

Climate Change and Sustainability Education

A survey of students in England



ACKNOWLEDGEMENTS

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About the UCL Centre for Climate Change and Sustainability Education

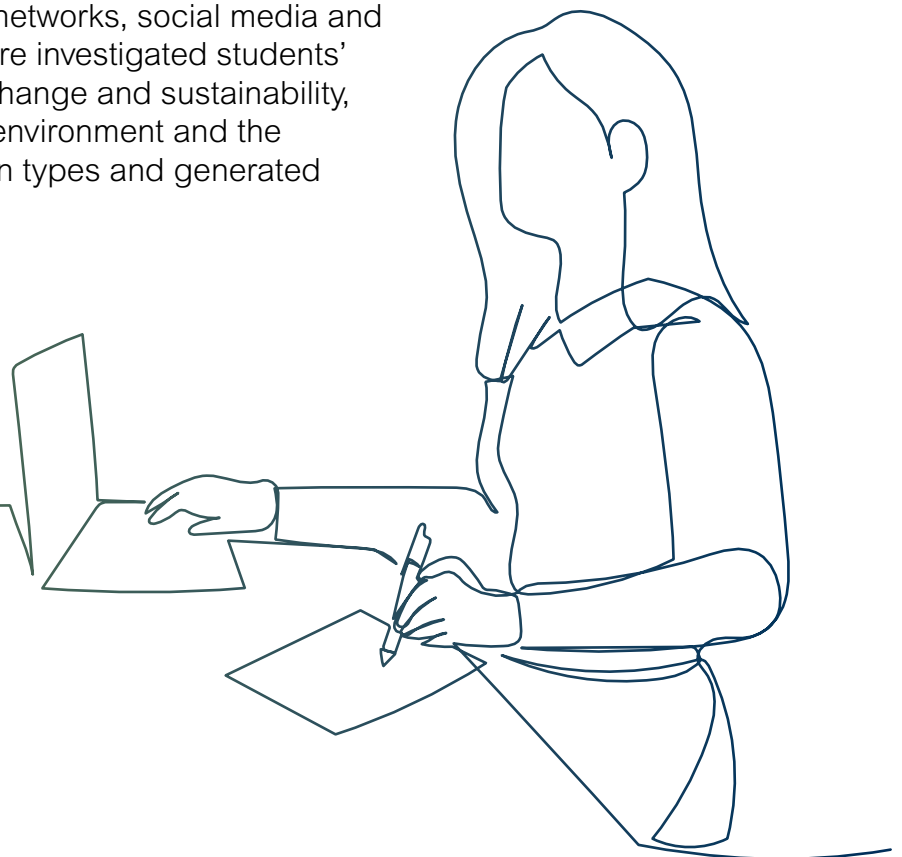
UCL's Centre for Climate Change and Sustainability Education (CCCSE) aims to support teachers to develop expertise that they need to prepare young people for a climate-altered future. This aim is achieved by three workstreams: (i) research to address pressing questions related to climate change and sustainability education policy and practice; (ii) design and implementation of free, phase- and subject-specific professional development for teachers and school leaders, *Teaching for Sustainable Futures*; (iii) international engagement to enhance the implementation of quality climate change and sustainability education in England and further afield.

Executive Summary

Children and young people are growing up in uncertain and precarious times, as the environmental, social and cultural effects of global climate change begin to affect their everyday lives (Rousell & Cutter-Mackenzie-Knowles, 2020). It is, therefore, widely acknowledged that high quality climate change and sustainability education is needed for children and young people, who will have to contend with the uncertain effects of climate change brought forth by previous generations. In recent years, young people across the globe have strongly advocated for greater access to education that effectively prepares them to respond to the complexities and uncertainties of human-induced climate change (e.g. Teach the Future, n.d.; Fridays for Future, 2022); however, there remains little in-depth understanding of school students' perspectives of, and aspirations for, climate change and sustainability education. This understanding is crucial to inform support for schools to provide high quality climate change and sustainability education which gives all students the opportunity to thrive in a climate-altered future. This report shares detailed findings about student perspectives and experiences of climate change and sustainability education in England in 2024, with a particular focus on students in Years 7-9 (ages 11-14). The results reveal both strengths and gaps in the provision of climate change and sustainability education in England, and serve as an evidence base for researchers, policymakers and practitioners who seek to support schools and teachers to fulfil their important roles in society's transformation to a more sustainable future.

