



CAMBRIDGE

Introduction  
paper

# Ready for the world

## Empowering learners through climate change education



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# Introduction: education is key to tackling the climate crisis

Last year was the warmest on record. The planet was 1.48°C hotter in 2023 compared with the time before the mass burning of fossil fuels, and 2024<sup>1</sup> could be even warmer. The extreme heat triggered destructive wildfires, storms and floods around the world. Alongside approaches for reducing greenhouse gas emissions, transitioning to renewable energy sources and protecting biodiversity, education is now recognised as a major strategy to mitigate climate change. While students in some countries have been demanding such education is added to their curriculum,<sup>2</sup> a new UNICEF-Gallup poll reveals that while most children and young people say they have heard of climate change, only half understand what it is.<sup>3</sup> Cambridge wants to build a new climate education community to address this challenge.

Education is a vital component of climate change action because it plays a crucial role in equipping current and future generations with the holistic knowledge and skills to address climate-related challenges at local, national and global levels. Only by understanding the origins and impacts of climate change can learners develop appropriate policies and technologies to innovate in ways that can save our planet<sup>4</sup>. Moreover, improved understanding of the disproportionate impacts of climate change on vulnerable communities helps drive equitable climate action, and climate change education enables learners to discern accurate information from misinformation and claims of environmental benefits that do not exist (greenwashing).

To achieve its aims, climate change education needs to be high quality, holistic across the curriculum and school ages, and able to set global issues in a local context. Our ambition at Cambridge is to build such an educational approach by listening to our global community of educators, policymakers, thought leaders and learners, and understanding their requirements. Only through such education will young people across the globe be ready for a world impacted by climate change.





## High-quality education matters

### A beacon of high-quality climate change education for all

At Cambridge, we want to build the world's most trusted teaching, learning and assessment community. In parallel with the University of Cambridge, our mission is to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence.

Through the University of Cambridge, we collaborate with academics from the Faculty of Education; Judge Business School; the Department of Geography; the Department of Applied Mathematics and Theoretical Physics and the Department of History and Philosophy of Science, and we are about to begin a significant collaboration with academics from the Department of Engineering. This work is done jointly with **Cambridge Zero** (an initiative established within the University of Cambridge that draws on international capabilities to develop greener technologies and zero-carbon solutions that work for individuals, society and economies). It is this background of evidence from the various departments at the University that we can uniquely bring into our approach of developing climate change education together with our experienced community of educators, policymakers and thought leaders in 160 countries, and 10 000 schools around the world.

As proud signatories of the UN Global Compact, we are committed to the UN Sustainable Development Goals (SDGs) for inclusive and equitable education. For us, inclusive education means that every person has the right to feel safe, accepted and supported in our schools whether they are a learner, a teacher or a school leader. We celebrate the diversity in our community and continually strive to ensure our education is respectful of the customs and laws of the people we serve, by listening to their voices every step of the way.

What this means for climate change education is that, with the input and feedback of our Cambridge community, we are developing our programmes of teaching, learning and assessment to best equip students to respond to both local and global climate challenges. As climate change affects everyone, this programme will only be effective if all young people have the opportunity to access such high-quality education, and we welcome those who are not part of the Cambridge community into this initiative.



## Across all subjects: a multi-disciplinary curriculum

Knowledge about climate change has been commonly associated with geography and science-related subjects. However, as this is a major issue facing society, it is important to acknowledge that multiple subjects can contribute the skills required to understand and tackle the climate crisis.

Cambridge is increasingly working to embed this knowledge and understanding across our courses where relevant. This multi-disciplinary approach is particularly relevant as we help learners to develop not only knowledge *about* climate change, but also the values, attitudes and skills to *understand* and *address* climate change.

For example:

- Quantitative skills and the ability to engage critically with data and statistics are vital for thoughtful engagement with evidence about climate change, so mathematics has a distinctive contribution to make.
- English and languages education equip learners to express reasoned opinions and to critically evaluate arguments about climate change.

