Climate Change Education (CCE) Position Paper: A call to action

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Executive summary

Our commitment is to comprehensive, unified, research-informed action to ensure that all Australian young people receive quality climate change education. We are three national education associations, and we call for the following five actions:

1. Make climate change education explicit and mandatory across the F–12 curriculum to support Australian students to be active, responsible citizens.
2. Develop a conceptual progression of learning, through the curriculum, that leads to deep engagement with human-induced climate change across all years of schooling.
3. Provide professional learning for pre-service and in-service teachers, school leaders, and administrators to build knowledge, values, and skills related to climate change education across disciplines.
4. Develop a national education action plan that prioritises climate action.
5. Fund a coordinated program that enables multiple cross-institutional research initiatives to inform effective climate change education in schools.

Who we are

The **Australian Science Teachers Association (ASTA)** is the national not-for-profit peak professional body for science teachers and is a federated group of eight state- and territory-based associations. ASTA produces four issues of a peer-reviewed journal for science teachers in Australia each year. ASTA promotes and advances science education by:

- providing advocacy and leadership as the peak body for science educators at a national level;
- supporting Member Associations to provide quality professional learning and development;
- promoting opportunities for the broader community to engage with science education;
- providing scholarships and bursaries to eligible individuals, in accordance with the requirements of a scholarship fund as defined by the Australian Taxation Office; and
- supporting the education of young people up to the end of Year 12 in their scientific studies and pursuits.

ASTA invited colleague associations to lend their strength to this call to action policy paper. We are delighted to be joined by AGTA and AAEE.

The **Australian Geography Teachers Association (AGTA)** is the peak professional body for geography teachers and represents the interests of its member affiliates to national education decision-making bodies. The Association is committed to excellence in the teaching and learning of geography in Australian schools and enhances awareness of its applications in society. AGTA promotes and disseminates research on geography education through its journal, *Geographical Education*.

The **Australian Association for Environmental Education (AAEE)** is Australia's peak professional body for environmental educators, providing a collaborative and supportive network for the growing force of cross-sector environmental educators across our states and territories, and hosts the *Australian Journal of Environmental Education (AJEE).*

AAEE leads the Climate Change Strategy, a national advocacy program that voices Australians' desire for climate change education across Australia.

1. Introduction and rationale

Human-induced climate change is supported by scientific data (CSIRO, 2024), but the Intergovernmental Panel on Climate Change (IPCC, 2023) states that the pace and scale of climate action are insufficient to address climate change. Therefore, we are calling for courageous political leadership, clear planning, and proper resourcing to improve how climate change is taught in Australian classrooms. **This call to action is directed to education policymakers, school systems, teacher unions, and teacher professional associations, because strong action is needed across the whole system to guide national direction and to build teachers' skills and confidence.**

Understanding of climate change in Australia has historically been shaped by economic priorities, business interests, and political debates, with the public receiving limited information and scientific evidence. The OECD Climate Literacy Framework (OECD, 2025b) provides educators with guidance to help students understand the complex scientific, social, and ethical aspects of climate change so that they can make good decisions about their own futures and the future of their communities. **Teachers need a strong system of support to build deep expertise in climate change education, and they must be recognised as leaders who guide this work in schools.**

Other countries are moving faster than Australia in strengthening their climate change education. The OECD's Programme for International Student Assessment (PISA) 2025 Science Framework (OECD, 2025a) states that 15-year-old students must be able to make informed decisions, take action, and demonstrate "Agency in the Anthropocene" (White et al, 2023). The OECD (2025b) has also created a 2029 Climate Literacy Framework to guide the inclusion of climate change knowledge, reasoning, and action in curriculum and assessment. **These documents demonstrate strong international leadership and highlight the need to develop a clear, explicit F–12 curriculum progression on climate change in Australia.**

ASTA's working group has used these international frameworks, along with the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, the Action for Climate Empowerment (ACE) agenda, and the outcomes of the 2024 Australian Climate Change Education Summit to shape this position paper. The ACE agenda calls on governments to educate, empower, and involve all groups in understanding and responding to climate change. ASTA, AGTA, and AAEE have worked with leading educators from across Australia to bring research-based insights into this document. **A key part of this work is to position us to have a strong voice in conceptualising and implementing climate change education in Australian schools.**