Methods

UCL's Centre for Climate Change and Sustainability Education (CCCSE) conducted a survey of school students in England entitled 'What do you think about Climate Change and Sustainability Education?'. Between March and May 2024, students were invited to respond to an online questionnaire, recruited through class teachers who were reached via email lists, professional networks, social media and the CCCSE website. The questionnaire investigated students' thoughts on learning about climate change and sustainability, as well as their views on nature, the environment and the future. It included a range of question types and generated quantitative and qualitative data.



Results

The questionnaire gathered 2429 responses from students from 30 schools across England, although not all students answered every question. The sample of students comprised 40% in Year 7, 24% in Year 8 and 27% in Year 9. Of those who specified their gender, 56% were girls and 43% boys (with 1% identifying as non-binary or gender diverse). With regards ethnicity, 56% were from white backgrounds, 25% from Asian / Asian British backgrounds, 7% from mixed backgrounds, 5% from Black / Black British backgrounds, 4% from Arab backgrounds, and 4% from other ethnicities/backgrounds. Students were also asked to convey the number of books at their home; essentially, students with fewest books can be inferred to have less advantaged socio-economic circumstances, while those with most books can be inferred to have more advantaged socio-economic circumstances (Sutton Trust, 2023). Using this measure, the sample of students completing the questionnaire comprised 16% with the fewest books at home ('None or very few (0–10 books)') and 25% with the most books at home ('Enough to fill three or more bookcases (more than 200)').

KEY FINDINGS

- Students generally conveyed that they feel happy; however, 87% expressed concern about what the world will be like in the future because of climate change. Climate change evoked many negative emotions, particularly sadness, anxiety, guilt and shame. Statistically significant differences were revealed across students, with girls and students from more advantaged socio-economic circumstances being more likely to feel negative emotions.
- Students reported learning about climate change and sustainability in a range of subjects at school, most commonly geography (90%), assemblies or tutor time (75%), and science (68%).
- Students reported opportunities for undertaking a range of activities related to climate change and sustainability, most commonly that their schools supported them to help their family to be more sustainable (48%) and to visit nature outside school (48%). Few students reported engagement with the National Education Nature Park (12%) or undertaking projects with their local community (17%).
- Students recognised the value of learning about climate change and sustainability but did not necessarily find it enjoyable: 76% agreed that it is important to learn about climate change and sustainability, while only 46% agreed that they enjoy learning about it. Statistically significant differences were revealed across students, with girls and students from more advantaged socio-economic circumstances being more likely to find it enjoyable and agree that it is important to learn about.
- Students tended to convey that their teachers explain how climate change and sustainability are relevant to them and what they can do to make decisions that are more sustainable (60% agreed). However, fewer reported that they were able to influence how their school was responding to climate change and sustainability (29% agreed).

- In relation to looking after the environment, 66% of all students agreed that they know what they can do to look after the environment and 56% agreed that they would like to do more to look after the environment. Statistically significant differences were revealed across students, with girls and students from more advantaged socio-economic circumstances being more likely to agree both that they know what to do and that they want to do more. Of all students, only 16% agreed that adults are doing enough to look after the environment.
- Few students conveyed aspirations about careers related to climate change and sustainability, with only 17% agreeing that they would like to work in a job related to climate change and sustainability in the future.
- Many students conveyed that they would like to spend more time outdoors although they were not necessarily always encouraged to do so: 73% of all students agreed that they would like to spend more time outdoors in nature while at school, while only 32% agreed that their teachers encourage them to spend more time outdoors in nature.

Opportunities for policy and practice

The research highlights inequalities in access, experience and aspiration in relation to climate change and sustainability education in England; in particular, there are significant differences between boys and girls, and students from different socio-economic circumstances (reflected through the number of books at home). To address these inequalities, the report outlines five key opportunities to advance policy and practice in climate change and sustainability education:

1. Formally recognise the distinctive role of all school subjects in providing young people with a holistic understanding of climate change and sustainability, including through a revised National Curriculum.
2. Extend the scope for outdoor learning, and other engagement with nature and the outdoors, within and beyond the formal curriculum and for all students.
3. Foster a sense of agency for all students by building specific occasions for meaningful engagement and action, both within and beyond the curriculum.
4. Provide greater support for schools and teachers to develop green careers provision. This includes embedding an understanding of green careers across subjects and within educational opportunities beyond the formal curriculum.
5. More explicitly address the affective dimensions of climate change and sustainability education, including climate anxiety, with students.

