

Sustainability and Climate Change Education: Creating the Foundations for Effective Implementation

Report Summary

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This report has been produced by the Sustainability and Climate Change Education Working Group. As a diverse group of educators, we believe that we have the expertise to guide the effective implementation of the Department for Education's Sustainability and Climate Change Strategy (2022). We hope that our collective efforts in the fight against climate change have a lasting and positive impact on the lives of children and young people in England.

Our vision

Is to ensure that all teachers and school leaders are equipped to help children and young people take climate action and protect the environment.

Our mission

Is to help teachers and school leaders become experts when teaching children and young people about sustainability and climate change.

We are committed to achieving our mission by:

- Championing a better environment for all life on Earth.
- Being evidence informed. Supporting teachers and school leaders by sharing what we've learned from our research.
- Working collaboratively to solve complex environmental challenges. We will amplify the voices of partners from all sectors and backgrounds. Our work acknowledges that no one person or organisation has all the answers.

With kind thanks to contributions made by:

- Colin Diamond CBE, Professor of Education Leadership, University of Birmingham
- Lekha Sharma, Vice Principal, Head of Lower School, The John Wallis Church of England Academy
- Becky Watters, Education to Profession Advisor, Environment Agency
- Dr Paul Vare, Senior Lecturer - Research Development Education and Humanities, University of Gloucestershire

Photography in this report has been provided by [Learning through Landscapes](#).

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Heena Dave
Curriculum Designer, Teacher
Development Trust

As a former Head of Science at Bedford Free School, Heena is an experienced school leader and co-author of 'Cracking Key Concepts in Secondary Science'. She is currently Senior Curriculum Designer at the Teacher Development Trust, the national charity for effective professional development and is responsible for creating evidence-informed learning for school leaders. She previously worked at the Environment Agency as Research Manager and as Head of Programmes and Partnerships for the outdoor learning and environmental education charity Learning through Landscapes. She is currently completing a Doctorate in Education at the University of Stirling on what makes effective environmental education in schools.



Jo Gilks
Early years educator, SENCO
and forest school leader

Jo is an early years educator, SENCO and forest school leader with a passion for nature & permaculture. Jo has worked in many different settings, both conventional early years and progressive outdoor settings across London and Essex. Providing children with real world experiences of the natural environment through play, growing food and learning to care for wildlife is her passion; Her aim is to create equitable, nurturing, inclusive, sustainable education experiences for young children in green spaces in inner city settings where children can learn to love nature.



Dr Leigh Hoath
Associate Professor leading
science education at Leeds
Trinity University

Dr Leigh Hoath is an Associate Professor leading science education at Leeds Trinity University and was a teacher before moving into Higher Education. Leigh holds a prominent role within the Association for Science Education and is a regular contributor to their conferences and writer for their journals. She is an author of science education books and the consultant to BASF, developing their engagement and outreach work. She is an education consultant to the BBC and developed the Blue Planet Live Lesson and teaching resources and more recently led on the development of their latest education campaign, The Regenerators, focusing on climate education.



Patrick Kirwan
BSc PhD PGCE

After a career in science as an epidemiologist, Patrick trained as secondary science teacher with TeachFirst in London. While working in disadvantaged London schools Patrick developed a bespoke award-winning model for a whole school nature curriculum. This fundamentally changed his perception on education. While continuing to teach, Patrick set up the nature aspect of a community social enterprise to share his model with other primary and secondary schools. In school and community settings, he uses nature as a conduit to foster wellbeing, leadership skills, confidence, resilience, environmental awareness and climate action. In March 2021 Patrick founded The Irish Schools Sustainability Network (ISSN).



