CENTRE FOR CLIMATE CHANGE
AND SUSTAINABILITY EDUCATION

UCL

The key contributions of subjects to climate change and nature education: a curriculum policy proposal

global action plan

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A Voice for Subjects

ACKNOWLEDGEMENTS

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Contents

Introduction

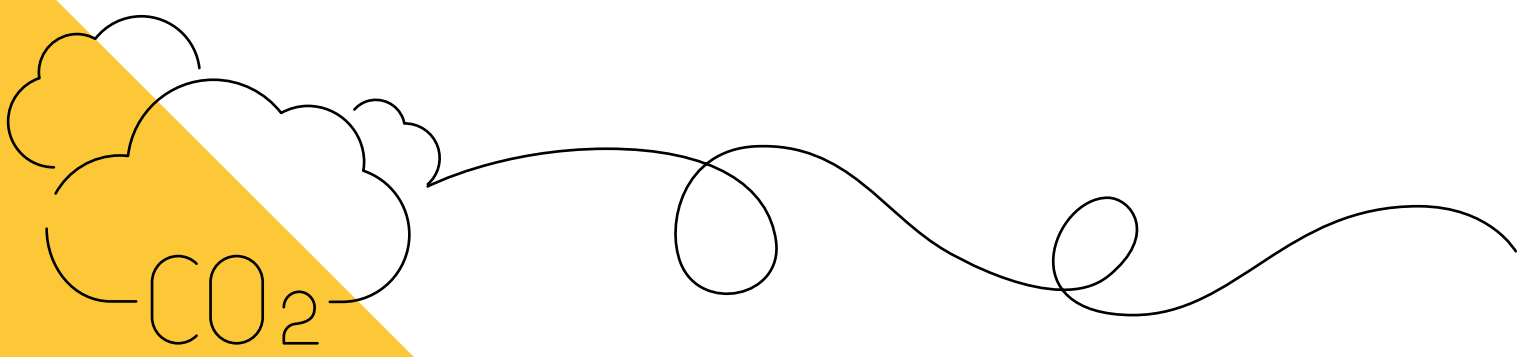
The climate and nature crisis is an existential threat. It impacts the poorest and the most vulnerable hardest and soonest, but no person, no community and no nation is safe. **In this regard, the crisis stands alone in the list of issues society is currently grappling with.** We also know that the situation is more urgent than many previously thought, and we therefore agree with the Intergovernmental Panel on Climate Change's (IPCC) conclusion that:

> Targeting a climate resilient, sustainable world involves fundamental changes to how society functions, including changes to underlying values, worldviews, ideologies, social structures, political and economic systems, and power relationships.[1]

Appreciating that we are part of the natural world, that we depend on its health for our own, and that we, therefore, need to adopt more sustainable lifestyles, requires a reorientation of all areas of the curriculum. **This curriculum policy proposal highlights the key contributions of subjects across the whole curriculum to climate change and nature education.**

We recognise, however, that fundamental change takes time and is impossible without formal education systems that are orientated toward that change. This proposal is, therefore, not a call for immediate radical and revolutionary change to the education system; to echo the Department for Education's (DfE) ongoing Curriculum and Assessment Review, we recommend '*evolution not revolution*'[2]. Indeed, we know that the education system in England is already evolving and gradually reorientating itself in response to the climate and nature crisis. We have included below some examples of how pioneering teachers are already responding across a range of subjects. **However, we know that these innovative practices are not happening across all schools**[3]. This curriculum policy proposal sets out an approach to tackle this situation.

West Lodge Primary School in Harrow is developing a sustainability framework for its curriculum, built around the school's core values that everyone should be resilient, inclusive, kind, sustainable, united and curious. To launch the initiative, the school has run a whole-school English project on swifts which includes poetry, persuasive writing (to local businesses) and writing and performing songs. Identifying actions that help protect swifts is a key part of the project, including improving nesting sites and building swift boxes. The school has also been exploring ways to link mathematics with biodiversity, for example by looking for examples of symmetry outside.



The Chase School in Malvern is encouraging teachers to 'tweak' lessons and units of work where there are already opportunities to focus on issues of climate change, nature and/or sustainability. In English, for example, this has included choosing new texts such as *The Survival Game* and *Diary of a Young Naturalist*. The English and Music departments have also worked together to explore protest songs about water pollution and other environmental concerns. Next year, there are plans for students to create their own musical instruments using upcycled materials.