1. Introduction

A recent Intergovernmental Panel on Climate Change report (IPCC, 2023) conveys sobering scenarios about the future for our young people and appeals for “deep, rapid, and sustained reductions in greenhouse gas emissions” (ibid, p.12). Although technological responses are essential to achieve this, technocratic solutions alone will not solve the climate crisis; a widespread societal transformation is needed. Education can play a profound role in this transformation as it is fundamental to building a society with knowledge, skills and motivation to tackle climate change (Greer et al., 2024). However, while research exists which investigates teachers’ capabilities in relation to knowledge and teaching about climate change and sustainability (e.g. Greer et al., 2023), there is little understanding of school student perspectives on and experiences of climate change and sustainability (education). This understanding is crucial to inform support for teachers and schools to provide the highest quality education which, in turn, enables students to develop the agency they need to thrive in a climate-altered future.

Education is also an avenue to mitigate inequalities, including through the provision of opportunities and particular support. People with more advantaged socio-economic circumstances often gain more success within and beyond education; advantage is often cumulative over time, and inequalities of income are often compounded with other inequalities, such as gender, ethnicity and disability (Cattan, et al., 2022; Marmot et al., 2020; Shaw et al., 2016). As such, identifying inequalities is essential in order to determine where (more) effort and support need to be focused.

With this in mind, this report presents research which examines the views and experiences of students in Years 7-9 (ages 11-14) in England, and highlights opportunities to enhance climate change and sustainability education policy and practice.

1.1 Research aims

The research presented here sought to generate new insight into the state of climate change and sustainability education in England, from the perspective of students, through surveying students aged 11-14 (in academic Years 7-9). Particularly, research presented in this report focused on the following questions:

1. What are student experiences and perceptions of climate change and sustainability education within and beyond the formal curriculum in school?
2. What would students like to learn about in relation to climate change and sustainability in school?

This research also considered similarities and differences across demographic data (gender, socio-economic background and ethnicity) in order to identify and better understand any inequalities within these areas of education.

1.2 Research context

1.2.1 Climate change and sustainability education

Climate change and sustainability education aim to generate understanding of the wide-ranging, interconnected, environmental and social issues that define our time, and support students' capabilities for acting in response to those issues. **Climate change education** often focuses on increasing scientific knowledge, and has been frequently applied through top-down approaches in formal settings (Monroe et al., 2019; Rousell & Cutter-Mackenzie-Knowles, 2020). However, it is argued that there is a need to move beyond an over-emphasis on learning the science of climate change, partly because this focus does not necessarily translate into pro-environmental attitudes and behaviours (e.g. Brownlee et al., 2013).

Sustainability education can be understood as education that supports today's citizens to live in ways that do not cause environmental harm, but rather to lead environmentally restorative lives that maximise opportunities for life on a healthy planet, now and in the future (Greer et al., 2023). Like climate change education, sustainability education is understood and enacted in various ways. It can be construed as transformative in approach when it challenges the unsustainable structures and values that govern institutions and individuals (e.g. Lotz-Sisitka et al., 2015). It can also be framed in terms of whole-school approaches that involve actions across a range of dimensions such as: governance and leadership; operations, including buildings, energy, waste and transport; teaching and learning; and community engagement and partnerships (e.g. Wals & Mathie, 2022). Sustainability education can also be conceptualised as the development of competencies or, within policy discourse, as the cultivation of 'green skills' (e.g. Department for Education [DfE], 2022). Increasingly, research relating to both climate change and sustainability education underscores the importance for holistic, participatory, and creative approaches that address concerns for justice and advocacy for the environment and that draw on multiple disciplines, or are embedded across school disciplines and subjects.



1.2.2 Policy context in England

Since the 1990s, devolution of the home nations of The United Kingdom of Great Britain and Northern Ireland (UK) has meant that each jurisdiction has the authority to develop and govern their own public services; consequently, England, Northern Ireland, Scotland and Wales determine their own education policy, including national curricula. Here we focus on England.

Currently, in England, the National Curriculum includes climate change and sustainability in secondary geography and science (Dawson et al., 2022) and, in principle, it affords teachers of all subjects flexibility to incorporate related content across their teaching (DfE, 2014). In addition to the curriculum, the DfE's Sustainability and Climate Change Strategy for the Education and Children's Services System (2022) sets out priorities for England across five action areas (Climate Education, Green Skills and Careers, Education Estate and Digital Infrastructures, Operations and Supply Chains, and International) and three key initiatives (National Education Nature Park, Climate Action Awards, and Sustainability Leadership). In particular, the National Education Nature Park, led by the Natural History Museum, brings together a network of outdoor spaces in education settings across England, encouraging students' participation in community science projects and supporting their connection with the local environment (Natural History Museum, 2023)¹.