The growing influence of artificial intelligence (AI) and the speed at which unverified information

spreads make it even more important that climate change education helps students to develop strong thinking and evaluation skills. International documents such as UNESCO's ESD for 2030 Roadmap (UNESCO, 2020), the OECD PISA 2025 Science Framework (OECD, 2023), and the UNFCCC's ACE agenda (UNFCCC, 2016) all emphasise the need for learners to make informed judgments in fast-changing information environments. Teachers at every year level need support to recognise and respond to the false and misleading information about climate change that is now widely shared through digital and AI-driven platforms. **We highlight the importance of continuing to teach critical thinking and media literacy skills so that students learn how to evaluate evidence, question information, and build strong habits for analysing claims.**

Strong climate change education depends on teachers having accurate, trustworthy scientific knowledge and suitable teaching approaches. This means that pre-service teachers, in-service teachers, school leaders, and administrators all need high-quality professional learning to support schools in adopting whole-school, place-based approaches that respond to social-environmental challenges. **These approaches help students to make informed choices about climate actions, build moral and civic responsibility, and develop the agency they need for future decision making.**

We call for urgent action in education so that students graduate from school with high-level climate literacy enabling them to make decisions, address climate change challenges, and adapt to future climate conditions. These actions include:

- making climate change education explicit and mandatory across the F–12 curriculum;
- building a clear conceptual progression of climate change learning across all years of schooling;
- providing professional learning for teachers, school leaders, and administrators;
- developing a national education action plan that prioritises climate action; and
- funding a coordinated program that enables multiple cross-institutional research initiatives to inform effective climate change education in schools.

2. What is climate change education (CCE)?

CCE is a systems-based approach to teaching and learning that enables students to understand the complexity of human-induced climate change, its causes and consequences, and responses to it.

CCE requires a multidisciplinary, systems-based approach that encompasses science, geography, civics, and ethics. Such an approach can engage with the complexity of global climate change processes, drawing upon the understanding that a system is a set of elements that are connected to each other by feedback relationships and organised in a way that achieves a function. Systems are:

> interconnected in such a way that they produce their own pattern of behavior over time. The system may be buffeted, constricted, triggered, or driven by outside forces. But the system's response to these forces is characteristic of itself, and that response is seldom simple in the real world. (Meadows, 2008, p. 2)

In the context of CCE, a system is not only about sustainability or the weather/climate but about understanding Earth's systems and how human interactions cause negative outcomes. Earth's systems are the interlinked physical, chemical, biological, and human processes that cycle materials and energy in complex and dynamic ways (Skamp & Greene, 2023).

When it is effective, CCE enables students to:

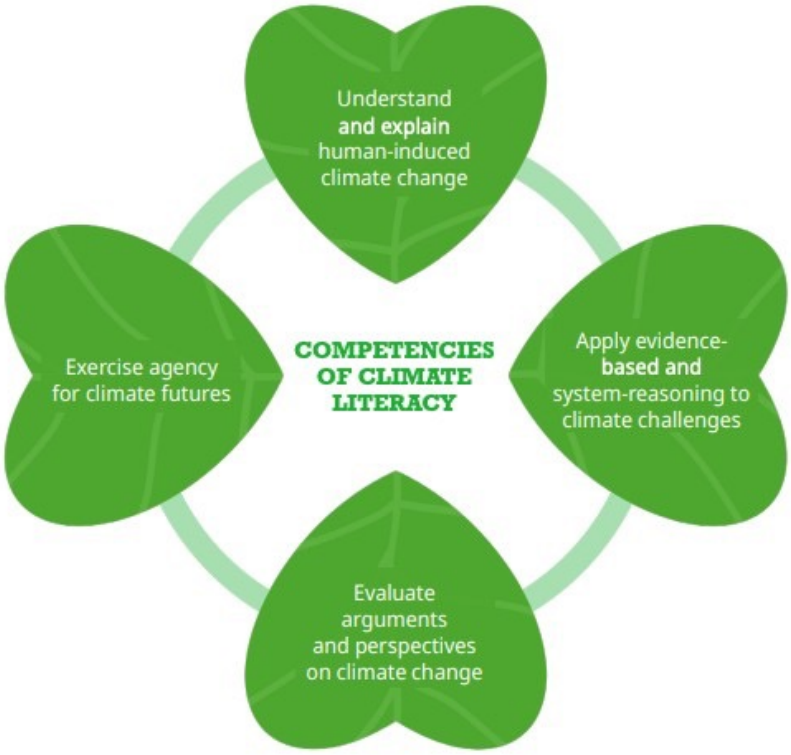
- understand that Earth's systems are changing at unexpected rates;
- understand how human systems interconnect with the Earth's system to produce social-ecological challenges such as human-induced climate change, biodiversity loss, energy transition, antimicrobial resistance, and plastic pollution;
- use data as evidence to model the rate of change and understand the Anthropocene as an epoch of human-induced changes to Earth's systems;
- take informed action to address local social-ecological challenges; and
- develop skills that enable students to have agency to make responsible decisions.