- The creative arts make a distinctive contribution in enabling learners to express their responses to climate change and to appreciate the responses of diverse groups.
- Understanding the behaviours of both individuals and societies is key in delivering climate action. Social sciences develop an awareness of contemporary social, cultural and political trends and issues, and an ability to examine these in a rigorous, reasoned and analytical way.

When planning opportunities for climate change education across the curriculum, coherence is important to ensure careful progression in learning, avoid unintended repetition between subjects, and ensure a genuine contribution from each discipline's strengths. Regular review and updating of curricula are also vital as new research and policies on climate change and associated responses become available.

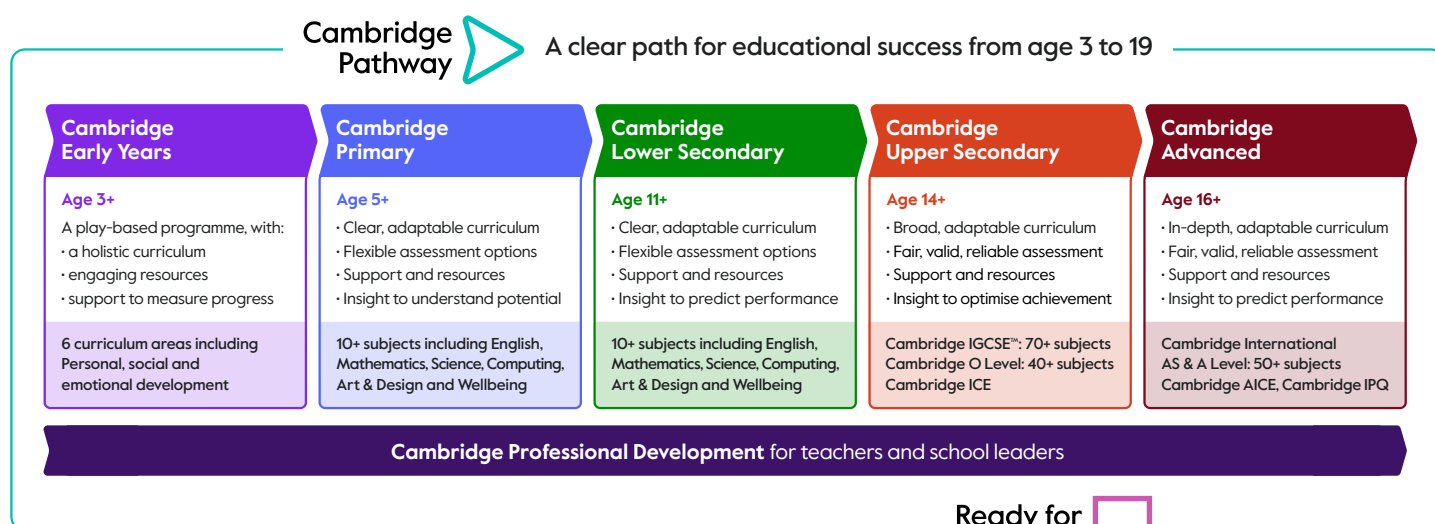


## Across all school ages of primary and secondary education

For climate change education to build momentum and achieve its aims, it should be embedded across the whole school curriculum from the youngest to the oldest learners in a system, and beyond to higher education. Clearly the nature of knowledge, values, attitudes and skills cultivated will vary with each age group and, as we have already noted, careful planning for progression is essential.

We offer a fully integrated and flexible educational system for learners age 3 to 19 – the **Cambridge Pathway**<sup>5</sup> – that brings together globally recognised teaching and learning with meaningful assessments that measure student mastery. Each stage of the Cambridge Pathway builds on learners’ development from the previous one. Schools can offer any of the five stages

and any of the courses, alongside other curricula. In our new **Cambridge Early Years**<sup>6</sup> programme, the topic of ‘Understanding our world’ instils a sense of care for the environment, and the programme’s foundational skills in maths, communication, language, literacy and creative expression are the basis for future skills required to engage with climate change education.



