
- **Understand/Apply**: Reflect on personal perspectives and prejudices that may affect understanding of human rights concepts.

Intermediate level

- **Analyze**: Examine case studies or historical events to distinguish how infringements on human rights impact personal and collective security.
- **Evaluate**: Critique personal biases and privilege to enhance advocacy for human rights.

Advanced level

- **Evaluate**: Assess how increased self-awareness, emotional intelligence, and resilience impact decision-making and interactions in human rights advocacy, fostering personal growth and effectiveness.
- **Create**: Develop comprehensive self-care plans that integrate mindfulness practices, emotional regulation techniques, and community support systems to enhance resilience and sustain engagement in human rights work.

Gender Equality

Introductory level

- **Understand**: Identify how gender equality impacts the students' feelings of safety, compassion, stress, and connection.
- **Understand**: Begin to reflect on personal experiences and observations related to gender equality and its effects on inner states and cultural stress levels.

Intermediate level

- **Apply**: Demonstrate to what extent cultural levels of stress are affected by gender inequality.
- **Analyze**: Critically reflect on personal biases and assumptions related to gender equality and its impact on society.

Advanced level

- **Create**: Develop advocacy campaigns or policy proposals informed by mindfulness principles and informed self-reflection, aiming to address root causes of gender-based oppression and promote holistic well-being within diverse cultural contexts.

Statistics

Introductory level

- **Understand**: Identify the fundamental principles of statistical analysis, including data collection methods and basic descriptive statistics, while beginning to recognize personal biases and understanding one's positionality within the community and global society.

Intermediate level

- **Understand/Apply**: Describe the application of statistical methods in real-world scenarios, such as hypothesis testing and regression analysis, while demonstrating awareness of personal perspectives and their potential impact on data interpretation within the broader societal context.

Advanced level

- **Evaluate**: Critically evaluate complex statistical models and research methodologies, integrating intrapersonal competency by recognizing and mitigating personal biases, acknowledging one's role in shaping data analysis and interpretation, and considering the ethical implications of statistical findings within the global and local community settings.

Engineering

Introductory level

- **Remember**: Recall foundational engineering concepts and principles, such as Newton's laws of motion and basic circuit analysis, while reflecting on personal biases and recognizing one's positionality within the engineering profession and society.

Intermediate level

- **Understand**: Discuss the application of engineering theories and methodologies in solving practical problems, such as designing structures or developing electrical systems, while demonstrating awareness of personal perspectives and their potential influence on design decisions within broader societal contexts.

Advanced level

- **Create**: Innovatively design and implement engineering solutions that address complex challenges, synthesizing diverse perspectives and intrapersonal competencies such as self-awareness and adaptability, to develop sustainable and socially responsible solutions. This involves effectively managing personal biases, collaborating with diverse stakeholders, and demonstrating resilience in the face of uncertainty, while ensuring clear communication and ethical decision-making throughout the design process.

Example assignments and assessments

Based on the assessment questions proposed by Giangrande et al. (2019), here are some example assignments and assessments per level of proficiency (introductory, intermediate, and advanced).

Are learners able to be present in themselves?

Introductory level

- Keep a daily journal for a week, in which you reflect on your thoughts and emotions at different points during the day. Note down what you were doing, how you felt, and any significant thoughts that crossed your mind.

Intermediate level

- Practice mindfulness meditation for 10 minutes every day for two weeks. Focus on being present, observing your thoughts and feelings without judgment.

Advanced level

- Engage in a silent retreat for a weekend where you disconnect from all distractions and spend time solely with your thoughts. Reflect on your experience and how being present in yourself impacts your overall well-being.
- Conduct a self-reflection exercise where learners create a personal mindfulness journal for a designated period, such as a week or month. In this journal, they will record their daily experiences, emotions, and thoughts, along with any mindfulness practices they engage in. At the end of the period, learners will analyze their journal entries and identify patterns in their mindfulness practice, reflecting on moments of presence, challenges encountered, and strategies for cultivating self-awareness and inner peace.

Can learners hold contradictory feelings and thoughts?

Introductory level

- Engage in a debate with a friend or family member on a topic where you hold conflicting views. Practice listening to their perspective without immediately trying to refute it.

Intermediate level

- Write an essay exploring a topic from multiple perspectives, acknowledging the validity of different viewpoints even if they contradict your beliefs.