3. Action needed

Action 1: Make climate change education explicit and mandatory across the F–12 curriculum to support Australian students to be active, responsible citizens.

The greater purpose of a curriculum is to equip students to become citizens capable of making the decisions needed to ensure a sustainable future. Student knowledge about climate change is assessed by PISA; as such, if Australian education is to be considered a global success, it is vital that climate change knowledge is explicitly outlined in

Figure 1: Competencies of Climate Literacy.



national and state curriculum documents. Both the OECD PISA 2025 Science framework and the 2029 Climate Literacy Framework (See **Figure 1** above) provide evidence-based support for the development of explicit content descriptors and elaborations in the curriculum. The PISA Science Framework (OECD, 2025a) supports calls for strengthened climate change education in the Australian curriculum, along with opportunities for students to engage in local climate action and initiatives.

Some countries, including Italy, Thailand, France, Taiwan, England, and Vietnam, have mandated climate change education within their curricula, but many have not (McKenzie, 2023). Climate change education is based predominantly in science and geography subject curricula. Curricula primarily focus on knowledge about the causes and impacts of climate change, with much less emphasis on action-oriented learning (Benavot & McKenzie, 2024).

For example, in Australia, anthropogenic climate change is currently included in the Australian Curriculum and in state/territory curricula in science and geography.

However, its scope is limited and coverage occurs mostly in Year 10, when some students choose not to study science or geography, meaning that they miss out on CCE. Currently, curriculum documents across the country lack a coordinated approach to climate change education, and teachers must be given more information so they are able to unpack the content needed for relevant local climate change action. Care must be taken to ensure that resources are suitable for the age of the children or young people (Tytler et al., 2025b).

We call for the strengthening of curriculum across all year levels to ensure appropriate, localised, and relevant climate change education.

Table 1 provides principles that could be used by curriculum and policy writers, as well as teachers, to generate climate change education that builds student agency and identity, while also fostering in students hope for a future in which both mitigation and adaptation strategies are used to deal with the issues the world is facing.

Action 2: Develop the progression of learning through the curriculum for all years of schooling to provide a clear conceptual sequence that enables deep engagement with anthropogenic climate change.

Climate change is complex, but understanding of core scientific and social concepts can be built progressively throughout schooling, ensuring that students develop a continuum of knowledge, understanding, skills, and values as they move from simple observations in the early years to analysing global systems and human choices in late secondary school.

Table 1: Principles for teaching climate change.

Principles for teaching climate change

1. CCE should address the science of climate change and human systems, including Earth systems interactions.
2. We should prioritise agency when teaching young people about climate change, developing activities that engage students in decision making and action, and critical thinking.
3. We must highlight the choices we have and what can and must be done at the individual and collective levels, rather than focusing solely on the impacts of climate change.
4. Teachers should consider the potential for learner anxiety and explore relevant resources – such as the Climate Council Climate Anxiety Toolkit, and resources from state governments and teacher associations – to support them.
5. Engaging with democratic processes is one of the ways that students can take action on climate change. CCE can play an important role in guiding students to prepare for critically engaging with community action, local council policy, and voting informed by critical understandings of high-level climate policy agendas.
6. CCE should recognise that the challenges of the Anthropocene are wider than the climate crisis. For example, the planetary boundaries model identifies the different systems that are threatened.
7. All education, including CCE, should demonstrate respect for a range of different knowledge, especially Aboriginal and Torres Strait Islander knowledge.
8. We must teach critical thinking and media literacy, and support students to develop a disposition for analysis. There is evidence that students who better appreciate the nature of science are more willing to accept and act on climate change.

