



Climate Change

Authored by

Melissa Taggart, NAAEE

Rising temperatures. More frequent and intense floods, droughts, and fires. Increasing loss of species and ecosystems. Ongoing damage to our most vulnerable communities. Climate change is no longer a distant threat; it is now directly touching our lives. As we experience its impacts in real time, many sectors, including policy, business, science, and technology, offer promising solutions. And while the efforts of these sectors are necessary and vital, education is an often overlooked key that may unlock solutions to the challenges we face. Education, and the actions it can inspire, transcends political and cultural boundaries; it brings us together and leads us forward through critical thinking, dialogue, and action. Education can help people understand the science behind climate change, and it can address the emotional and social factors that influence our choices and behavior. This chapter explores several research-based, practical approaches that can be used in climate change education and illustrates them through case studies.

Background

The scientific community has shown conclusively that climate change is not only real and happening, but that it is largely human-caused.¹ Global temperatures are rising at an alarming rate, but our efforts to slow the impacts of climate change are insufficient.² The United Nations recognizes the threats posed by climate change within its 17 Sustainable Development Goals: Goal 13 states that we must take urgent action to combat climate change and its impacts.³ Even as climate change affects every species and ecosystem on the planet, its impacts are not felt equally. A 2019 report by the UN Human Rights Council⁴ found that while people living in poverty are responsible for a mere fraction of global emissions, they will be the population most severely impacted by climate change, and that the timeline for this is short: Many are already experiencing serious impacts, and by 2030, these effects will be dramatically more severe. To adequately address climate change, we must also address its disproportionate impact on low-income communities, poorer countries, Indigenous peoples, and the young people who will inherit the climate crisis.

Climate change education (CCE) has emerged as a critical tool that we can use to inform and empower people to engage in meaningful actions and community-based efforts aimed at addressing climate change. And recognition and support for CCE is increasing worldwide. UNESCO has declared climate change education an essential tool that we can use to build a sustainable future.⁵ The Paris Climate Agreement's Action for Climate Empowerment focuses on six elements⁶ that are integral to addressing climate change, with education cited as a key component. (The other five are training, public awareness, public access to information, public participation, and international cooperation.)

Climate Change Education: Challenges and Opportunities

The scale and complexity of climate change presents formidable challenges to CCE, and as climate change increasingly touches our lives, these challenges shift from abstract to immediate. The words “climate change” used to summon images of polar bears struggling on distant melting ice caps; now we think of record heat, catastrophic storms, out-of-control fires, and flooding in our own communities. And as the abstract becomes personal, we, as educators, have an evolving opportunity to promote a scientific understanding of climate change—and to couple that with the skills and motivation that can lead to civic engagement.

In addition to increasing scientific understanding, CCE actively addresses psychological and social (psychosocial) barriers that may prevent people from learning about and taking action to address climate change.⁷ We know that understanding climate change does not necessarily lead to taking action based on that knowledge.⁸ From a psychological perspective, our emotional state influences our actions, sometimes profoundly. For example, when we feel overwhelmed by information (e.g., the climate is warming and we’re nearly too late to reverse the trend), we can become paralyzed. On the other hand, when we feel encouraged (tree plantings have significantly reduced carbon levels), we may feel more motivated to act. And we can think about behaviors from a social perspective, too. Consider how people relate to recycling: In places where recycling is seen as a social norm, you’ll find more people doing it. Linked together, psychosocial factors—individual thoughts and behaviors in combination with social elements—create a complex web of motivations that affect why we do (or do not do) certain things.