Advanced level

- Participate in a group discussion where you intentionally take on a viewpoint opposite to your own and argue for it convincingly, demonstrating your ability to hold contradictory thoughts and empathize with diverse perspectives.
- Organize a structured debate or discussion forum where learners are presented with controversial topics or ethical dilemmas. Each participant will be assigned a position to argue, which may or may not align with their personal beliefs. Throughout the debate, learners will be evaluated based on their ability to articulate and defend their assigned position, while also demonstrating empathy and respect towards opposing viewpoints. Following the debate, learners will reflect on their experience, acknowledging any internal conflicts or shifts in perspective that arose during the discussion.

Do learners practice self-awareness?

Introductory level

- Create a list of your strengths and weaknesses, reflecting on situations where each of them comes into play. Discuss your findings with a trusted friend or mentor.

Intermediate level

- Use a self-assessment tool such as the Myers-Briggs Type Indicator (MBTI) or Emotional Intelligence (EQ) test to gain deeper insights into your personality and emotional tendencies. Reflect on how this self-awareness impacts your interactions with others.

Advanced level

- Keep a reflective journal for a month in which you analyze your behaviours, motivations, and decision-making processes. Identify patterns and areas for growth, and develop a plan for personal development based on your findings.
- Create a reflective portfolio assignment where learners compile a collection of personal essays, artwork, or multimedia presentations that explore different aspects of their identity, values, and experiences. Throughout the portfolio, learners will reflect on

moments of self-awareness and growth, discussing how they have come to understand themselves better and navigate challenges in their personal and academic lives. As part of the assessment, learners will also set goals for further self-improvement and outline strategies for enhancing their self-awareness and emotional intelligence.

Can learners find strategies to seek inner peace?

Introductory level

- Introductory Level: Create a list of activities that bring you joy and relaxation. Commit to incorporating one of these activities into your daily routine for a week and reflect on how it impacts your sense of inner peace.

Intermediate level

- Research different meditation techniques such as mindfulness, loving-kindness, or transcendental meditation. Choose one technique to practice for a month, and keep a journal documenting your experiences and observations.

Advanced level

- Design and implement a personal retreat day, in which you disconnect from technology and spend time in nature or in a peaceful environment. Develop a structured itinerary including meditation, reflection, and activities that promote inner peace.
- Design a presentation or infographic outlining different strategies for seeking inner peace, including meditation techniques, stress management practices, and lifestyle changes. Explain the benefits of each strategy and provide examples of how they can be implemented in daily life. Additionally, reflect on your personal experience with one or more of these strategies and discuss how it has contributed to your overall well-being.

Can learners make meaning in the work they do?

Introductory level

- Write a reflection on your current job or school activities, identifying aspects that give you a sense of purpose and fulfillment. Discuss with a peer or mentor how you can further cultivate meaning in your daily tasks.

Intermediate level

- Conduct informational interviews with professionals in fields that interest you, exploring how they have found meaning in their careers. Reflect on their insights and consider how you can apply similar principles to your own career path.

Advanced level

- Undertake a project that aligns with your personal values and passions, whether it's starting a community initiative, volunteering for a cause you believe in, or pursuing a creative endeavour. Document your journey and reflect on the meaningful impact it has on your life and the lives of others.
- Write a reflective essay discussing the concept of meaningful work and its importance in personal and professional development. Draw on research and personal anecdotes to explore factors that contribute to finding meaning in one's career, such as alignment with values, opportunities for growth, and impact on others. Reflect on your own career aspirations and goals, identifying steps you can take to pursue meaningful work and make a positive impact in your chosen field.

Do learners practice love and compassion?

Introductory level

- Perform random acts of kindness for friends, family, or strangers over the course of a

week. Reflect on how these actions make you feel and the impact they have on others.

Intermediate level

- Engage in empathy-building exercises such as role-playing scenarios or volunteering at a local charity. Reflect on your experiences and how they deepen your understanding of others' perspectives and needs.