Our premise is that by including references to climate change, nature and sustainability in the aims of all subjects in the revised curriculum, more teachers will be encouraged and empowered to innovate, regardless of the age and subject they teach. This approach is often not about finding space for additional content, but, rather, about adopting an environmental lens through which to explore existing opportunities, to develop sustainability knowledge and skills, and to activate and reinforce values that underpin a commitment to sustainability actions. In other words, **a relatively small nudge in the revised curriculum could play an important part in legitimising and encouraging more innovative curriculum practices in classrooms in response to the climate and nature crisis.**

This proposal builds on the important contributions of previous work in this field:

- Teach the Future's Tracked Changes project[4](2022);
- UCL's report, The role of subjects and subject associations in climate change and sustainability education in England[5] (in partnership with the Council for Subject Associations and the Natural History Museum) (2024);
- The Royal Meteorological Society's Curriculum for Climate Literacy[6] (2025).

Each of these documents has made a valuable contribution to articulating the benefits of a whole curriculum approach and fleshing out what it might look like in practice. In order to build on these foundations, we think it is helpful to:

- define the distinctive contribution of each subject to climate change and nature education in as concise a format as possible, using wording that can be incorporated into the revised national curriculum; and
- include a focus on skills, capabilities and ways of being, as well as knowledge, where appropriate.

To achieve this goal, we have collated a series of short statements that summarise the key contributions that all subjects can make, including all those in the national curriculum, alongside an overarching aims statement. These curriculum statements show how every subject can contribute to a whole school approach that would also include the wider aspects of school life reflected in a school's Climate Action Plan. This initiative is a collaboration between the UCL Centre for Climate Change and Sustainability Education, Global Action Plan, the National Association for Environmental Education and the Council for Subject Associations. It has been made possible by the insightful contributions of many subject associations and learned societies who have responded with enthusiasm to our requests. More information about the organisations involved can be found towards the end of this document.

Accelerating change – the new climate reality

While the severity and extent of the ongoing nature crisis has been well understood for a long time, our understanding of the climate crisis has undergone a very recent shift; **climate change has changed**. According to the Office for National Statistics, in the UK to date the impacts of most climate change-related extreme weather events have been at an order of magnitude that is high, with heat-related deaths on the increase[7]. However, the majority of people and most of the built environment and agricultural land have been able to cope. This situation may be about to change. Recently, climate scientists have reported an increase in the rate at which global average temperatures are rising. Professor Piers Forster and colleagues, in their annual 'Indicators of Global Climate Change' report, conclude that **'human-induced warming has been increasing at a rate that is unprecedented in the instrumental record**, reaching 0.27 [0.2–0.4]°C per decade over 2015–2024'[8]. The latest Met Office observations show similar temperature trends at a UK level[9].

Exactly why the rate is accelerating is open for debate, but the crucial issue is that the rate of change is faster than many predicted, with numerous scientists openly expressing their 'surprise'[10]. **If our coping ability does not keep pace with the rate at which climate change is accelerating – and the Climate Change Committee[11] warns that it is not – the UK will step into a new reality.** As a nation, we will quickly go from having extreme weather events that are uncomfortable, but tolerable, to extreme weather events that are deadly and cause long-term, sometimes irreversible, changes.

What now seems certain is that with or without a robust policy response, the climate and nature crisis is going to radically change the way society functions. In this proposal, and in the spirit of evolution not revolution, we propose a measured change to how the education system in England might respond to the climate and nature crisis. It is a modest change, but one which - if well implemented - would support the wider societal change process that the accelerating crisis demands.

Why is the climate and nature crisis a whole curriculum issue?

A challenge for curriculum writers and curriculum makers (teachers) is knowing exactly what climate change and nature education involves. **While knowledge has a crucial role to play, preparing young people for the future requires clarity about how it will contribute to a more sustainable future and build capacity for action.** In other words, a focus on outcomes is needed: students who are compassionate, collaborative, creative and imaginative and who are ecological thinkers[12] as well as critical and systems thinkers (see the Appendix). While understanding the mechanics of climate change and biodiversity loss is fundamental, this does not explain why change is happening or what is needed for the future.