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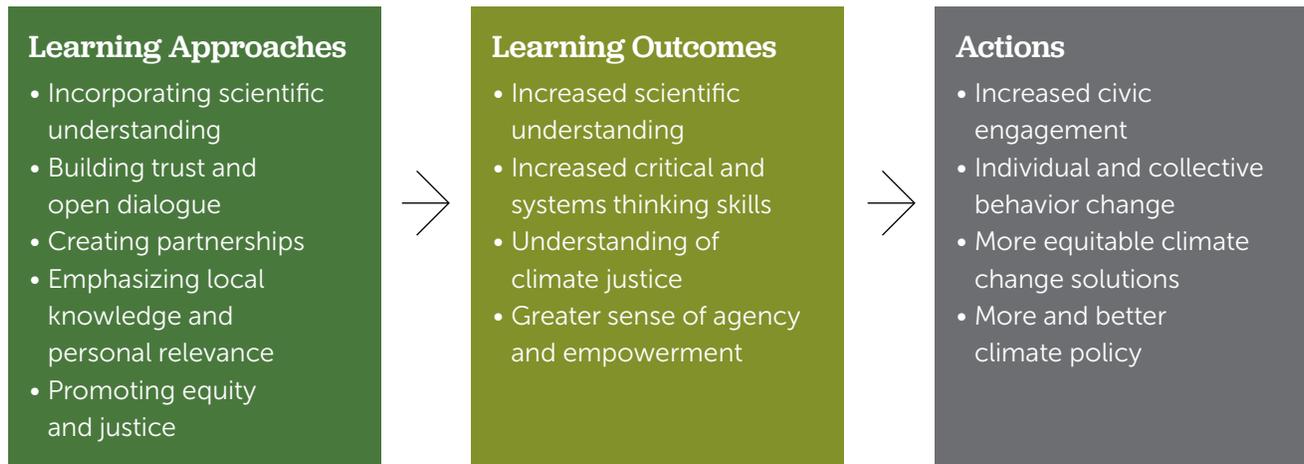
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Just as we consider psychosocial dimensions, we must also consider the age and developmental stage of the learner. Young children, for example, may benefit most by simply spending time in the natural world, an experience that is foundational to their future learning about climate change. Older children, youth, and adults can frequently understand more complex issues and often have the ability to formulate solutions and foresee outcomes. These variables—an individual’s complex social, psychological, and emotional experiences, and their developmental level and cognitive abilities—are all in play as they approach learning. For more information about how developmental factors can play a role in environmental education, we encourage you to check [NAAEE’s K-12 Guidelines for Excellence in Environmental Education](#).

Elements of Effective Climate Change Education

CCE's ultimate goal is to inspire people, individually and collectively, to take action to address climate change. As educators, we can help learners reach this goal through specific learning approaches, as described in Figure 1.

Figure 1. Key components of effective climate change education



Building trust and open dialogue

A quick web search will uncover answers to almost any question we might ask about climate change. But how can we be sure that the answers we find are fact-based? The complexities of climate change, coupled with the ways in which the issue is politicized, leave it wide open to misrepresentation. Even the most experienced of us can find it challenging to sort out fact from fiction. The most effective climate change education programs take this reality into account. If we implement approaches that are built on a foundation of trust, and if we promote open and free discussions and encourage learners to seek common ground, we can help them grapple more effectively with the complexities of climate change. By relying on these elements—trust, and open and free exchange of ideas—we also empower ourselves, even as we may struggle with our own conflicting beliefs and group identities.⁹ Our cultural norms, family background, and political leanings can shape our beliefs about climate change—and how we teach about climate change. We must recognize our personal beliefs to effectively support learners as they explore their own.

Creating mutually beneficial partnerships

We can lower the volume of misinformation by bringing more voices into the conversation, and especially more trusted voices. When scientists and educators work together, for example, they can develop more scientifically accurate and pedagogically sound CCE programs. This kind of collaboration allows both educators and scientists to learn from and with each other, and can elevate educators' confidence in teaching about climate change.¹⁰ In the case study *Spreading Climate Change Literacy on Wheels: Science Express Climate Action Special*, we explore some of the ways in which collaborations helped shape a CCE initiative.