Advanced level

- Develop and implement a community service project aimed at addressing a social issue or supporting a marginalized group. Collaborate with others to spread love and compassion in your community, and reflect on the challenges and rewards of your efforts
- Develop a multimedia project (e.g., video presentation, podcast, or art installation) that explores the theme of love and compassion in action. Interview individuals who have demonstrated acts of kindness and compassion in their communities, and showcase their stories alongside reflections on the importance of empathy, altruism, and social responsibility. Reflect on your experiences with practising love and compassion, and discuss how these values can contribute to creating a more compassionate society.The work submitted should include a series of reflection questions for the student to answer and for the educator to grade based on a pre-established and shared rubric. Below are some sample questions for evaluation, you are free to directly copy the activity into Moodle and edit it by clicking the 'Re-use' button in the bottom-left corner.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://opentextbooks.concordia.ca/education-sustainability/?p=53#h5p-6

Additional curated resources

For more examples of integration into course content, the **InTegrate website** offers a selection of valuable insights into designing curricula and assessing student learning. The fol-

lowing links to sample curricula in the area of intrapersonal competency are categorized by subject areas and highlight the central themes of each lesson.

- Environmental Politics: Who am I in relation to this?
- Geology: Role-play to grasp different perspectives.
- STEM and Human Sciences: Reflect and integrate feelings and beliefs about climate change through contemplative inquiry.
- Political science / Human Sciences: How can contemplative practices help to hold emotionally difficult issues?
- Environmental Science/ Human Sciences: Mindful self-reflection to lead a personal sustainable lifestyle while navigating difficulty of change.
- English: Discover my own sense of place
- Human Sciences / Fine Arts: Embodied outside education
- Education/ Human Sciences: Social and emotional wellness, equity and positionality
- Economics / Human Sciences: Cognitive, emotional and somatic self-awareness through contemplative practices to grasp triple inequality (systemic thinking)
- Social-Natural-Physical Sciences/ Mathematics: Reflect on emotive responses to different data and positionality, sensory log assignment

DISCIPLINE-SPECIFIC RESOURCES

The aim of this section is to offer faculty strategies to integrate sustainability into their disciplines or courses. We focus on two disciplines—**Mathematics & statistics** and **English**—which may not immediately appear connected to sustainability. We highlight instructional methods tailored to these disciplines and provide links to valuable resources while identifying relevant sustainability topics, thus demonstrating how sustainability can be directly incorporated into and engaged within these specific fields of study.

Mathematics & statistics

Mathematics and statistics are crucial components when it comes to understanding sustainability. Whether it's gender equality or biodiversity, these fields rely heavily on numerical data and analysis. Integrating assignments that involve mathematics and statistics can help students see the connections between sustainability and their field of study.

Instructional methods for classroom settings

- Using real-world case studies and simulators to gamify instructional methods.
- Engaging in collaborative projects, such as crafting action plans to mitigate climate change effects.
- Employing mathematical concepts, tools, and skills for analysis (performing and presenting it), including equation-based analysis and applied calculus.
- Incorporating online quizzes to foster civil discourse and enhance decision-making skills.
- Conducting data collection and subsequent analysis, such as examining historical carbon dioxide levels or measuring greenhouse gas emissions.

Resources

For specificity, several intriguing resources are available:

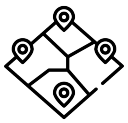
Visualize

Food and **carbon footprint calculators** offer insights into the environmental impact of daily activities. Students could discover that consuming one or two glasses of wine per week is comparable to emitting 24 kilograms of greenhouse gases annually, driving 100 kilometres by car, or heating a house for three days. They could delve deeper into analyzing the environmental impact and digital footprint of cryptocurrency.

Simulators like EN-ROADS allow interactive exploration of parameter changes and their effects on temperature rise. Visit the **website** and **video demo** for more information.

Discuss

Quiz projects like **Drawdown** rank solutions to climate change, facilitating discussions and providing hope amidst environmental challenges. Further reflection on the numbers and perhaps ensuing presentations are interesting instructional activities.



Map

Geographic Information Systems (GIS) provide visual data support for statistical analysis, ranging from local to global scales.

- ESRI Interactive geographical maps for public policy (USA): These maps offer visual support derived from the USA Census and can be utilized by anyone. They provide accurate and authoritative data on various aspects such as environment, infrastructure, social justice, health, economic opportunity, public safety, and natural resources. Students have the opportunity to visualize data that can be used for statistical analysis.
- Living Atlas offers global-scale data, not limited to the USA, including the Social Vulnerability Index. This resource allows users to map variables such as income, broadband internet access, and poverty status, among others.