Dr Geoff Mackey
BASF Corporate Affairs &
Sustainability Director

Geoff was brought up on a small family farm in South Armagh, N. Ireland, he read biology in Liverpool and followed it with a range of post graduate qualifications in Health & Safety and management including a sleepless MBA. His doctorate concerned the strategic business value of social networks. He is a Director of BASF plc, responsible for a service portfolio in UK & Ireland and BASF's Sustainability network in Europe. A Fellow of IOD, RSC and IEMA, he has been within the BASF group for almost 20 years and advises a wide range of strategic and tactical groups inside and outside BASF covering private, public and third sector organizations in arenas including science, environment and further education.



Paul Tyler
Teacher, Kirkhill Primary School

Paul Tyler teaches at Kirkhill Primary School in East Renfrewshire and has been a passionate advocate of teaching Climate Change and sustainability in primary schools. Over 15 years in the classroom he has developed a cross curricular approach covering many aspects of Climate Change and sustainability, and created resources to engage and inspire. He is the author of Topical Science Updates, a monthly science newsletter for schools, which often feature sustainability as a core theme. Paul is also a member of the ASE and a fellow of the PSTT, he writes and speaks extensively about his experiences teaching science.



Carley Sefton
CEO, Learning
through Landscapes

Carley Sefton is CEO of the Learning through Landscapes Trust, the UK's leading School Grounds charity who specialise in curriculum linked outdoor learning. LtL believe connection with nature should be recognised as a fundamental part of education, at every stage, for every child and young person. With over 30 years of experience LtL have levied over £30million into UK schools to transform the use of school grounds, improve biodiversity and nature and to support teachers to develop their outdoor teaching practice. Carley is committed to championing the voices of children and young people from disadvantaged and underrepresented communities and ensuring that they understand their important role in protecting the natural environment. She is passionate about empowering every child to benefit from outdoor learning and play throughout their education.



Ben Rogers
Director of Curriculum and
Pedagogy, Paradigm Trust

Ben Rogers is director of curriculum and pedagogy at Paradigm Trust. He is also a Chartered Science teacher, a member of steering panel of the Education Endowment Foundation's primary science report, on the editorial board for the Association for Science Education's Primary Science journal and a member of Ofsted's science advisory group.



Foreword

Our children and young people face an unprecedented challenge that is not of their own making. For decades scientists have known what lies on the horizon for humanity if the rising levels of atmospheric carbon dioxide are not addressed. Time and time again, scientific research has shown our global leaders the urgency needed to manage and provide support for the imminent catastrophes that loom as a result of global warming. However, climate literacy should not just be for decision makers of today: it is an essential life skill that our leaders of the future must possess.

Just as we teach our children and young people to look both ways before crossing a road to avoid an oncoming collision, a deeper understanding of the science and impacts of climate change prepares them for an uncertain future. Embedding climate change educational policies and frameworks into the curriculum is a major step towards ensuring that each child has a basic right to understand what their future holds. However, it is not just children and young people who need upskilling; senior leadership teams, teachers and educators in all educational settings also need support, funding, and flexibility to help ensure that climate change is integral to every learner's journey. This should also be implemented in higher education settings, as well as compulsory schooling.

Much of the narrative concerning climate change naturally sits within the STEM subject areas. However, to ensure that we inspire a creative and innovative generation of young people ready to face the issues of climate change, we must be ambitious in our approaches. Championing climate

change across educational cultures, starting from pre-school settings, ensures that the message is as fully embedded and inclusive as other issues like healthy eating and exercise are.

Educators will be our key drivers in inspiring and empowering climate change champions of the future. I know from personal experience that many pre-school, primary and secondary school teachers find the science of climate change not only overwhelming and intimidating but also anxiety inducing. In addition, we need to focus on how we decolonise our narratives and teaching about climate change. There needs to be reflection and consideration on the social inequalities and impacts of climate change not only on nature but also for communities who are most at risk, especially those in the global south. Teachers and educators in all settings deserve and should receive opportunities for professional development that is effective, sensitive, and responsive to the needs of their learners.

This report is a call to action for decision makers to create lasting change for children and young people and the planet they will inherit. If delivered effectively, sustainability and climate change education will be a critical tool for children and young people as they navigate the biggest challenge they will face in their lives.