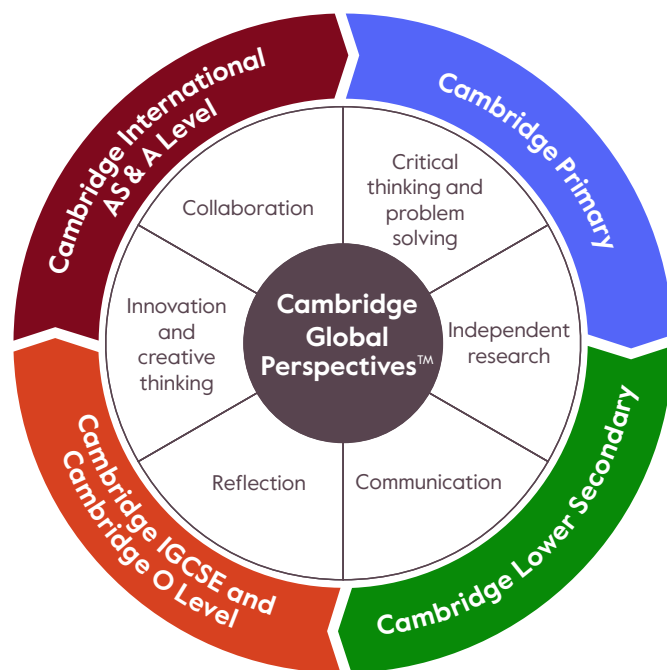
Learners need to be equipped with the skills, values and attitudes for working with climate change knowledge and the Cambridge learner attributes foster these approaches, enabling children and young people to be:

- **confident** in working with information and ideas – their own and those of others
- **responsible** for themselves, responsive to and respectful of others
- **reflective** as learners, developing their ability to learn
- **innovative** and equipped for new and future challenges
- **engaged** intellectually and socially, ready to make a difference.<sup>7</sup>

Our flexible and innovative **Cambridge Global Perspectives™** series across Cambridge Primary, Cambridge Lower Secondary, Cambridge IGCSE™ and Cambridge International AS & A Level builds these skills in a collaborative context. The Cambridge **Global Perspectives** curricula enable learners to develop and apply a range of transferable skills in the context of key global issues: analysis, collaboration, communication, evaluation, reflection and research.<sup>8</sup>

As part of climate change education, it is useful to consider a set of trans-subject themes in knowledge that can be explored in a range of contexts. These could include themes for older students such as complexity, futures,<sup>9</sup> global governance, systems thinking<sup>10</sup> and interdependence. Such themes work across subject boundaries and are helpful in developing learners' resilience and adaptability to meet the challenges of an unknown future.

Cambridge offers a range of resources as well as subject-based and enrichment professional development for our teachers and leaders to support them in being confident with knowledge and pedagogy, to enable their young people to learn and thrive in a changing world.<sup>11</sup>





## Aligned approach across teaching and learning (pedagogy)

The technological, geopolitical, societal, ethical and environmental contexts that young people are inheriting mean that we should not only have a sharp and dynamic focus on curricula content but also on future educational models and how they should be delivered. Engagement with the topic of climate change is more dependent on how it is taught and brought to life with real-world applications, rather than the curriculum alone.

Cambridge's research review, the *Great Teaching Toolkit*<sup>12</sup> outlines four elements of a model for effective teaching which are essential in climate education:

### 1. Understanding the content.

- Teachers need to be equipped to understand the causes, effects and responses to climate change, anticipate and respond to common misconceptions, and select appropriate learning activities.

### 2. Creating a supportive environment.

- Teachers must create a classroom climate where learners feel safe to express their views about climate change and to respect the views of others.