Teach

Interdisciplinary Teaching about Earth for a Sustainable Future (InTeGrate) teaching materials offer peer-reviewed resources tailored to sustainability topics and academic subjects. It includes lesson plans for various disciplines but especially strong on geosciences and STEM. Teaching materials are available **for Mathematics** and **for Statistics**.

Moreover, examples of assignments, inspired by Paul Hawken's (2017) Drawdown, and shared by **Dr. Almomani**, Associate Professor of Mathematics, **Geneseo**, NY, include:

- Group projects on fish sustainability and species extinction, utilizing differential equations for analysis. Students have to perform the requisite analysis of the equation and to properly convey technical information, or show Equilibrium Solutions.
- Assignments on compost investment and waste reduction strategies, employing applied calculus and data integration. After providing context to raise awareness, students will apply calculus to create a graph using curve fitting and trend line functions in Excel. They will utilize integration concepts to determine the total compost amount and gather data on CO2 emissions from tools such as watchmywaste.com. Subsequently, students will formulate recommendations for waste reduction on campus.
- Numerical analysis tasks, including Numerical Approximation, related to windmill electric power and solar collector design.
- Exploration of real-world applications of linear algebra.

Can numbers, algebra and trigonometry save the planet?

Experts speak about this:

- The mathematics of climate change. In this video segment, Dr. Budd, Gresham College, describes how mathematical and physical models work and the assumptions that go into them. He will discuss how reliable our predictions of climate change are, and show how mathematicians can give us insights into both past and future.
- University of Waterloo's Faculty of Mathematics, and their department of Applied Mathematics, is home to experts in climate change. Consult their website for more information and for finding like-minded peers.
- How mathematics can contribute to the climate change debate. In his 2021 article, University College London Professor Ted Johnson explains how a collaboration with Florida State University could help make climate change predictions cheaper and more widely accessible.
- Seven ways math can save the world. Blog post on a panel discussion hosted by the Grantham Institute, Imperial College London, in 2016.

English

The field of English, akin to other languages, offers a unique avenue for promoting sustainability. It serves both as a conduit and subject matter for education for sustainability. English texts can actively or passively engage with sustainability content; students can learn from literature or discourse on sustainability and be challenged to create their own written or spoken pieces on the topic.

Language facilitates communication and shapes perceptions and societal attitudes towards sustainability. Through the analysis of literary works and the examination of linguistic nuances, English education provides a profound opportunity to delve into the complexities of sustainability issues. Moreover, it cultivates critical thinking skills essential for addressing these challenges effectively.

Sustainability encompasses a broad range of topics that may not immediately appear related to it. In English Studies, students can explore various sustainability-related themes such as physical and mental well-being, inclusion, equality, decent work, environmental equity, and the cradle-to-grave perspective. For example, through literary analysis, students may examine characters' struggles with well-being in novels or representations of social justice in poetry.

Consequently, English emerges as a pivotal discipline for integrating sustainability, despite current **reports** indicating a scarcity of sustainability-focused content within its curriculum at Concordia. This page aims to present strategies for incorporating sustainability into your English studies.

Instructional methods for classroom settings

General learning activities

Semantic or linguistic analysis

Students conduct linguistic analysis of texts to examine how language shapes perceptions and representations of sustainability. This could involve analyzing the use of specific terms, metaphors, and rhetoric in environmental discourse to uncover underlying ideologies and power dynamics. Analyzing media for specific sustainability vocabulary and everyday language usage could be a valuable exercise for students. By examining how sustainability

concepts are conveyed through language in various forms of media, such as news articles, advertisements, or social media posts, students can develop a fuller understanding of the ways in which sustainability is communicated to the public.

‘Plain English’ communication

Students practice summarizing complex sustainability concepts in clear and accessible language through methods such as writing summaries, letters, presentations, short videos, interviews with experts, and blog posts. This helps students develop effective communication skills for engaging with broader audiences about sustainability issues.

Creative writing workshops

Students focus on creative writing techniques for expressing ideas and emotions related to sustainability. This could include poetry, fiction, or creative nonfiction writing exercises that encourage students to explore personal connections to environmental themes and issues.

Global perspectives

Students explore how different societies and historical contexts approach environmental issues, based on readings or resources from global authors and filmmakers. By including perspectives from diverse cultures and regions in the study of sustainability literature and media, students will broaden their understanding of sustainability on a global scale.