Dr Anjana Khatwa
Earth Scientist and Presenter



Executive summary

Effective sustainability and climate change education is our generation's priority.

According to the latest Intergovernmental Panel on Climate Change report (2022), global warming is leading to the increasingly irreversible destruction of terrestrial, freshwater, coastal and open ocean marine ecosystems. Approximately half of the species assessed globally have shifted poleward or to higher elevations to avoid the extreme impact of rising temperatures in their native habitats. The impact of global warming will inevitably lead to the loss of species, land and habitable areas of the planet which will in turn have serious adverse socioeconomic consequences for coming generations.

Climate change is an educational entitlement that children and young people are now demanding. They must be equipped with the knowledge and skills that allow them to reduce their impact on the planet within their lifetimes and adapt to the changing world we will leave behind.

Who we are

Led by a collaboration between Leeds Trinity University and the Teacher Development Trust, we have brought together the expertise of educators across nursery, primary, secondary age phases and higher education with businesses, the Environment Agency and the charity sector to respond to the Department for Education's (DfE) Sustainability and Climate Change Strategy launched in April 2022.

As a working group, we offer a positive response to the implementation of the DfE's sustainability and climate change strategy. We hope this report will be used to support change in schools by helping create an evidence base which can be used to better inform future practices as processes are implemented and outcomes develop.

Our key findings

We have examined eight key themes, in bold, we believe are key to the effective and meaningful implementation of sustainability and climate change education. Although predominantly aimed at school settings, the principles are applicable to all age phases and establishments.

This summary report provides a starting point to create guiding principles and a framework to work from, which can be shaped and moulded to each setting. We know that school leaders will have hard choices to make, driven by priorities such as learning recovery and squeezed budgets. Under this pressure, as in other areas of life, care of the environment often becomes an aspiration rather than a necessity. In order to change this, we ask that school leaders and teachers use this report to guide their approach to sustainability and climate change within their context.

The first key theme is **sustainability, climate change and inequality**, which discusses the exacerbated inequalities of socially and geographically disadvantaged communities in the context of climate change. This work should acknowledge the pressing need for the assessment of climate vulnerability and the full comprehension of social justice issues from all school leaders and teachers as a core part of their professional development.

It is essential to develop a culture which ensures that learners possess the knowledge and skills to approach the current and future environmental challenges they will face in their lifetimes. Realistically, this culture takes time to build, but is a worthwhile process. When sustainability and climate change education is approached as a whole-school priority, rich, professional conversations can be facilitated. This will ensure that sustainability and climate change education is not just the responsibility of one teacher but that it is in the hands of every teacher, staff member and child or young person.

Curriculum is also an essential part of the discussion. The full report outlines how teachers can support and actively engage with curriculum content in order to increase their knowledge. It is also beneficial to consider the connections between sustainability and climate change and environmental and outdoor education.

Pedagogy is often assumed rather than explicitly discussed. The full report addresses the complexities of teachers, learners and content interaction and the challenges of introducing new contexts or content. For example, there is evidence of a lack of teacher confidence in relation to science-based content, particularly in primary

settings. In addition, taking on environmental teaching that goes beyond traditional classroom activity demands different pedagogical strategies. There is a need for educators to teach aspects of sustainability and climate change that they may not be familiar with. As a result, one of the most significant actions required is **effective professional development**.

Time and resource-poor teachers are able to tap into a wealth of support available. Two key examples – working with business and working with charities through **outreach and engagement** – are explored. Developing these long-term partnerships can enable schools to bring sustainability and climate change examples to life by helping children and young people understand how employers intend to adapt their business models in the future and provide insight into potential employment opportunities available.

There are always multiple competing priorities in schools. However, in order to address the global crisis we face, commitment is needed to effectively implement this strategy. There is a key role to play for organisations, such as subject associations and school governors, to support the prioritisation of this work and **overcoming barriers to implementation**.