We are well aware that there are logistical challenges to a whole curriculum approach, especially in secondary schools. However, **we believe that the education system can and must rise to the challenges of the climate change and nature crisis, through collaboration, creative thinking and belief in a shared goal.** The subject statements included in this document point to many opportunities for subjects to work together.

The curriculum policy proposal

The interim report of the Curriculum and Assessment Review in England recognised climate change and sustainability as focus areas[13]. There are, however, no official indications that these issues are being viewed through a *whole curriculum lens*, despite many calls for this to be the case. Indeed, **current indications suggest that opportunities for teachers of Geography and the sciences will rightly continue and may grow, but opportunities for teachers of other subjects remain less clear.** This continuation of the status quo is despite evidence that many teachers, across all subjects, report wanting to make a meaningful contribution to the climate change and nature education of their students[14].

This eagerness to contribute is not currently matched by official encouragement and 'permission' to do so. This absence is what our curriculum policy proposal seeks to address. **We strongly believe that by including climate change and nature education in the aims of the national curriculum, more teachers and school leaders will be empowered to nurture the knowledge, skills and values needed for a more sustainable future.**

In particular, we are asking that:

1. **One of the overarching aims of the national curriculum should respond to the climate and nature crisis.**

2. **The aims of every subject in the national curriculum should include a reference to their distinctive contributions to climate change and nature education.**

To support this proposal we have developed, in collaboration with subject associations and learned societies, a set of short statements which summarise the powerful and distinctive contributions of each subject towards climate change and nature education. The wording of these statements could easily be incorporated into individual subject aims in the revised curriculum. We are also proposing an overarching curriculum aim to illustrate the potential power of such a statement:

> **Education should: help young people to discover their deep connection with nature; understand the diverse forces shaping the built and natural environment; develop the preparedness needed to build a more climate resilient and equitable future; and support collective action for the good of people and planet.**

This overarching aim would lend considerable legitimacy to learning that is oriented towards a more sustainable future. Together with the subject specific statements below, this proposal offers an elegant solution to the challenge of developing a curriculum that serves multiple purposes while keeping statutory content to a minimum. **By shifting attention to the lenses through which existing content can be explored and by highlighting the crucial role of skills and values alongside knowledge, this proposal does not call for substantial new content to be included in the revised curriculum but rather for an additional lens through which to explore it.** The climate and nature crisis is not simply an information-deficit problem; it is a problem about how we choose to live and interact with each other and our environment.

Curriculum statements

These statements set out the kinds of knowledge, skills and values that different subjects can contribute to a more sustainable future. Subject associations and learned societies were invited to draft and share initial statements which formed the basis of those included below. While final responsibility for the statements lies with the organisations leading this work, we are deeply grateful to colleagues for their expertise and thoughtful responses.

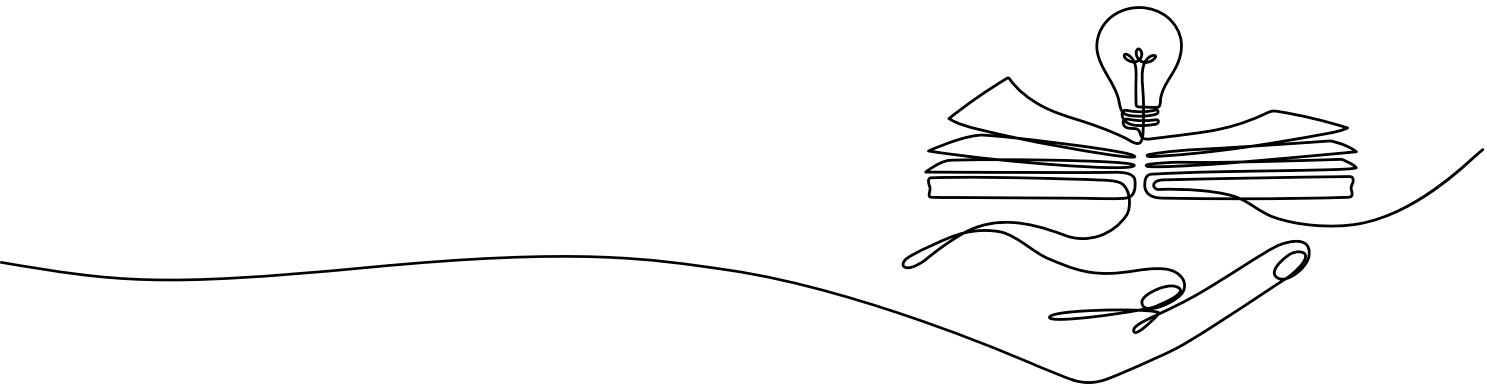
Taken together, these statements offer an exciting opportunity to respond to the climate and nature crisis in a coherent, holistic way. We offer them as examples of a whole curriculum approach, to stimulate debate and to provide inspiration to curriculum reviewers, writers and makers.