Activities linked to sustainability competencies

Futures-thinking

Students engage in activities like scenario planning, future workshops, and forecasting to envision potential futures and explore strategies for sustainability. This may involve imagining desirable futures through back-casting or exploring utopian and dystopian scenarios in literature and other media.

Values-thinking

Students analyze the values presented in texts (e.g., books, videos, films, video games, theatre, poetry, essays) and how they evolve. This helps students understand the cultural, social, and ethical dimensions of sustainability and how they are represented in literature and media.

Systems-thinking

Students analyze how literary texts reflect broader societal and environmental issues relevant to sustainability. For example, they might examine how characters' experiences mirror real-world supply chain dynamics, considering the production, distribution, and consumption of goods, shedding light on environmental and social impacts.

Activities linked to pedagogical approaches

Collaborative learning

Students work together in groups to explore sustainability issues through projects and discussions. This fosters teamwork and allows for diverse perspectives to be considered. Group projects could involve analyzing sustainability themes in literature or creating multimedia presentations on environmental topics.

Critical and reflective thinking

Students participate in activities such as debates (e.g., devil's advocate debate), fishbowl discussions (where a small group discusses while others observe) or keeping reflective journals. These methods encourage students to think critically about sustainability issues, analyze different viewpoints, and reflect on their perspectives and biases.

Interdisciplinary collaboration

Students collaborate in other disciplines, such as environmental science, sociology, or economics. Interdisciplinary projects or guest lectures can provide students with a more holistic understanding of sustainability and its intersections with other fields of study.

Technology integration

Students work with digital tools and platforms, such as online databases for researching environmental topics, multimedia storytelling platforms for creating interactive narratives, or virtual reality simulations for immersive learning experiences related to sustainability challenges. **The Lab for Innovation in Teaching & Learning (LITL)** can partner with you to explore different ways to integrate technology with a sustainability focus.

Experiential learning

Service-learning opportunities

Students apply their English language and communication skills in real-world settings while addressing community sustainability needs. This could involve partnering with local organizations on writing projects, communication campaigns, or advocacy efforts.

Community engagement projects

Students collaborate with local communities or organizations on sustainability initiatives. This could involve conducting research, organizing events, or developing educational materials that address local environmental challenges. You may wish to browse resources from and get in contact with **Concordia's Office of Community Engagement** for more information on how to get started. Another resource at the university is **CityStudio**, who can match you with a community partner to tackle sustainability issues in the Greater Montreal Area.

Simulation and role play

Students engage in simulated scenarios or roleplay activities to immerse themselves in real-world sustainability challenges. For instance, they might act out different stakeholders in a hypothetical environmental debate or play roles in a simulated negotiation for sustainable development projects.

Field trips

Students go on field trips to environmentally significant sites or welcome guest speakers from relevant organizations to provide firsthand experiences and insights into sustainability issues. Experiential learning opportunities can deepen students' understanding and engagement with environmental topics. Visit Concordia's **Office for Experiential Learning** to find deeper resources to help you integrate experiential learning into your courses. You may also wish to consult the **Office for Decolonizing and Indigenizing Curriculum & Pedagogy** for practices on **land-based pedagogy.**

Resources

For specificity, several intriguing resources are available:

Visualize

Food and carbon footprint calculators offer insights into the environmental impact of daily activities. Students could discover that consuming one or two glasses of wine per week is comparable to emitting 24 kilograms of greenhouse gases annually, driving 100 kilometres by car, or heating a house for three days. Coming up with an action plan on everyday lifestyle elements could be an interesting instructional activity. Simulators like EN-ROADS allow interactive exploration of parameter changes and their effects on temperature rise. Visit the website and video demo for more information.

Discuss

Quiz projects like **Drawdown** rank solutions to climate change, facilitating discussions and providing hope amidst environmental challenges. Further debating about the favourite solution of the group, and perhaps ensuing presentations are interesting instructional activities. Gamified card sets such as **Future cards** or **Troubled Future** cards could lead to interesting oral exchanges, discussing hazards and solutions for teaching hope.

Read

Captivating books offer opportunities for review and essay writing, such as How Bad are Bananas? (Berners-Lee, 2021), Drawdown book (Hawken, 2017), Braiding Sweetgrass (Wall Kimmerer, 2013), and There Is No Planet B (Berners-Lee, 2021).