1.2.3 Student perspectives and experiences of climate change and sustainability education

There is relatively little research exploring student perspectives and experiences of climate change and sustainability education, within or beyond the English context. Various polls have found that students get most of their information about sustainability and climate change from school classes, social media, television and family; however, students do not feel they are taught enough about how to make a difference to sustainability, and have asked for more practical guidance because they want to do more (Wheeler, 2023). Within school, students have reported learning about climate change predominantly through geography, yet have felt that climate change has been insufficiently linked to social, economic, and political contexts, and has been presented as something in the future or otherwise distanced from contemporary times and local contexts, often with outdated case studies (British Science Association, 2023). Students in England have further expressed a desire to learn more about climate change, biodiversity loss, pollution, and many other environmental topics, although stronger interests in issues related to climate change have been conveyed by girls compared to boys, and by those with more advantaged home or family circumstances (Hamlyn et al., 2024).

Children and young people increasingly express that they feel worried or concerned about climate change; for example, a large-scale survey of 10,000 young people aged 16-25 across 10 countries reported that out of 1,000 participants in the UK, 49% stated that they were extremely or very worried about climate change (Hickman et al., 2021). This is increasingly known as climate anxiety, and while mild climate anxiety might foster pro-environmental behaviour, more extreme cases can become overwhelming and elicit feelings of fear, helplessness and powerlessness. While education has the potential to mitigate climate anxiety, it is broadly agreed that this requires the development of agency and empowerment of young people via strategies they can use to take action (Tayne et al., 2020).

¹ At the time of writing (July 2024), there is a new Labour government. Within their manifesto they acknowledge that "the climate and nature crisis is the greatest long-term global challenge that we face" (Labour Party, 2024, p.47) and state a commitment to building "an education system that prepares our children for life, work, and the future" (p.11). Any potential impact of this manifesto on policy in relation to climate change and sustainability education is not yet clear.

1.2.4 Summary

Climate change and sustainability education is variously understood, and in England they frequently occur as part of a subject-based curriculum with an emphasis on scientific knowledge. However, while research exists which investigates teachers' capabilities in relation to knowledge and teaching about climate change and sustainability (e.g. Greer et al., 2023), there is little understanding of student perspectives on and experiences of climate change and sustainability (education), including potential inequalities within them. With this in mind, this survey captures current perspectives, experiences and aspirations of students in England, which can inform policy development and practice in this area.



2. Methods

2.1 The questionnaire

Students were surveyed to gather their experiences of and perspectives on climate change and sustainability. The research was conducted with approval from the UCL Research Ethics Committee (REC 1918), and data were managed in accordance with the UK GDPR and DPA 2018 (Data protection number: Z6364106/2023/12/45).

Students were invited to complete an online questionnaire (via the Qualtrics online platform). The questionnaire design and content were informed by existing research, and a variety of question types were used to facilitate engagement throughout the questionnaire and to maximise insight. The question types encompassed selecting options, selecting extents of agreement or disagreement for various statements, selecting frequencies of engagement with various activities, and open text fields for sharing views and experiences.

Responses were sought from students in England in Years 7 to 9 (ages 11 to 14), between March and May 2024. Participants were recruited via their teachers who were, in turn, contacted via a range of networks, social media channels, and existing communication distribution lists, including those from the CCCSE and subject associations. Efforts were made to gather responses in schools with varied experiences of climate change and sustainability education; although it is possible that teachers who are already engaged in teaching related to climate change and sustainability may have supported the survey, the research sought to encompass whole classes or year groups such that responses were received from students with a wide variety of perspectives and engagement.

2.2 Data analysis

This report shares findings from the first phase of analysis which focused predominantly on the quantitative aspects of the questionnaire responses. Preliminary analysis applied a range of approaches to quantify students' responses and to reveal similarities or differences across groups of students, including through considering cross-tabulations with chi-squared tests and through independent-samples t-tests (without assuming equal variances across the groups of students being considered), where equivalent results emerged across different analytical approaches and perspectives. This report focuses on conveying extents of agreement (or other equivalent positive response categories) for ease of interpretation, and 'statistically significant' differences across groups of students (with underlying statistical tests involving $p < 0.05$).

Qualitative data is included from one question in relation to what activities students said helped their learning about climate change and sustainability education and why. Responses were analysed thematically by two researchers separately; they then met to review and agree the themes and associated descriptions. Following this meeting, codes for all responses were checked for accuracy.

2.3 The respondents

Responses were received from 2429 students across England, although some students may not have answered every question.

2.3.1 Personal characteristics

The questionnaire asked students to provide personal demographic information, although these questions were not compulsory.