Art and design

Art, craft and design provides a safe space to explore difficult concepts, fostering autonomy, original thinking and innovation. Learners can be empowered to engage with climate change and sustainability through meaningful and personal creative exploration, critical and contextual analysis, developing design behaviours and material literacy. The freedom of a curriculum that is concept rather than content driven provides the opportunity to nurture nature connectedness, explore socially engaged practice, and deliberate on the meaning of citizenship. Art, craft and design equips learners to not only solve, but identify problems with agency, harnessing the power of imagination, creativity and design thinking.

Biology

Learning about biology enriches a young person's view of the world, enhances their capacity to appreciate nature and helps to inspire the next generation to care, think, innovate and work together to protect and improve the world we live in. Biology can provide young people with the knowledge and skills to understand environmental interactions and processes and provide insight into some of the solutions to the current climate and nature crises. Biology supports young people to become scientifically literate citizens and helps them to make informed choices, including about the environment around them.



Business

Business education can prepare young people to design and transform enterprises to meet human needs within planetary boundaries. This process requires an examination of what a shift in focus from profit maximisation to purpose-led practice means for business. Young people can explore how the design of a firm – its networks, ownership, governance, and finance – can support or block regenerative goals. Rather than simply analysing how businesses appear to respond to external pressures, young people can be supported to examine enterprises as powerful system-shapers, capable of fostering resilience, equity and sustainability when designed with care. Business education can foster imagination, responsibility and the skills needed to build future-fit organisations to serve people and planet.

Chemistry

Chemistry education enables learners to understand the world around them and provides people with the knowledge and skills to tackle environmental challenges facing society on key topics such as air pollution, climate change, sustainable materials and green energy technologies. By exploring local, global and national contexts, young people can gain understanding of the chemical processes which underpin the causes, consequences and potential solutions to these challenges. Chemistry empowers young people to make decisions about their own lives and critically evaluate scientific developments. Through developing chemistry skills and knowledge, young people are equipped to make informed decisions and contribute to a more resilient future for all.

Citizenship

Effective citizenship education can help young people to become climate-literate, active citizens who demonstrate concern for nature, people and the planet. It provides knowledge and critical skills to understand environmental and climate change and the diverse impacts on communities locally and globally. Young people can examine the evidence, explore sustainable solutions and consider multiple perspectives to understand climate change in relation to key citizenship concepts such as democracy, law, economy, equity, diversity and human rights. They can evaluate where power lies to address the impacts of climate change and consider the role of international agreements, laws, regulation and incentives in changing behaviour and protecting the environment. Young people can also explore climate justice, adaptation, resilience and green skills, learning how individuals, businesses, governments and communities can act ethically and collectively to create practices and policies for living together more sustainably.

Classics (Classical Civilisation, Ancient History, Latin & Greek)

Studying the ancient world can develop an understanding of a wide spectrum of beliefs and attitudes towards the natural world from across different global regions, cultural contexts and social formations. It enables young people to see how they have changed over time in response to different developments and, ultimately, how the environment has contributed to shaping key phases in human history. Through deep engagement with diverse bodies of source material, including classical literature, studying the ancient world empowers young people to become critical thinkers, develop empathy and reflect on the legacy and modern relevance of other cultures' beliefs and practices.

Computing

Computing provides the opportunity to develop essential critical digital and media literacy in a world of growing data and media use and misuse. Young people can consider the impacts, positive, negative and neutral, of rapidly developing technologies and AI on climate change, sustainability, the economy and personal safety. Computing can develop the skills to research about the environment, nature and global inequality as well as supporting learning in all areas of the curriculum and beyond. It encourages learners to be creative, curious problem solvers and responsible digital citizens.