Watch

Several movies can be the foundation for critical review, such as Don't Look up. (McKay, 2021). Short films like The Story of Stuff project could be reviewed or even produced as an assignment.

Map

Interdisciplinary Teaching about Earth for a Sustainable Future (InTeGrate) teaching materials offer peer-reviewed resources tailored to sustainability topics and academic subjects. It includes lesson plans for various disciplines but especially strong on geosciences and STEM. Access InTeGrate materials here for English Studies.

FACULTY CO-CREATED RESOURCES

Illustration by Wednesday Laplante, © Concordia

In 2024, members of Concordia's faculty interest group on Education for Sustainability contributed to a multimedia resource library. This library provides exemplary learning materials that may support educators in teaching sustainability. The content is categorized by several themes and includes books, videos, news articles, online simulations, interactive databases and websites.

Contributing faculty members include:

- Govind Gopakumar
- Peter Graham
- James Grant
- p.k. langshaw
- Stuart James Macmillan
- Mitchell McLarnon
- Elizabeth Miller
- Rebecca Tittler

You can view **the resources group by category on the CTL website here.**

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Glossary

change agent

an individual or group who actively works to initiate, facilitate, and drive positive and sustainable change within their communities, organizations, or broader society. They play a pivotal role in driving the transition towards a more sustainable and equitable world, working at the intersection of education, advocacy, policy, and action.

eco-anxiety

“Eco-anxiety is the distress caused by climate change where people are becoming anxious about their future (Coffey et al., 2021, p.1)”. The term "eco-anxiety" usually refers to climate change-oriented anxiety (Kurth & Pihkala, 2022). However, for Kurth & Pihkala (2022, p.1), “the label “eco-anxiety” may be best understood as referring to a family of distinct, but related, ecological emotions”. The authors also discuss “a specific form of eco-anxiety, “practical eco-anxiety,” or “the unease that one experiences when thinking about how to respond to ecological threats like climate change. Given the daunting complexity of these situations, one is uncertain about what the best course of actions is; one’s resulting anxiety not only sensitizes one to these challenges, but also prompts the cognitive engagement and motivation that can help one address them (2022, p.1)”.

intrapersonal competency

Also known as the self-awareness competency. The ability to consciously and proactively engage as a change agent for sustainability. This involves the ability to be aware of one’s own emotions, desires, thoughts, and behaviors as well as one’s positionality in society and one’s own role in the local community and (global) society and in the local community. Building on this, the intrapersonal competency involves the ability to reflect and act on that self-awareness and to regulate, motivate, and continually evaluate one’s actions and improve oneself, drawing on and developing emotional intelligence.

land-based pedagogy

"Land-based education, in resurging and sustaining Indigenous life and knowledge, acts in direct contestation to settler colonialism and its drive to eliminate Indigenous life and Indigenous claims to land." (Wildcat, MacDonald, Irlbacher-Fox & Coulthard, 2014, p. 3)

More resources here: https://www.concordia.ca/library/guides/indigenous-fac-res/land-as-pedagogy---land-education.html

learner-centred pedagogy

Can also be referred to as 'student-centred' learning or pedagogy. This educational approach prioritizes the needs and interests of the learner and encourages them to take a more active role in the learning process through interactive, experiential and collaboration.

polycrisis

According to the Cambridge University Dictionary (**2024**), a polycrisis is a "a time of great disagreement, confusion, or suffering that is caused by many different problems happening at the same time so that they together have a very big effect". Mark et al. (2023, p.1) define a polycrisis as a "state in which multiple, macroregional, ecologically embedded, and inexorably interconnected systems face high – and advancing – risk across socioeconomic, political, and other dimensions".

presencing

The ability to stay present to your internal environment at the same time as engaging with your external environment. (Giangrande et al.,2019, p. 6).

sustainability-inclusive courses

A sustainability-inclusive course incorporates a unit or module on sustainability or a sustainability challenge, includes one or more sustainability-focused activities, or integrates sustainability challenges, issues, and concepts throughout the course.

Versioning history

This page provides a record of edits and changes made to this book since its initial publication. If the change is minor, the version number increases by 0.1. If the edits involve substantial updates, the version number increases to the next full number. Due to the guide's continuous updating, the addition or removal of a resource is not recorded on this page.

Version	Date	Change	Affected web page
1.0	June 2024	Original publication	N/A
1.1	July 2025	Addition of section on ‘Faculty co-created resources’	link