Much of the **evaluation** of environment, sustainability and climate change education relies on anecdotal, qualitative or small-scale quantitative analysis. We recommend deeper, robust and evidence-informed evaluation that leans on organisations such as the Education Endowment Foundation to undertake large scale, data-driven studies that comprehensively inform us about the effectiveness of the strategies in place.



Why are we talking about sustainability and climate change education?

Following a consultation period from November 2021, the Department for Education launched their Sustainability and Climate Change: A strategy for the education & children's services systems in April 2022. There is little doubt that a focus on this agenda is overdue and that the strategy is welcome. The purpose of this report is to offer a response which considers the overarching principles that should underpin the implementation of this strategy into education settings.

It is worth highlighting that this report only touches the surface of some of the complexities that encompass this topic, for instance the very definition of 'sustainability'. Throughout this report we have chosen to use the term 'sustainability and climate change' to not separate the two areas, which aligns with the strategy in discussion. We acknowledge that much of the terminology associated with these areas is problematic and is often open to interpretation. This issue will be tackled in future discussions as the implementation of the strategy unfolds with time.

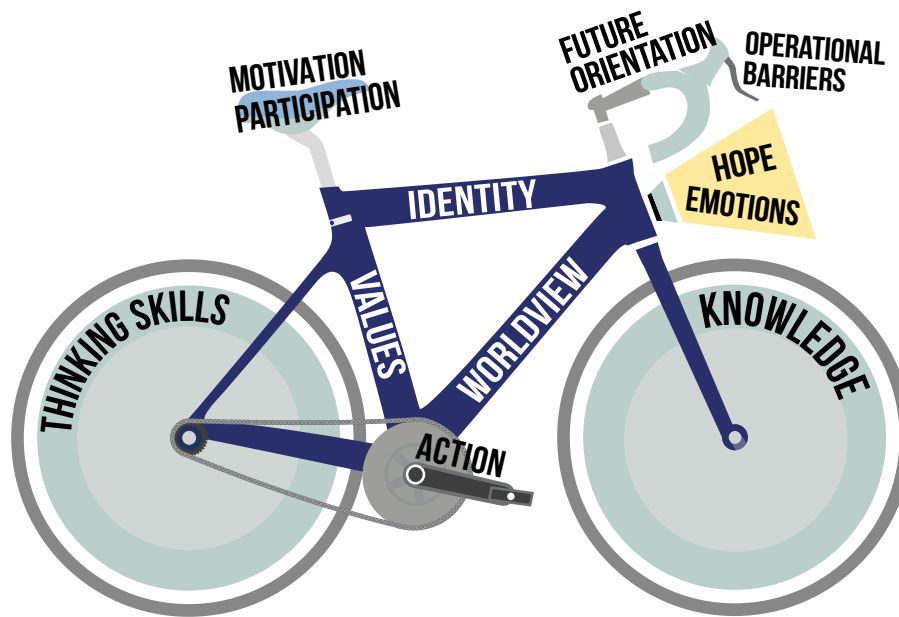
We also recognise that education is complex and that although we may be addressing sustainability and climate change, it is difficult to deal with this in isolation. In order for us to reliably suggest first steps, we have drawn upon associated literature and existing approaches, such as from outdoor and environmental education.

The group that has developed this response represents early years education, primary and secondary age phases, higher education, industry and non-governmental organisations (NGOs). All members have experience of teaching or working in the environmental sector or environmental education, science or relevant industries. Above all, they have a commitment to ensuring that the implementation of this strategy is meaningful and goes beyond learners simply knowing more about sustainability and climate change to also facilitate their education to compel them to take informed action and engage in behaviours that have a positive impact on the planet.

The report only addresses the key themes. These are not exhaustive but have been prioritised to facilitate a timely and considered response. The sections are supported by literature, outline a position in relation to the theme and are critical to ensure effective implementation. The sections end with reflective questions for school leaders and teachers to support them in considering how to approach sustainability and climate change education within their setting.