- **Age Group:** The sample of students was comprised of 40% in Year 7 (957 of 2417 students who specified their academic year), 34% in Year 8 (812 students), and 27% in Year 9 (648 students).
- **Gender:** The sample of students was comprised of 56% girls (1270 of 2276 students who specified their gender), 43% boys (975 students), and 1% non-binary and gender diverse students (31 students).
- **Ethnicity:** The sample of students was comprised of 56% with white backgrounds (1299 of 2319 students who specified their ethnicity/background); 25% with Asian / Asian British backgrounds (569 students); 7% with mixed backgrounds (154 students); 5% with Black / Black British backgrounds (113 students); 4% with Arab backgrounds (101 students); and 4% with other ethnicities/backgrounds (83 students).

As partial context, in England during 2023/2024, across all year groups within state-funded secondary schools: 69% of students had white backgrounds; 13% had Asian / Asian British backgrounds; 7% had mixed backgrounds; 7% had Black / Black British backgrounds; 2% had other ethnicities/backgrounds; and 2% had unclassified ethnicities/backgrounds (DfE, 2024)².

2.3.2 Home context (books at home)

The questionnaire followed international surveys, such as the Trends in International Mathematics and Science Study (TIMSS) (Martin et al., 2019), in asking students to convey numbers of books at home ('How many books or ebooks are there in your home? (Do not count magazines, newspapers, or your school books)'); this reflects some aspects of home or family resources, given that students may not necessarily know their home or family income or other financial information. In England, students' reports of numbers of books at home inversely scales with their eligibility for free school meals³: students with the most books at home have the lowest proportion of students eligible for free school meals, while students with the fewest books at home have the highest proportion of students eligible for free school meals (Richardson et al., 2020). Considering differences between those with very few books and those with the most books offers insight into the extent of potential educational and wider inequalities (Richardson et al., 2020). Our sample of students involved 16% with the fewest books at home ('None or very few (0–10 books)') and 25% with the most books at home ('Enough to fill three or more bookcases (more than 200)').

² Equivalent contextual information is not publicly available for independent schools and their students across England.

³ Eligibility for free school meals follows from families receiving income-based support or benefits, essentially reflecting low family income.

2.3.3 School contexts

Students were not required to specify their school, and not all students did so; for those that did, the sample of students covered 30 schools. The 30 known schools covered 24 state-funded secondary schools (21 academies and three local authority-maintained schools), and six independent schools. Most of the known schools were mixed in gender: 26 schools had mixed gender admissions, three schools only admitted girls, and one school only admitted boys. The known school locations involved: nine in London; five in the East of England; four in the East Midlands; four in the West Midlands; three in the South East; three in Yorkshire and the Humber; one in the North East; and one in the South West. The known school locations involved 21 in urban areas and nine in rural areas.

From publicly available information, the 24 state-funded secondary schools within the sample had 21% of students across all academic year groups who were known to be eligible for free school meals, during the 2023/2024 academic year (DfE, 2024). As partial context, during the 2023/2024 academic year, state-funded secondary schools had 24% of their students known to be eligible for free school meals across all year groups (DfE, 2024).