Dance

Dance combines creativity, interpretation, analysis and physical skill. Dance education can provide young people with meaningful opportunities to explore the world around them – at local, regional, national and global level – and engage with issues that are important to them. Through the act of choreography (making dances) and the study of professional dance works, young people can find a new way of using their 'voice' to make a statement about critical matters, including sustainability and climate change. Dance has a positive impact on physical and mental wellbeing and supports the development of skills such as collaboration and resilience, which help young people navigate an increasingly complex world.

Design and technology

Sustainability ought to be at the heart of modern design and technology education. Through design and technology, young people can develop the creative and critical thinking skills needed to design solutions that are not only innovative but also environmentally and socially responsible. As highlighted in the Design Council's *Design for Planet* initiative, the climate crisis demands systemic change, starting with how we educate future consumers, innovators and designers. By embedding sustainability into the Design and technology curriculum, we equip learners to shape a better, more sustainable future for everyone.

Drama

Drama, with its roots in play-based learning, can help to develop healthy, humane, empathetic, creative and democratic people. These qualities are vital to the survival of the natural world. By exploring stories of climate change and sustainability, both fiction and non-fiction, across all key stages, drama methodology can develop deep understanding of this complex crisis. The use of drama conventions, such as teacher in role, enables children and young people to engage in sustainability issues across many curriculum areas. If young people develop this classroom pedagogy for performance, it creates a powerful tool for sharing knowledge more widely, empowering both performer and audience to develop agency and critical thinking.

Early Years Foundation Stage (EYFS)

Early childhood is situated in the ecological context of the family, the locality, the community and the global world. Children need to become aware of how they are interconnected and that actions (theirs and those of others) have an impact. They must not be framed as “saviours” of the planet, but if the foundations are laid in early childhood, research shows that fundamental values and attitudes are formed at this time that influence the belief systems and ways of being that develop in later childhood and adult life. The nurturing of compassionate and ecological values and attitudes at the EYFS can, therefore, play a vital role in a young person’s climate change and sustainability education.

Economics

Economics can help young people understand how economies can support human and wider ecological wellbeing. It can take a wide systemic view, recognising that economic activity both shapes and is shaped by society and Earth systems. Young people can explore how households, commons, markets and states could work together in the embedded economy to meet human needs. Through this, they can develop critical and ethical awareness of how economic decisions affect people and the planet. Economics education can empower young people to think in systems, question dominant assumptions, and imagine and design regenerative economies rooted in care, justice and sufficiency.

English

English education fosters critical thinking, empathy, and communication skills, which are essential for understanding and addressing sustainability and climate change. Through critical engagement with diverse literary and non-literary texts and other discourse, students learn to analyse arguments, identify bias, and evaluate sources. Young people also encounter different relationships between peoples, animals and environments, across cultures and histories, and can imagine alternative futures, question dominant narratives, and appreciate the power of storytelling. English education builds confidence in written and spoken expression, enabling meaningful participation in global debates. It empowers young people to advocate persuasively for sustainable actions and to understand the human dimensions of environmental challenges.

Geography

Geography is a curriculum heartland for climate education, sustainability and green skills from Early Years to A Level. Its distinctive approach focuses on the interactions and interdependencies between people and their environment and develops the skills young people will need in order to understand, adapt to and mitigate against a changing climate. Geographical fieldwork also provides them with first-hand experiences of nature and landscapes. In this way, geography enables young people to better understand how and why our climate is changing, how this will impact and transform our economy, society and environment – locally, nationally and globally - and what can be done about it.

History

School history can provide an essential understanding of how human attitudes towards each other and the natural world have changed over time and how this process has shaped the current climate and ecological crisis. History can strengthen young people's understanding that humans are part of the natural world by demonstrating how they and their environment have affected each other through time. History also inspires young people with examples of human resilience and adaptability in the past and provides a vital perspective when we envision a more sustainable future.