Science and geography are key disciplines engaged with understanding, tracking, and responding to this meta crisis. Other subjects can use climate change contexts within their content to support and enhance the general capabilities of critical thinking, civics, and sustainability. Effective climate change education will build cross-disciplinary connections.

CCE is conceptualised differently depending on children and young people's stages of learning, so the curricular progression of ideas should reflect this **(Table 2). We recommend developing increasingly complex ideas about the nature of science, details of climate science and systems thinking, and planetary boundaries across the twelve years of school at age-appropriate levels.**

Action 3: Provide professional learning for all pre-service and in-service teachers, school administrators, and leaders to build teachers' confidence, knowledge, and skills related to anthropogenic climate change across disciplines.

We recognise the need for well-funded, relevant, accessible, and contextually appropriate professional learning, and commit to providing support for climate change education for all stakeholders. Each region in Australia has its own complex societal and economic beliefs about climate change, and these must be reflected in the educational resources that are developed. These resources must also include Indigenous knowledge and understanding.

CCE is most powerful when taught through a scaffolded sequence of guided inquiry rather than as an add-on in isolated lessons. Drawing on a large body of research around the teaching of the Nature of Science (NOS), we know that students don't learn ideas well if teachers only hint at them. CCE should not be "hidden" within the topic of sustainability or in occasional projects. For students to develop agency and to see themselves as part of the solution, CCE must be clear, intentional, and reflective. The best approach is to:

- Use local events and issues as contexts – such as bushfires, floods, or school-based sustainability projects – so that students see climate change as relevant to their own lives. For example, teachers and students could conduct local biodiversity audits and then link the findings to CCE.
- Pose reflective, open-ended questions that push students to consider evidence, values, and consequences. For example, "Why do we see more intense storms now than in the past? Why is the increase in antibiotic-resistant bacteria an issue for us? Why do some governments and businesses refute climate change?"

Table 2: Progression of concept development across F–12.

Early years	Lower primary	Upper primary	Secondary school
Attunement to the world around them and the place in which they live, and to the development of an environmentally responsible disposition. Making accurate and detailed observations	Identifying and describing the human and Earth systems in place around them.	Increasing knowledge about ecological integrity including climate change, biodiversity, and systems thinking and human system interactions.	Increasing interdisciplinary thinking, including values, civic engagement, argumentation, and using futures thinking. Building a sense of identity and agency in climate related issues and the disposition of responsible Earth stewardship.

- Encourage cross-disciplinary connections, linking science, mathematics, geography, history, and civics so that students understand both the causes and societal impacts of climate change. Encourage students to take action to address climate change in their local area.
- Teach critical thinking skills explicitly within CCE contexts. For example, analyse and evaluate trends and patterns in global temperature change against time graphs and consider limitations or significant points, or evaluate claims made by social media influencers about climate change.

The need for immediate action is to focus on agency, both individual and collective, as defined in Table 3. CCE should also move towards incorporating decision making and action within science and avoiding a focus on science that is divorced from social implications.

Table 3: Definitions of agency

Individual agency occurs when students take initiative, make choices, and influence climate action, moving beyond passively taking in content to become active agents of change. This could be encouraged through lifestyle changes, educating others, or joining or starting clubs and projects. It is not about student activism, nor is that intended by this paper. **Collective agency** is when a group of people act together with a shared purpose towards a common goal. This can be empowering for students.

Teacher professional learning is crucial to establishing effective climate change education (Tytler & Freebody, 2023). Teachers currently have varying levels of knowledge about ideas essential to CCE, including, for example, the complexities of the science of interactions between Earth and human systems. Teachers' familiarity with pedagogies that foreground critical thinking in social-environmental challenges also varies, and some may need structured programs to build their knowledge to support students' decision-making and action, lead discussions of values, or adopt sensitive approaches to fostering students' positive outlook.