### 3. Maximising opportunities to learn.

- Learning outside the classroom<sup>13</sup> is a valuable part of climate change education.<sup>14</sup> It needs to be sensitive to education systems and cultural context, but it has the potential to encourage learners to engage meaningfully with climate change education. This outside learning approach is reinforced by recent research that has shown the positive impact on wellbeing of spending time in natural environments.<sup>15</sup> The Scandinavian Forest Schools movement is influential in some areas of the world, for example, while there is a strong tradition of geography and science fieldwork in other countries.

### 4. Activating hard thinking.

- Activating hard thinking about climate change involves teachers in effectively structuring, explaining, questioning, interacting, embedding and activating learners and learning.

Cambridge encourages an active learning approach to pedagogy, which is ideally placed to fulfil these aims. Active learning is an approach where learners participate in the learning process by building knowledge and understanding. In schools they will usually do this in response to learning opportunities designed by their teacher.<sup>16,17</sup>



Active learning incorporates and links to other aspects of great teaching, such as: opportunities for learners to plan, monitor and evaluate their learning (**metacognition**<sup>18</sup>); ensuring that feedback flows both ways between teacher and learners, and is acted on by the teacher (**assessment for learning**<sup>19</sup>); and enabling participation of all learners (**inclusion**<sup>20</sup> and **oracy**<sup>16,17</sup>). Learning must be designed with all learners in mind.

Climate change education calls for a particular emphasis on creativity, critical engagement, skills of listening to and respecting the views of others, and the development of informed opinions. A wide range of excellent learning strategies for different age groups are available worldwide to achieve these aims, and Cambridge draws on these practical ideas during our extensive programme of subject and enrichment training for teachers and leaders.<sup>21</sup> We also provide tools to enable schools, teachers and leaders to evaluate their curricula, skills and professional development opportunities.<sup>22</sup>

Teachers can support learners in their reflections by encouraging them to describe what they observe and feel before evaluating and analysing how this contributes to their understanding of climate change issues and their attitudes. Once learners are clear in their own minds what their values are, they can explore what actions they want to take.



## Mental health and wellbeing

High-quality climate change education also has space to address **eco-anxiety** among students. **Eco-anxiety**<sup>23</sup> (also known as eco-distress or climate anxiety) is ‘a way of describing how people feel when they hear bad news about our planet and the environment’.<sup>24,25</sup> These reactions can include feeling ‘anxious, worried, upset, scared, sad, angry or unsure about the future’.<sup>24</sup>

Eco-anxiety can cause a wide range of responses in mind and body, potentially affecting concentration, sleep and daily living. It can be particularly acute if the person feels like the situation is outside their control and that they have no ability to respond.<sup>26</sup> One study found that over 70 per cent of young people felt ‘hopeless’ in response to the climate crisis.<sup>27</sup> Another study reported that 59 per cent of respondents age 16 to 25 in 10 countries felt ‘very or extremely worried’ about climate change.<sup>28</sup>

Appropriate pedagogy can play a vital role in addressing and alleviating eco-anxiety by:

- encouraging learners to express their feelings about climate change.<sup>26</sup> Creative and collaborative responses to climate change have a particular value in enabling learners to communicate their feelings and to consider appropriate actions<sup>29</sup>
- empowering learners to consider small and practical steps they can take in relation to climate change<sup>24</sup> and modelling these practical steps within the classroom and school community
- encouraging learners to see that action on climate change is a local, regional, national and international responsibility and that many people and organisations are involved
- providing information and addressing misconceptions about climate change
- encouraging learners to explore ‘good news stories’, hopeful futures and case studies of climate change action around the world<sup>30</sup>
- being aware that eco-anxiety can cause acute distress, looking out for this and referring to appropriate medical advice.



Local context is important to consider in climate change education and this also has a bearing on climate anxiety. In some areas, families will be reliant on employment directly or indirectly related to fossil fuel use – for example, mining or aerospace industries. Economically disadvantaged communities may have fewer choices about purchasing goods, housing or energy, so to emphasise the response of individuals or families to climate change may be unhelpful. Instead, it might be preferable to focus on the response of the whole school community and to affirm existing climate-friendly strategies.