Languages

The study of languages is key to engaging young people in developing a sense of connectedness, interdependence, respect, empathy and intercultural understanding as active citizens. Through language learning, young people can explore environmental issues, culture and life across the world and the reasons for different ways of living and being. This process should also include cultural, religious, political, economic, social and historical drivers of the values, attitudes and actions of people across the world. Exchanges in person and online, as well as international visits, offer young people the opportunity to reflect upon the relationship with the natural world that people have in their own home and in communities around the globe.

Mathematics

School mathematics provides the underpinning knowledge, numerical skills and understanding of the key concepts needed in order to critically evaluate and influence the important decisions affecting sustainability and climate change. These concepts include, but are not limited to, probability, risk and uncertainty, statistics, rates of change, analysis of data and data communication. Without these skills, the next generation will struggle to make optimal decisions for themselves as individuals or as part of the families, the communities, the workplaces and the organisations in which they operate. Such a skills gap will impact the required progress needed on sustainability and climate change at all levels: local; national; and international.

Music

Music is an essential form of expression for young people, enabling them to connect with - and make sense of - a complex and changing world. The songs and instrumental music of the past, as with history, poetry and art, map out a record and catalogue of issues that have affected the environment and our natural world. Music in the curriculum is also an opportunity for young people to look into their future and nurture their imagination by creating their own music for different purposes, including to influence others. Finding learners' unique voice and making music together as choirs, ensembles and bands strengthens community cohesion and young people' sense of interdependence and supports young people's social development. Together with more sustainable ways to make and listen to music, this process is essential for more sustainable futures.

Personal, Social, Health and Economic (PSHE) education

PSHE education plays a vital role in helping young people to reflect on the climate and nature crisis in relation to their own lives. It can provide opportunities to recognise and respond to the impact that the crisis can have on mental health and promotes the positive role that spending time in nature can have on wellbeing. PSHE can support young people to identify values and attitudes that underpin sustainability and develop the resilience and agency to act on them through everyday behaviours. Finally, PSHE education builds vital skills such as empathy, critical thinking, media literacy and relationship-building, all crucial to navigating the climate and nature crisis.

Physical education (PE)

PE plays a vital role in promoting sustainability and addressing climate change by fostering lifelong habits that connect individuals with the natural world. Through outdoor activities, active physical activity, and engagement with green spaces, PE can encourage environmental stewardship and a deeper appreciation of nature. By highlighting the importance of physical and mental wellbeing in sustainable lifestyles, PE helps young people understand how personal health is interconnected with planetary health. Furthermore, PE cultivates values such as cooperation, resilience and responsibility, all of which are essential for facing environmental challenges and working collectively toward a more sustainable future in harmony with nature.

Physics

Studying physics develops learners' understanding of why the temperature of our planet is increasing which enables them to make evidence-based decisions relating to climate and sustainability, such as which energy resource we should use to generate electricity. They also learn about how scientists monitor climate change and use computer models to determine its likely consequences. Furthermore, young people learn how to use evidence, reasoning and logic to evaluate and develop arguments relating to potential solutions.

Psychology

Psychology, as a school subject, can significantly contribute to young people's understanding and skills in relation to climate change and sustainability, helping prepare them for climate-related life challenges. Psychological factors such as denial, disempowerment and social norms, help explain why people fail to act with urgency, and why many experience climate-related mental health issues; factors such as self-efficacy, motivation, optimism and social support show how individual and community-level resilience can develop. These psychological processes are taught in many psychology courses in the UK; they are highly relevant to the Sustainable Development Goals and can be readily integrated into a whole-school curriculum.

Religious education (RE)

RE encourages young people to explore both religious and non-religious attitudes towards nature and the planet. Using theology, philosophy and social sciences, students can critically examine how belief, ethics, reasoning and lived experience shape our understandings of our responsibilities towards fellow humans and the more-than-human, from primates to rivers. RE highlights how traditions and beliefs hinder and inform sustainable living and environmental ethics. By engaging with diverse worldviews, students can grapple with complex planetary issues and reflect on their own values. This can foster agency and hope, empowering them as global citizens to respond meaningfully to the climate crisis and envision a more sustainable, compassionate future.

Science

School science provides an essential understanding of the natural and physical environment. As well as a body of knowledge, science shows how our understanding of the environment continues to evolve and explains how that knowledge has been accumulated over time through experimental and theoretical methods. Finally, science education provides an opportunity to develop the ability to critically examine claims about environmental issues in order to distinguish between reliable information, disinformation and misinformation.