Photo © *Spreading Climate Change Literacy on Wheels: Science Express Climate Action Special Case Study*, VASCSC, Ahmedabad

Emphasizing local knowledge and personal relevance

Local knowledge—the collective knowledge and insights that a community acquires over time—is also important to consider as we address climate change. The most promising and impactful CCE programs are rooted in local knowledge and work to incorporate the unique ways in which a community understands its experiences, leveraging that understanding to create relevant learning opportunities and actions.¹¹



Photos: © *This is Indigenous Land Case Study*, Land and Water Program

Promoting equity and justice

Climate change has a disproportionate impact on some populations, leaving many communities at far greater risk. This unequal impact will persist unless the world, as a whole, works to understand and address it. Low-income communities and a number of specific populations—people of color, Indigenous peoples, people with disabilities, young people, and women—are statistically at a greater risk of experiencing impacts of climate change, such as food and water insecurity, or the dangers of poor air quality and floods.¹² Climate justice recognizes these inequalities and seeks to shift conversations from a narrow focus on environmental issues to a broad view that examines the impact of environmental events in parallel with the socioeconomic consequences of our warming world. By understanding how specific populations are unequally and unfairly affected by climate change, we can also work to ensure that their voices influence decisions about climate policy and actions.

Exploring the impact of climate change on Indigenous peoples can help us better understand climate justice. These populations have suffered from the consequences of climate change and face personal displacement and the exploitation, or even loss, of natural resources. Indigenous peoples attribute deep cultural values to natural places, and these values inform their local knowledge,¹³ but this knowledge may be exploited or even dismissed in the design of climate change solutions.¹⁴ CCE's focus on building trust and promoting open dialogue can bring inequities—whether they are inadvertent or intentional—into focus.

The case study *This is Indigenous Land* explores a program in Manitoba, Canada, that is designed to help Indigenous post-secondary students explore their perspectives on climate change. Through a variety of creative activities, students identify their feelings linked to climate change and learn to construct personal visions of a future that is more equitable and just.

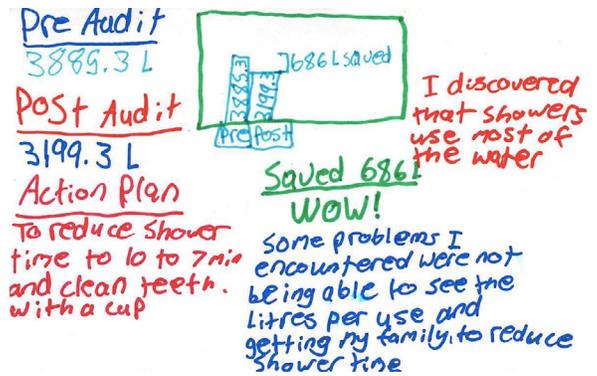
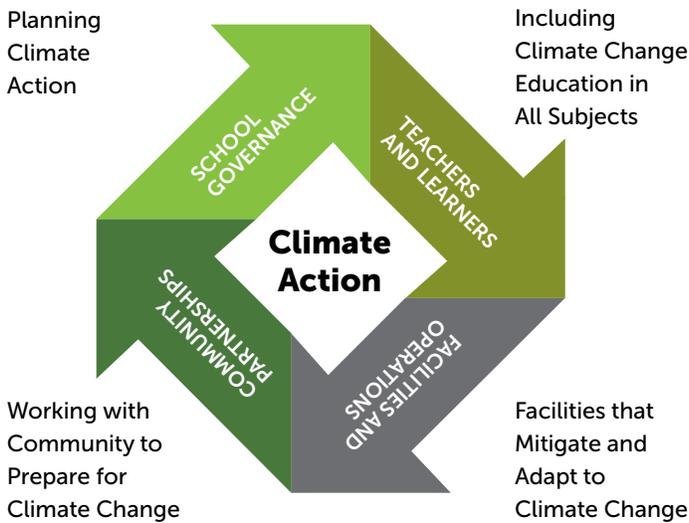
Building agency and empowerment