## Assessing climate change education – learners and educators

Both assessment *for* learning (formative assessment) and assessment *of* learning (summative assessment)<sup>31</sup> are important for climate change education. Assessment for learning is an integral part of pedagogy for climate change education.

As with any element of learning, we need to establish:

- ‘where the learner is going’ using learning intentions and success criteria
- ‘where the learner is right now’ through eliciting evidence of learning
- ‘how to get there’ through high-quality feedback.<sup>16</sup>

In most contexts, learners will already have some knowledge about climate change from informal sources or previous education, so it is important to activate this prior knowledge and to be alert for misconceptions about climate change.<sup>32</sup>

There are many excellent strategies for formative assessment that can be naturally embedded within the teaching and learning process rather than ‘bolt-on’ extras.<sup>19</sup> These strategies enable teachers to receive a regular flow of feedback about the progress of all students’ learning, so that they can respond flexibly to adjust teaching to learners’ needs. Peer- and self-assessment strategies can be used as part of the reflection on the learning process to empower learners to recognise and evaluate their own learning about climate change.

Summative assessment strategies need to respond not just to knowledge about climate change, but to skills such as collaborative and critical thinking, which are an important part of the Cambridge Pathway. It can be a challenge to ensure both validity and reliability in summative assessment of complex and sophisticated skills<sup>33</sup>. The **Cambridge Global Perspectives** suite of specifications specialises in teaching and assessing skills relevant to climate change education. For example, the assessment objectives from Cambridge IGCSE Global Perspectives are as follows:<sup>34</sup>

### AO1 Research, analysis and evaluation

- design, carry out and evaluate research into current global issues, their causes and consequences and possible course(s) of action
- use evidence to support claims, arguments and perspectives
- identify and analyse issues, arguments and perspectives
- analyse and evaluate the evidence and reasoning used to support claims, arguments and perspectives
- analyse and evaluate sources and/or processes to support research, arguments and perspectives
- develop a line of reasoning to support an argument, a perspective or course(s) of action.

### AO2 Reflection

- consider different perspectives objectively and with empathy
- justify personal perspective(s) using evidence and reasoning
- consider how research, engagement with different perspectives and working as part of a team have influenced personal learning.

### AO3 Communication and collaboration

- select and present relevant arguments, evidence and perspectives clearly and with structure
- present research and include citations and references
- contribute to the Team Project.

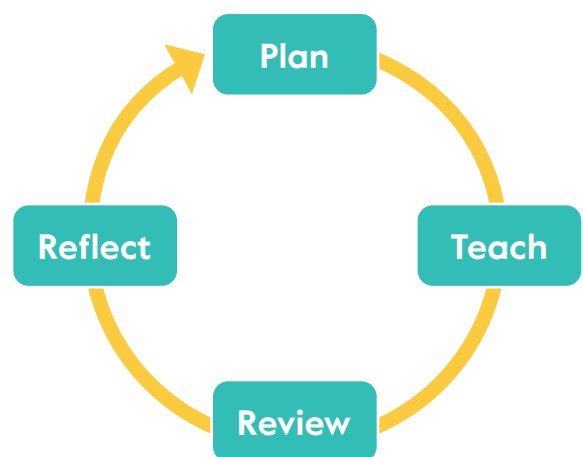




For Cambridge IGCSE, these objectives are assessed through a variety of ways including written examination, individual reports and team projects depending on which skills are being evaluated. Applying the right assessment tool to evaluate a particular competency is a key principle of **Cambridge Global Perspectives**.