The frameworks that support our thinking

We have drawn upon previous research to shape the discussions held as a group and move forward



Cantell et al. (2019) – bicycle model demonstrating the interrelatedness of sustainability and climate change education

the thinking around strategy implementation. A portion of this research has come from outside the UK. One particular model that informed early discussions came from Cantell et al. (2019) and offers a comprehensive view of climate change education. The study's bicycle model highlights the interrelation of many parts that coexist to achieve something 'that works'. Cantell et al. (2019) urge us to consider the needs of the 'user' in order for the bicycle to work, and this again aligns with our views on sustainability and climate change education. The educators and learners in each setting are the users of this strategy, and so their needs and outcomes should be central to it.

We know that it is idealistic, if not unrealistic, to expect any one person or education setting to achieve this functioning model in isolation. We believe that there should be a collaborative response to this strategy, not a competitive one. There is a need for stakeholders from all related

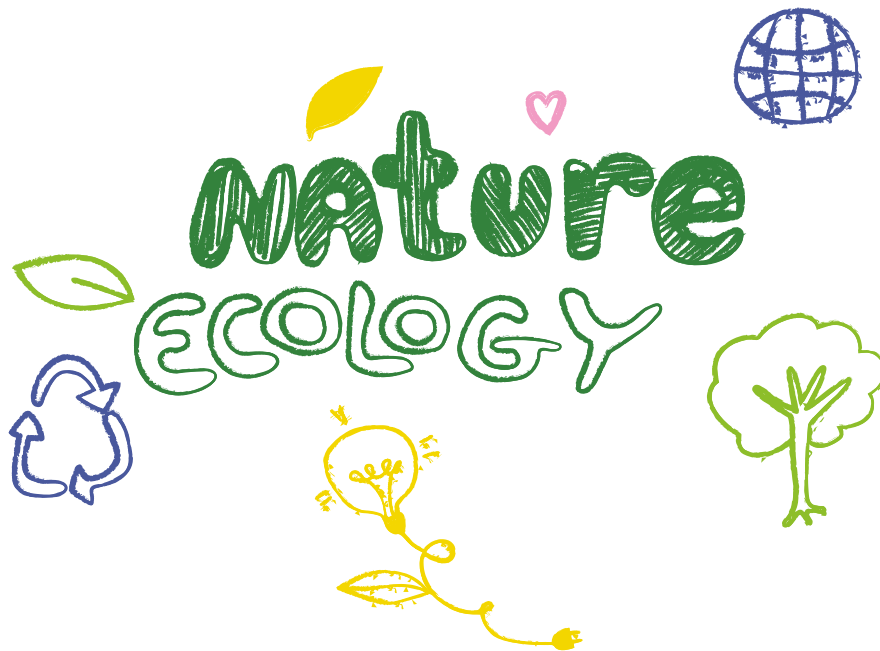
sectors to work together to bring about effective change. From this perspective, teachers and school leaders are encouraged to view their role as one part of a much wider response in delivering good sustainability and climate change education for children and young people.

This report does not offer a complete guide to teaching and learning the issues of sustainability and climate change in education and it is not positioned as such. Rather, it is a starting point of key principles that inform excellence in practice, encourage meaningful implementation and spark discussion around next steps for change. The real challenge for educators is to respond in an urgent manner given the scale of environmental degradation we are currently witnessing. We recognise meaningful and effective implementation takes time, but time is a luxury we do not have. Steps that can be taken should be taken now.

References:

Cantell, H., Tolppanen, S., Aarnio-Linnanvuori, E. and Lehtonen, A. (2019) Bicycle model on climate change education: presenting and evaluating a model. *Environmental Education Research*, 25(5), pp. 717–731.