As discussed in earlier sections, strong climate change education works to develop trust, address misconceptions, build collaborations, and leverage local knowledge. This holds true whether the CCE takes place in school or elsewhere, and regardless of learners’ ages (with the exception of young learners, as discussed earlier in this chapter). Holistic approaches, like the whole-school approach we describe below, can connect and integrate many of the concepts we’ve presented earlier and can be adapted for learners of all ages and backgrounds. Whole-school approaches incorporate CCE concepts that benefit everyone involved—learners at every level, teachers, school staff, administrators—and may even impact those outside of the school setting, including family and friends. When wrapped into a school system’s comprehensive educational programming, these concepts help build critical thinking skills and foster learner-driven action. Canada’s Sustainability and Education Policy Network (SEPN) endorses a whole-school framework that underscores the importance of climate change education as an integral function within an entire school.¹⁵

SEPN’s guidance points to a number of key elements that create a supportive and impactful CCE effort in schools: (1) CCE curricula should be fully embedded in academic subject areas; (2) schools should work to partner with community groups which can enhance their CCE efforts; (3) a school’s leadership should help plan and champion climate initiatives; and (4) schools should adhere to climate-friendly practices in the design and operation of their facilities. This kind of whole-school framework underscores that learning is fundamentally local, and, to be effective, it must be relevant to students, educators, and administrators alike. Students gain agency in how they address climate issues in their community—be it collaborating to design a school-wide energy efficiency plan, establishing a zero-waste cafeteria, or creating a rain garden—and they are able to see the results of their efforts. The learning processes wrapped into this approach underscore the importance of collaborative efforts, and they can empower everyone who participates.

The case study *Student Action for a Sustainable Future* demonstrates these concepts. We’ve included discussion questions and activities to help you explore this case study’s approach to CCE and how these principles can be applied in practical ways.

Whole Institution Approach



Photos: © Student Action for a Sustainable Future



DOWNLOAD THE CASE STUDY
“Student Action for a Sustainable Future”



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Discussion Questions and Activities

Authored by
Alex Russ

After reading the case study *Student Action for a Sustainable Future*, use these questions to facilitate discussion about climate change education (CCE).

1. Which CCE strategies are implemented in the *Student Action for a Sustainable Future* case study? How are they implemented?
2. What is the role of partnerships in *Student Action for a Sustainable Future*? What additional partnerships might also benefit the program?
3. How does the *Student Action for a Sustainable Future* program address equity? What other strategies would you use to enhance equity in this program? In this context, we are defining equity as the fair treatment, access, opportunity, and advancement for all people, while at the same time striving to identify and eliminate barriers that have prevented the full participation of some groups.¹⁶
4. If you were going to design a program similar to the one described in *Student Action for a Sustainable Future* for your own community, which elements of the case study would you borrow? Which elements would you avoid, and why?
5. Reflect on your own experiences with climate change actions. What barriers have you observed that prevented people and communities from organizing climate change actions?

Activities

1. **Design a program.** Design a hypothetical CCE program that aims to address misconceptions about climate change. What audiences would you work with? What are the roots of their misconceptions? What would be the main educational activities in your program? How would your program encourage participants to engage in climate change actions?
2. **Expanding and adapting to new locations.** The *Student Action for a Sustainable Future* program receives funding to expand its program to your city. What do the program developers need to know about your community, its culture, and its educational system so they can adapt the program to fit well with your needs and resources?
3. **Evaluation.** Continuous evaluation helps us improve our programs. In small groups, discuss how you would evaluate a CCE program. What metrics would you use and why? What specific knowledge or behaviors would you measure among learners, and how?
4. **K-W-L chart.** This activity is designed to help learners access and activate knowledge they already have and integrate new information. The K-W-L chart has three columns that are labeled Know, Want to Know, and Learned. Working individually or in small groups, learners can complete the first two columns (Know and Want to Know) before reading a case study, and then fill in the third column (Learned) after reading the case study. If they want to learn more after completing the chart, they can add items to the second column (Want to Know).

Endnotes

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