Conclusion

This is a key, but disorienting moment in time. It is imperative that policy decisions reflect current, not dated, understandings of the climate and nature crisis. The latest science shows us that we stand closer to the brink of a new climate reality than many had previously thought. There is a need, perhaps, to heed the words of Peter Drucker: 'the greatest danger in times of turbulence is not the turbulence; it is to act with yesterday's logic'[15]. Yesterday's logic tells us that climate change will advance at a pace that we will be able to cope with, and that teachers, school leaders and policymakers do not think climate change and sustainability education a priority. Today's logic tells us something different. **The expedience demonstrated by the subject associations who contributed to this proposal reflects the wider sense of urgency that is growing in the education sector. The climate science speaks for itself.**

Taken together, these 24 statements provide a compelling and comprehensive case for the inclusion of climate change and nature education across the school curriculum. They are not aspirations; they are grounded in the practices of teachers who have already responded to the climate and nature crisis that increasingly dominates the lives of people across the planet. We know that many teachers would value more commitment from policymakers to support them in their desire to make young people's education fully fit for purpose. To ignore the wishes of those people responsible for educating the youth of today would be a missed opportunity.

To conclude and reiterate, through this policy proposal we are recommending to the Department for Education that:

1. **One of the overarching aims of the national curriculum should respond to the climate and nature crisis.**

2. **The aims of every subject in the national curriculum should include a reference to their distinctive contributions to climate change and nature education.**

These are asks that are actionable and in the spirit of evolution not revolution.

List of contributors

This report is the result of a collaboration between four organisations:

The UCL Centre for Climate Change and Sustainability Education advocates for high quality climate change and sustainability education for all school-aged children through its research, support for teachers and policy engagement. The Centre's research-informed professional development programme for teachers, *Teaching for Sustainable Futures*, is tailored by subject and age phase and is designed to help all teachers embed environmental sustainability into their teaching.

Global Action Plan takes action with communities and our partners to address climate-related problems today and in doing so, influence systems for a more just and sustainable future. Whether we're equipping young people to lead community transformation through their schools, influencing national policy on clean air, or holding Big Tech to account, we act as both a catalyst and connector: turning insight into action, and action into long-term change.

The UK National Association for Environmental Education (NAEE) started life in 1960 as the National Rural Studies Association, changing its name and emphasis in 1971. Since then, the association has continued to support a wide range of professional educators to help them improve the quality of their teaching and their students' learning, in relation to environmental and sustainability issues.

The Council for Subject Associations is an umbrella organisation, independent of Government, which represents subject associations nationally and allows them to speak with a single voice on key issues and consultations with policy makers and the media. Its main focus is on research- and professional practice-informed approaches to the curriculum, pedagogy, teacher training and professional development.

The following subject associations and learned societies also contributed to this report:

AccessArt
Association for Citizenship Teaching
Association for Language Learning (ALL)
Association for Physical Education
Association for Science Education
Association for the Teaching of Psychology
Computing at School
The Classical Association
Design and Technology Association
Early Education
The Early Years Sustainable Hub
The Education Technology Association (NAACE)
The English Association
Geographical Association
Historical Association
Independent Society of Musicians
Institute of Physics
Joint Mathematical Council of the UK (JMC)
One Dance UK
Music Teachers Association
National Drama
National Society for Education in Art and Design
PSHE Association
Regenerative Economics
Royal Geographical Society
Royal Society of Biology
Royal Society of Chemistry
Technology, Pedagogy and Education Association
The UK Association for Music Education – Music Mark
UK Literacy Association

Appendix: The development of ecological thinkers – what climate change and sustainability education is and does

In 2021, Professor Stephen Sterling argued that education systems take one of four approaches to the climate change and sustainability agenda: (1) no response, (2) accommodation, (3) reform, and (4) transformation. He described each approach as follows:

> In the first, current global precarities are absent or barely reflected in policies and practices; in the second, institutional responses centre on campus greening and curriculum accommodation in "obvious" disciplines only. The latter two responses go further. A reformative response reflects intentional re-thinking at a policy level leading to shifts across much of the institution. A transformative approach nurtures a sustainability ethos as the driver of purpose, policy, and practice.[16]

Sterling is referring here to higher education, but this framework can also be used to evaluate how the sustainability agenda is approached in our early years, primary and secondary level education settings. The Department for Education (DfE) in England has, to date, followed an 'accommodation' approach. Over the last few decades, the extent to which sustainability is accommodated has fluctuated, but has trended overall towards greater accommodation. This proposal sets out what further accommodation of a sustainability agenda might look like, and specifically, why we need our young people to become 'ecological thinkers'.