Evaluating values, attitudes and resulting actions from climate change education is a challenging area, but interesting to explore further.<sup>35</sup> A simple **practitioner enquiry cycle** of plan, teach/implement, review, reflect can be used to structure the evaluation process.<sup>36</sup> Any teacher who uses assessment for learning approaches will have already started evaluating the impact of their teaching, but there are ways of extending this practice and the methods for evaluating impact in the classroom or whole-school context<sup>17</sup>. Schools benefit as teachers and leaders share the results of their evaluations within and outside their school communities. Cambridge supports teachers and leaders in evaluating the impact of current and existing initiatives in their schools through our professional development programmes and resources.<sup>37</sup>

#### Practitioner enquiry cycle



## Embedding change in our programmes and support

Working with experts at **Cambridge Zero**, we have identified opportunities to incorporate climate-related topics in a number of our curricula as they proceed through the redevelopment process, including those we are updating for September 2024 and first assessment in 2027.

To complement these updated resources, we are increasing support for the professional development of our teachers and leaders to help them become confident with the knowledge and pedagogy that will enable their young people to learn and thrive in a world of climate change.

Also, in partnership with **Cambridge Zero**, we have launched an innovative educational initiative, '**Cambridge Climate Quest**', across India. This is an educational programme that provides learners from Classes 8 through to 12 with a foundational awareness of climate change issues. The programme is the first of its kind launched in the country, and represents a major step forward in promoting awareness of climate change and proactive engagement on a widespread scale.

In addition, our international schools science competition for learners age 14 to 16 also supports thinking and learning around climate change.

The Cambridge Upper Secondary Science Competition is an extra-curricular activity that encourages scientific investigations into areas of relevance to the school and asks students to consider environmental sustainability in their planning, either in the focus of their investigation or in their use of resources. In 2023, we had 270 entrants, representing learners and teachers around the world who are thinking locally with global implications.







## Context matters

### Recognising the diversity of local, national and international contexts

The impact of climate change is uneven across the world. Similarly, the social, economic and environmental contexts of countries are diverse. This diversity is both *between* and *within* countries.

Diversity *between* countries can be seen in the financial resources available to mitigate the effects of climate change, the response to the UN SDGs,<sup>38</sup> the potential for different types of renewable energy,<sup>39</sup> the effects of increased extreme weather events on agriculture, and so on.<sup>40</sup>

Diversity *within* countries can be seen in variation in the fragility of different **ecosystems**,<sup>41</sup> the extent of urbanisation and land degradation, the level of environmental protection in different areas, and diversity of housing and consumption within the population.<sup>42</sup> Often climate change most severely affects the poorest and most marginalised proportion of a population as lack of income tends to reduce resilience to the effects of climate change.<sup>43</sup> Place matters, and an effective response to climate change in one place will not necessarily be appropriate in another.

Historical, economic and cultural factors affect the extent to which curricula recognise and highlight knowledge, attitudes, values and skills relating to climate change education.<sup>44</sup> In the same way that the effects of and response to climate change vary with place context, climate change education needs to respond to the particular environmental, social and cultural contexts and constraints of learners, schools and education.

In all countries, there needs to be sensitivity to economically disadvantaged families who may not have the choices and options open to families with higher incomes. This is particularly relevant to encouraging actions in response to climate change. For example, some families may not be able to choose an alternative fuel for heating or cooking, even if their present one releases carbon. Similarly, some families will have a greater range of food choices than others. It is important therefore that climate change education does not pressurise families who are already in challenging circumstances.

## Addressing controversy on climate change

Overwhelming scientific evidence supports the conclusion that the Earth's climate is changing, and that human activities contribute significantly to this change. However, efforts to undermine this science and deny the seriousness of the potential consequences of global warming persist. Controversy also surrounds some of the proposed responses to climate change in different areas of the world, including transport policy, environmental protection and methods of electricity generation which tend to be perceived differently within communities directly and indirectly affected.