Department for Education (2022) *Sustainability and climate change: a strategy for the education and children's services systems*. Available at: <https://www.gov.uk/government/publications/sustainability-and-climate-change-strategy/sustainability-and-climate-change-a-strategy-for-the-education-and-childrens-services-systems> [retrieved 12 June 2022].





Conclusions and recommendations

This report should act as a starting point for action, but our recommendations are not exhaustive.

There is a great deal of work to be done to bring sustainability and climate change education to the agenda across education settings in a meaningful and impactful way.

Our recommendations are:

1. Assess social inequality and its impact on sustainability and climate change education

The exacerbation of social inequalities driven by climate change is clear. The need to address diversity within the environmental sector is stark and staff should ensure issues of social inequality and climate change are an integral aspect of their professional development. Climate vulnerability is an area to be assessed as a priority.

2. Build a whole-school culture to support effective implementation

The importance of a whole-school culture which respects and responds to the climate crisis is essential for effective change. Education settings need a clear and articulated vision for enactment through the effective implementation of policies, routines and practices.

3. Create a coherent curriculum to develop a climate-literate society

The curriculum is the backbone of any educational setting, and we argue this should be infused with the knowledge and skills needed to develop a climate literate society. There needs to be a coherent approach taken to linking existing curricula content with sustainability and climate change, with the sequencing of substantive and procedural knowledge supported by high-quality resources.

4. Develop an effective pedagogy to deliver in a range of settings

There is a need for critical engagement with not just the content taught but also the method of teaching. There is a need for the close alignment of pedagogical approaches with specific curriculum subjects and the social context of the learners. School leaders and teachers should reflect on their confidence in their pedagogical approaches to best support the effective teaching of sustainability and climate change-related education. This should include teaching in settings beyond the classroom, acknowledging the demands of these spaces.

5. Invest in the long-term impact of professional development

In some cases, teacher confidence in this complex subject matter may be low. In order to deliver sustainability and climate change education that produces a lifelong impact on learners, effective professional development is key. To achieve this, school leaders must acknowledge that impact will only be achieved over time.

6. Leverage the value of partnerships and outreach programmes

The potential benefits of working collaboratively are vast and we wholeheartedly encourage the development of long-term relationships that recognise the needs of the educational setting and its learners. There is a clear role for the business and charity sectors in preparing children and young people for the world of work and showcasing effective sustainability in action, and this best practice is achieved through dialogue and curriculum focussed support. These sectors must not underestimate the value they bring and the potential they offer in terms of role model diversity.

7. Identify and overcome barriers to implementation

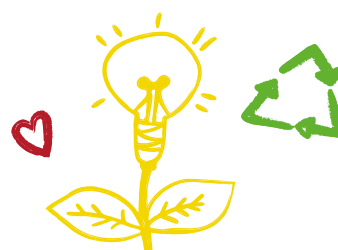
We have identified the challenges associated with each of the key themes throughout this report. We are very much aware that, with increasing pressures on time and budget, it is difficult for education settings to introduce yet more content into their teaching. It is essential for leaders to allow time for effective implementation through

resourcing and a strategic plan to create secure infrastructure. We know that there is no easy answer to these issues raised. However, we are resolute in the need for them to be addressed with some urgency.

8. Critically evaluate and improve impact over time

Embedding sustainability and climate change education into curricula is not a short-term action; it is an approach that will need to be developed as knowledge, resources and statutory teaching requirements evolve. There needs to be an effective evaluation of the impact of the integration of sustainability and climate change education which considers short, medium and long-term assessments and monitoring. This should focus on the knowledge, attitudes and behaviours of learners.

In this report we have outlined the views of many stakeholders and positioned a need for meaningful change through the coherent and considered implementation of a strategy to support this. We recognise the pressures within the education system and have attempted to be pragmatic and realistic in our recommendations. The reflections and recommendations within this report have the ability to support a sustained approach to the teaching of the global issues raised within it and we are optimistic that there can be a positive change with a collective commitment to this framework.





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