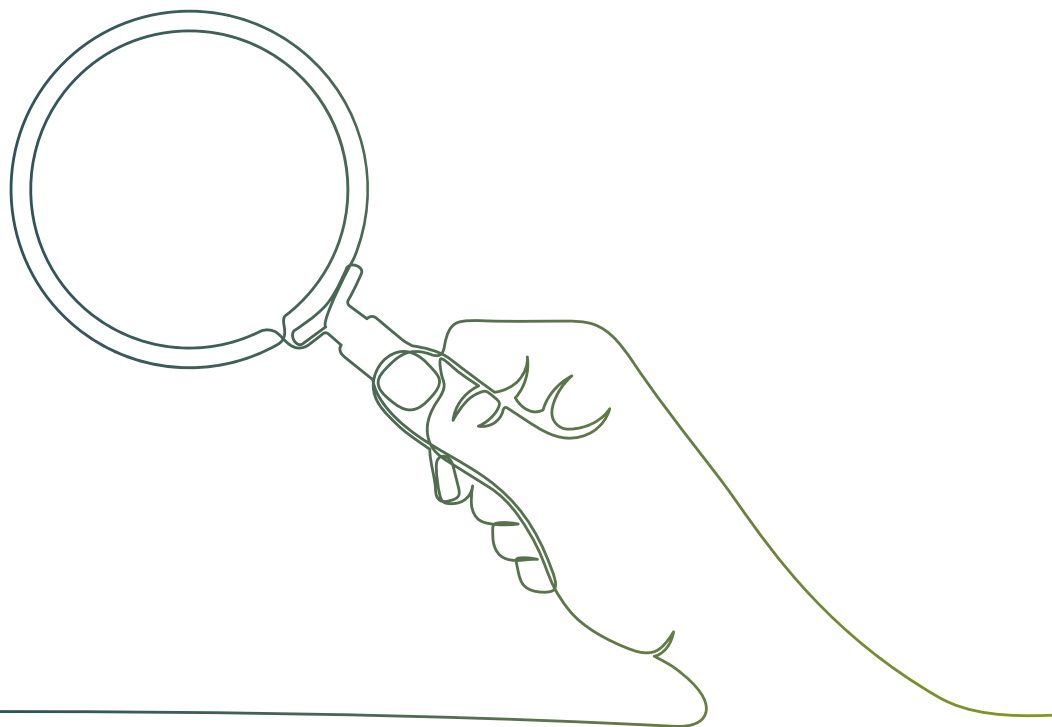


3. Results

This section of the report presents results in relation to how students feel about climate change, their experiences of climate change and sustainability education in and beyond the formal curriculum, their perceptions of the nature and value of climate change and sustainability education, and finally what they want to learn about (and how) in relation to climate change and sustainability.

This section (and the report as a whole) presents a brief sample of results; further, more detailed analysis, will be presented in subsequent papers.

- Findings are presented from across the sample of students (encompassing those in Year 7, Year 8, and Year 9), given that they are within the same curriculum Key Stage (Key Stage three). Future research may benefit from exploring similarities and differences across academic years.
- The analysis focused on comparisons across those who identify as girls (female) or boys (male), and could not undertake concurrent comparisons against those who identify as non-binary (and other gender diverse students) given the numbers involved (1% of the total sample, or 31 students). Future research would benefit from seeking larger samples, which may afford more extensive and diverse representation.
- This analysis also focused on comparisons across those students who described their ethnicity as white or those with other backgrounds via the collective term Global Majority Heritage (GMH). We use GMH to include people who stated they are from Arab, Asian/Asian British, Black/Black British, or Mixed or Multiple ethnicities, and in recognition of the fact that GMH people currently represent approximately 80% of the world's population (Campbell-Stephens, 2020). We recognise the limitations of grouping students rather than reporting responses from students of different ethnic backgrounds, such as Asian/Asian British, Black/Black British or Arab, separately. This may hide nuances between different groups, which will be considered separately within further analysis and academic papers.



3.1 How do students feel about climate change?

KEY FINDINGS



- Most students conveyed that their health was good, that they generally feel happy, and that their life was going well. Boys and those with more books at home tended to convey higher extents of wellbeing than girls and other students.
- Some students also conveyed worry over climate change: 36% of all students said they worry 'a lot' or 'all of the time' about what the world will be like in the future because of climate change; a further 50% reported they worry 'a little'.
- Climate change evoked many negative emotions, particularly sadness (conveyed by 67% of all students) and also anxiety, guilt and shame. Positive emotions were rarely conveyed.
- Significant differences were revealed across students, with girls and students with most books at home being more worried about what the world will be like in the future because of climate change (compared to boys and those with fewest books at home) and more likely to feel negative emotions, such as sadness, anxiety and guilt.

Students were asked about their health and wellbeing (Table 1): 78% of all students agreed or strongly agreed that *'My health is good'*, 65% agreed or strongly agreed that *'My life is going well'*, and 64% agreed or strongly agreed that *'I generally feel happy'*. Students with fewest books at home conveyed lower levels of agreement for all three of these questions, compared to students with the most books at home. Girls conveyed lower levels of agreement around feeling happy and that their life was going well, compared to boys.

Table 1. Students' health and wellbeing (percentages of agreement).⁴

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
My health is good	78%	* 65%	* 86%	78%	79%	77%	79%
I generally feel happy	64%	* 58%	* 69%	* 61%	* 70%	66%	64%
My life is going well	65%	* 58%	* 71%	* 62%	* 71%	65%	66%

Students were also asked how they feel about climate change. In particular, students were asked to respond to the statement *'I worry about what the world will be like in the future because of climate change'* with potential responses of 'not at all', 'a little', 'a lot' or 'all the time'. Overall, 36% of all students conveyed that they worry about what the world will be like in the future because of climate change 'a lot' or 'all the time', and 50% conveyed that they

⁴ This table shows the percentages of students who conveyed agreement (selecting 'agree' or 'strongly agree') to a series of statements relating to their health and wellbeing. The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistically significance differences are shown through asterisks (**) and shading.

worry 'a little', while 13% conveyed that they worry 'not at all'. Considering those who were most worried (those who said that they worry 'a lot' or 'all of the time'), significant differences were found between those who had fewest and most books at home (Table 2), with the latter reporting much greater worry (47% as opposed to 20%). Similar differences were also found between girls and boys, with girls reporting significantly higher worry than boys (44% of girls, as opposed to 27% of boys).