Action 4: Develop additional educational policy that enables schools to develop a whole place-based school approach.

In 2009, the Department of the Environment, Water, Heritage, and the Arts released *Living Sustainably – The Australian Government's National Action Plan for Education for Sustainability.* Under a vision that stated that all Australians should have the awareness, knowledge, skills, values, and motivations to live sustainably, the strategies and actions included:

1. Demonstrating Australian Government leadership
2. Reorienting education systems to sustainability
3. Fostering sustainability in business and industry
4. Harnessing community spirit to act

This policy was revoked in 2010. **We call on the Australian Government to again show leadership by redesigning the National Action Plan to focus on climate change education, and to ensure that CCE is supported and resourced to the necessary scope and scale for meaningful application across the country.**

A national action plan will guide schools and their communities to design their own climate change

adaptation plans and to support student learning. Student agency could be promoted through the creation of school hubs where individual schools or students can contribute to a collective climate change initiative. It is imperative that the plan recognises regional differences in climate change issues. A national action plan would provide schools with options and recommendations they can adapt to their own situations. The Australian Psychological Society (2020) also supports this need for government policy, stating that: "Governments and education providers should develop and implement national curricula on climate change, covering the science of climate change, its psychological and social dimensions, and solutions to it" (p.6).

Action 5: Fund a coordinated program that enables multiple cross-institutional research initiatives to inform effective climate change education in schools (e.g., an Office of Climate Change Education).

In this day of mis/disinformation regarding climate change and given the direction of the world stage, it is imperative that Australia is a key player in identifying the how and why of climate change and educating for mitigation and adaptation. We cannot afford to act after everyone else has progressed with their own education initiatives. **We must use this as a foundation to ensure that quality research can inform educational practices that are based in Australia for Australian students and teachers, but are also considerate of those in the diverse range of geographical places across this wide country.**

Climate change education must be implemented in all state and territory school curricula. Teachers plan, research, and teach the content, skills, and values required by their jurisdictions. Governments agree that education is the key to building a society that can make decisions, take action, and build a healthy country for the future. **Resourcing and support for a national teacher initiative will be foundational to this goal.**

OECD countries are tasked with building student climate literacy at personal, local, and global levels. This is more complex than just learning science content about climate change, although that is inherently important if students are to become critical thinkers. **Our science and geography teachers are best placed to provide learning opportunities for students to build their identity and agency that demonstrates both science and environmental competencies.**

4. Our recommendations and call to action

1. Make climate change education explicit and mandatory across the F–12 curriculum to support Australian students to be active, responsible citizens.
2. Develop a conceptual progression of learning, through the curriculum, that leads to deep engagement with human-induced climate change across all years of schooling.
3. Provide professional learning for pre-service and in-service teachers, school leaders, and administrators to build knowledge, values, and skills related to climate change education across disciplines.
4. Develop a national education action plan that prioritises climate action.
5. Fund a coordinated program that enables multiple cross-institutional research initiatives to inform effective climate change education in schools.

To prepare students for the future, CCE should be a visible, continuous thread from Foundation to Year 12, taught with intentional, reflective questioning in real-world contexts. The implicit inclusion of CCE will not work. By addressing both the scientific concepts and the social and emotional dimensions, schools can help young people to not only understand climate change but also to see themselves as capable contributors to a more sustainable and just future. Schools, families, and governments must work together so that young people both understand climate change and feel empowered to act on it.

As a collective, we are leading a growing understanding of the role science and geography play in supporting student action, and therefore agency, in climate change education. We do this to further enable and move forward our education practices in light of upcoming curriculum renewal in Australia in 2026, and to support teachers with the growing issue of climate change anxiety in children.

5. Concluding statement

We reaffirm that CCE is essential and compelling. We present a vision for an Australian education system that can build scientifically literate, hopeful, and active young citizens capable of shaping a sustainable future. We have a role as leaders in enabling the transformation to such a system.

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