Controversial issues can be described as those which:

- 'Evoke strong feelings and views.
- Affect the social, cultural, economic and environmental context in which people live.
- Deal with questions of value and belief, and can divide opinion between individuals, communities and wider society.
- Are usually complicated, with no clear "answers" because they are issues on which people often hold strong views based on their own experiences, interests, values and personal context [...]
- Can vary with place and time and may be long-standing or very recent. For example, an issue that is controversial in one community or country may be widely accepted in another.'<sup>45</sup>

Education draws heavily on values. School communities are built on shared values and the behaviours that flow from them, such as care and respect for others. These values are transmitted through speech, the written word and even the built environment of the school. Issues become controversial when there is no agreed 'right answer' within the community. A **values transmission** approach is therefore inappropriate, and, instead, a **values clarification**<sup>46</sup> approach is needed, where learners develop their understanding of the arguments from different perspectives and are encouraged to develop their own informed opinions in response.



Further elements of good practice in teaching controversial issues include:

- The teacher should reflect on their own understanding and values about the issue beforehand.
- The teacher should select appropriate learning strategies, depending on the school subject, learners' age and the issue under consideration. There are a range of options – for example, the teacher may take a 'neutral' stance aiming to present a balanced view of the issue, or they may model a particular viewpoint.<sup>45</sup>
- Learners' knowledge about the issue should be sufficiently developed, as appropriate for their age, so that they are able to state well-informed opinions.
- Learners should be given sufficient opportunities to develop and state their opinions, ask questions and reflect on their learning.<sup>47</sup>
- Ground rules for the activity should be agreed so that all learners feel safe and respected, and a positive classroom climate is maintained.<sup>45</sup>

Controversial issues around climate change response give an excellent opportunity for learners to develop their skills of critical evaluation of data, argument and counter argument, good practice in use of evidence and critical media literacy.<sup>16,17</sup>





## We practise what we teach

In recognition of the importance of climate change education, Cambridge has appointed a dedicated Global Director for Climate Education, Christine Özden. Christine led a workshop at the opening weekend of the 2023 UN Climate Change Conference (COP28) to discuss how to embed and scale up climate literacy in schools. The session at the ‘Greening Education Hub’ brought together local and global partners to share expertise on how we prepare current and future generations of learners – in different education systems and contexts – with the skills and knowledge to act on climate change.

We recognise the importance of policymakers in raising the profile of climate change education. At COP28, alongside hosting partners the Dubai Future Foundation, we invited government and education organisations to discuss what schooling will look like 30 years from now. Participants employed a ‘futures-thinking’ approach to anticipate plausible future directions, prompting questions such as: How will schooling need to respond to the increase in climate-

related issues? What will be the opportunities – and challenges – afforded by technology? What about potentially widening equality gaps?

Cambridge was the first university in the world to adopt a science-based target for carbon reduction, committing us to absolute zero by 2048.<sup>48</sup> Our approach for achieving this is set out in our **Carbon Reduction Strategy**.<sup>49</sup>

# Join our community on climate change education

Partnerships are key to delivering climate change education. Cambridge has a unique convening power to assemble critical groups, but this is not enough to tackle a challenge on the scale of climate change. We seek to learn more about the themes, issues and approaches that matter most to educators and leaders around the world, both in Cambridge and non-Cambridge schools.

We want to build a community of educators and leaders to influence the direction of climate change education that will empower current and future generations to respond and adapt to climate change, and we invite you to join our community in several ways:

- We encourage you to share your thoughts on this introductory paper and how climate change is already taught, or not, in your school. Share your feedback [here](#) and join our exclusive online research community on climate change education.
- In March, our online Cambridge Schools Conference will include two sessions devoted to climate change education, led by our curriculum team and a consultant who is an expert on climate change and sustainability education. Visit [www.cambridgeinternational.org/csc](http://www.cambridgeinternational.org/csc) for more information.
- Go to [www.cambridgeinternational.org/climatechangeeducation](http://www.cambridgeinternational.org/climatechangeeducation) to learn more – and keep up to date with what we are doing on climate change education and how you can be involved.



Together, we believe we can deliver high-quality climate change education that delivers knowledge, shapes understanding and skills, and gives learners and educators the confidence to thrive and make a positive impact in our changing world. Together, we can help learners be ready for a world impacted by climate change.



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