Table 2. Students' worry about climate change (percentages of those selecting 'a lot' or 'all the time').⁵

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
I worry about what the world will be like in the future because of climate change	36%	* 20%	* 47%	* 44%	* 27%	38%	35%

Students were also asked about specific feelings in relation to climate change, where students could select from a range of positive and negative emotions following the prompt of '*Climate change makes me feel...*' (Table 3). The emotions most commonly identified by students were negative, with *sadness* most frequently mentioned, with 67% of all students suggesting climate change makes them feel that way. There were significant differences between those with fewest and most books at home, with those with most books at home more likely to experience negative emotions; for example, *sadness* (78% as opposed to 49%) and *anxiety* (65% as opposed to 35%). A similar pattern was seen for girls and boys, with girls also being more likely to report that climate change makes them feel negative emotions, such as *sadness* (74% as opposed to 59%) or *guilt* (61% as opposed to 37%). Finally, negative emotions, such as *anger*, *shame* and *helplessness* were all highlighted more commonly than positive emotions, such as feeling *empowered* or *brave*.



⁵ This table shows the percentage of students who answered 'a lot' or 'all of the time' to the question 'I worry about what the world will be like in the future because of climate change'. The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistically significance differences are shown through asterisks (*) and shading.

Table 3. Students' emotional responses to climate change (percentages of those selecting responses).⁶

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
Sad	67%	* 49%	* 78%	* 74%	* 59%	65%	69%
Anxious	53%	* 35%	* 65%	* 60%	* 44%	51%	55%
Guilty	50%	* 39%	* 55%	* 61%	* 37%	* 54%	* 47%
Angry	48%	* 32%	* 61%	* 53%	* 40%	* 44%	* 50%
Ashamed	47%	* 33%	* 54%	* 54%	* 39%	48%	47%
Afraid	46%	* 30%	* 56%	* 53%	* 38%	* 43%	* 48%
Helpless	42%	* 32%	* 49%	* 48%	* 36%	44%	41%
Powerless	36%	* 26%	* 45%	* 41%	* 31%	35%	38%
Other	34%	35%	40%	* 35%	* 28%	36%	31%
Despair	24%	* 15%	* 33%	* 27%	* 19%	24%	25%
Uninterested	23%	* 34%	* 15%	* 20%	* 24%	23%	21%
Depressed	20%	* 16%	* 26%	19%	17%	* 17%	* 22%
Optimistic	19%	* 15%	* 22%	* 17%	* 21%	19%	20%
Empowered	18%	17%	21%	16%	16%	19%	16%
Brave	17%	20%	16%	* 13%	* 18%	17%	16%
Happy	9%	* 16%	* 6%	* 5%	* 9%	8%	8%