The Royal Meteorological Society (RMetS), building on the work of many others, has recently published 'A Curriculum for Climate Literacy'[17] that proposes ways to accommodate climate change in the National Curriculum. Helpfully, their focus extends beyond the "obvious" disciplines. They suggest ways to deepen students' knowledge of climate change across all subjects with the goal of developing their climate literacy which they define as: "an understanding of climate science as well as the complex social and economic factors which relate to an understanding of the interaction between people and the climate system."

Such climate literacy is undoubtedly important and foundational. If students in England were to gain it, they would be better able to understand the vast predicament that the climate and nature crisis presents, its causes, impacts, and the mitigative and adaptive responses that are available to them and to society. However, to complement climate literacy, and to ensure that understanding can turn into action, students also need to learn the skills required to be inventors, developers, testers, scalers, as well as adopters of appropriate and effective responses and solutions. Crucially, students also need capabilities that enable and motivate them to take care of themselves and the natural world as the crisis develops.

We return here to Stephen Sterling:

> The world is increasingly complex, interdependent and unsustainable, yet conversely, the way we perceive, think, and educate tends to be fragmentary and limited, and we tend to live 'like there's no tomorrow'. Addressing this mismatch requires developing competencies in systems thinking, critical thinking and creative thinking, but it requires something more fundamental and challenging besides: no less than our becoming 'conscious agents of cultural evolution' (Gardner 2001, p. 206) towards a more ecological culture and participative worldview, consistent with and able to address the highly interconnected and endangered world we have created.[18]

We know that students' competencies in systems thinking, critical thinking and creative thinking can be nurtured through the national curriculum; and we know that these are goals for many schools, teachers and students. What we cannot guarantee, however, is that the nurturing of these competencies is enough, if ensuring our young people are equipped to address climate change is the goal. History is littered with examples of individuals who had well-developed systems, critical and creative thinking skills, but put them to use in the service of goals that turned out to be less than beneficial to society and the planet.

Sterling, therefore, goes further than simply making calls for systems, critical and creative thinking. He does not dismiss them, or the need for them, but he adds 'ecological thinking' as a key goal. It would not be revolutionary for the national curriculum to add this as a goal too.

Ecological thinkers do not just understand the relationships, interconnections, and interdependencies that shape the world; they do not just have the critical, creative and imaginative thinking skills to see and comprehend alternative visions of the future, they have something else too. What sets ecological thinkers apart is that they feel those interconnections and interdependencies too; they relate. It is an emotional relationship to the land, to the oceans, to other people, and other species; it is a relationship over time and space. They come to feel connected rather than separate as beings, and this develops within them a deep sense of care for whoever or whatever they feel newly related to. It is from this place that their motivation to be 'conscious agents of cultural evolution' grows.

The curriculum needs to evolve so that it begins to develop not just critical, systems, and creative thinkers, but ecological thinkers. We need learners who think not just about the planet, but for and with the planet. In fact, we need learners who think as the planet. None of us are, after all, separate from the planet; we are the planet.

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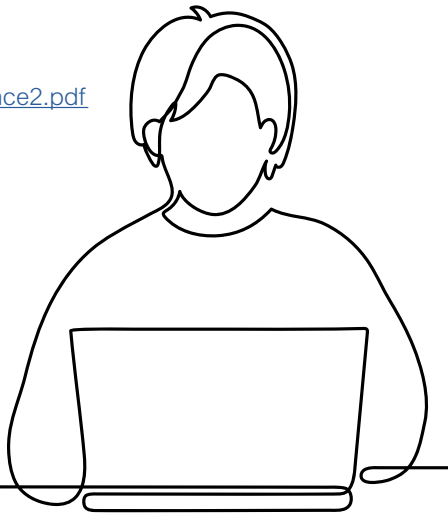

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