3.2 What are students' experiences of climate change and sustainability education within the formal curriculum?

KEY FINDINGS

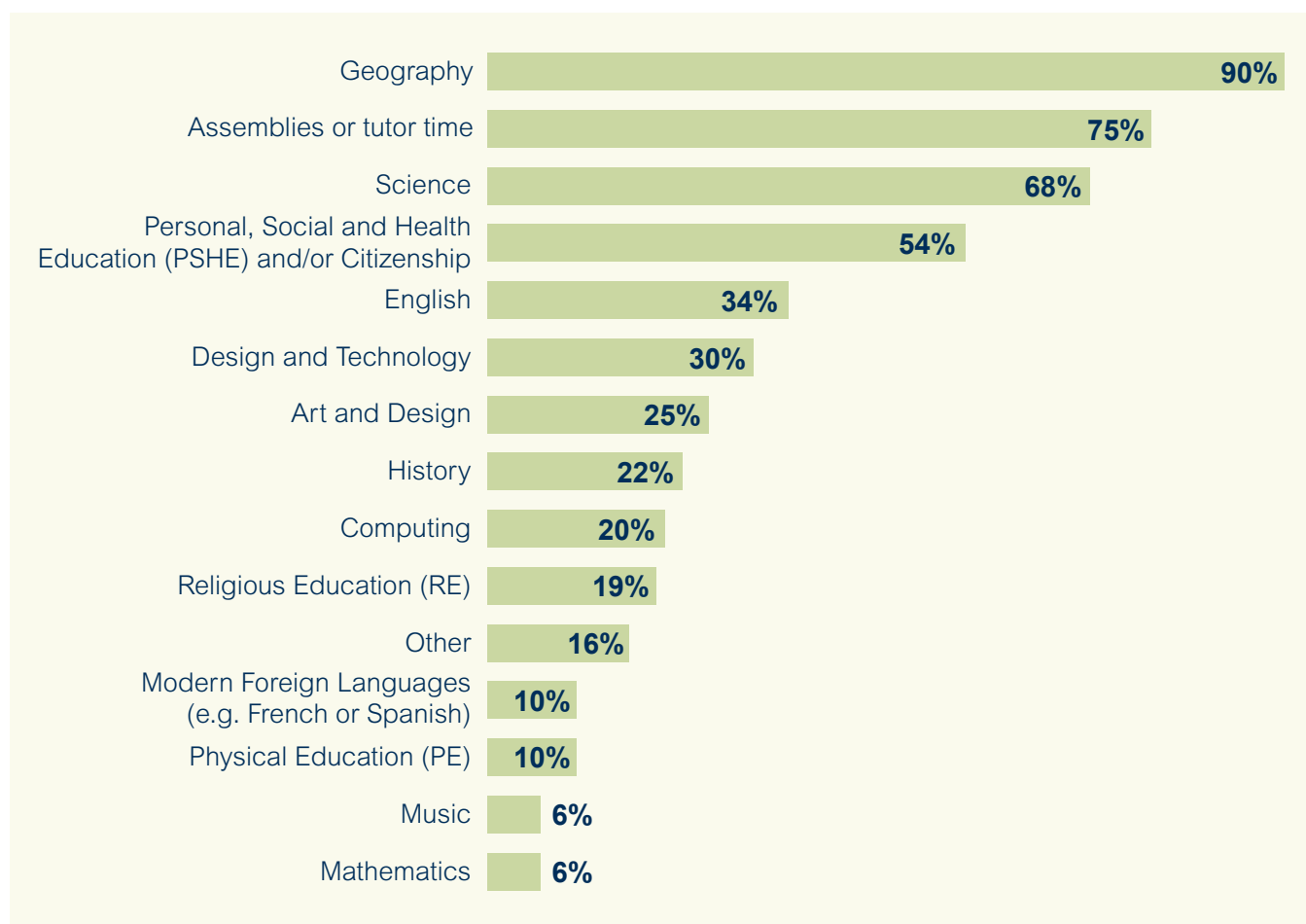


- Students most commonly reported learning about climate change and sustainability in geography (90%), assemblies or tutor time (75%) and science (68%).
- Students least commonly reported learning about climate change and sustainability in mathematics (6%) and music (6%).
- Students indicated that they learned about climate change and sustainability in a range of other subjects, such as religious education (19%), computing (20%), history (22%) and art and design (25%).
- Outdoor learning was experienced infrequently: 31% of students reported they go outside in lessons other than physical education (PE) on at least a weekly basis; 9% reported on a monthly basis; 26% reported less often than a monthly basis; and 34% reported that they never have lessons outside that are not PE.

⁶ This table shows the percentage of students who conveyed various emotions (those who answered 'yes') in response to the question 'Climate change makes me feel ...'. The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistically significance differences are shown through asterisks (***) and shading.

The questionnaire asked students to tick 'yes' or 'no' for each taught subject in response to the question 'At secondary school, I have learnt about climate change and/or sustainability in ...' (Figure 1). The subject in which students most frequently experienced learning about climate change and/or sustainability was geography (90%), with assemblies or tutor time (75%) and science (68%) following. Many school subjects were much less likely to offer students experiences of climate change and sustainability education through their lessons, particularly music (6%), mathematics (6%), physical education (10%) and modern foreign languages (10%), but also including religious education (19%), computing (20%), history (22%) and art and design (25%). Students were invited to add 'other', to which responses predominantly referred to drama and food technology / food science.

Figure 1. Subjects in which students have learnt about climate change and/or sustainability (percentages of those selecting subjects).⁷



Students were also asked to report how often they have lessons outside that are not PE (responding 'every day', 'most days a week', 'once or twice a week', 'once or twice a month', 'less often than once a month', or 'never'). In response, the most selected frequencies were 'never' (34%) and 'less often than once a month' (26%), with similar numbers (31%) reporting they go outside in lessons other than PE on at least a weekly basis. In addition, students were asked the extent to which they agree that 'My teachers encourage me to spend time outdoors in nature'; overall 32% students 'strongly agreed' or 'agreed' with this statement.

⁷ This figure shows the percentage of students who selected that they had learnt about climate change and/or sustainability in each subject area (via the prompt 'At secondary school, I have learnt about climate change and/or sustainability in...'). It shows results from across all students within the sample (Years 7-9).

3.3 What do students learn about climate change and sustainability beyond the formal curriculum?

KEY FINDINGS

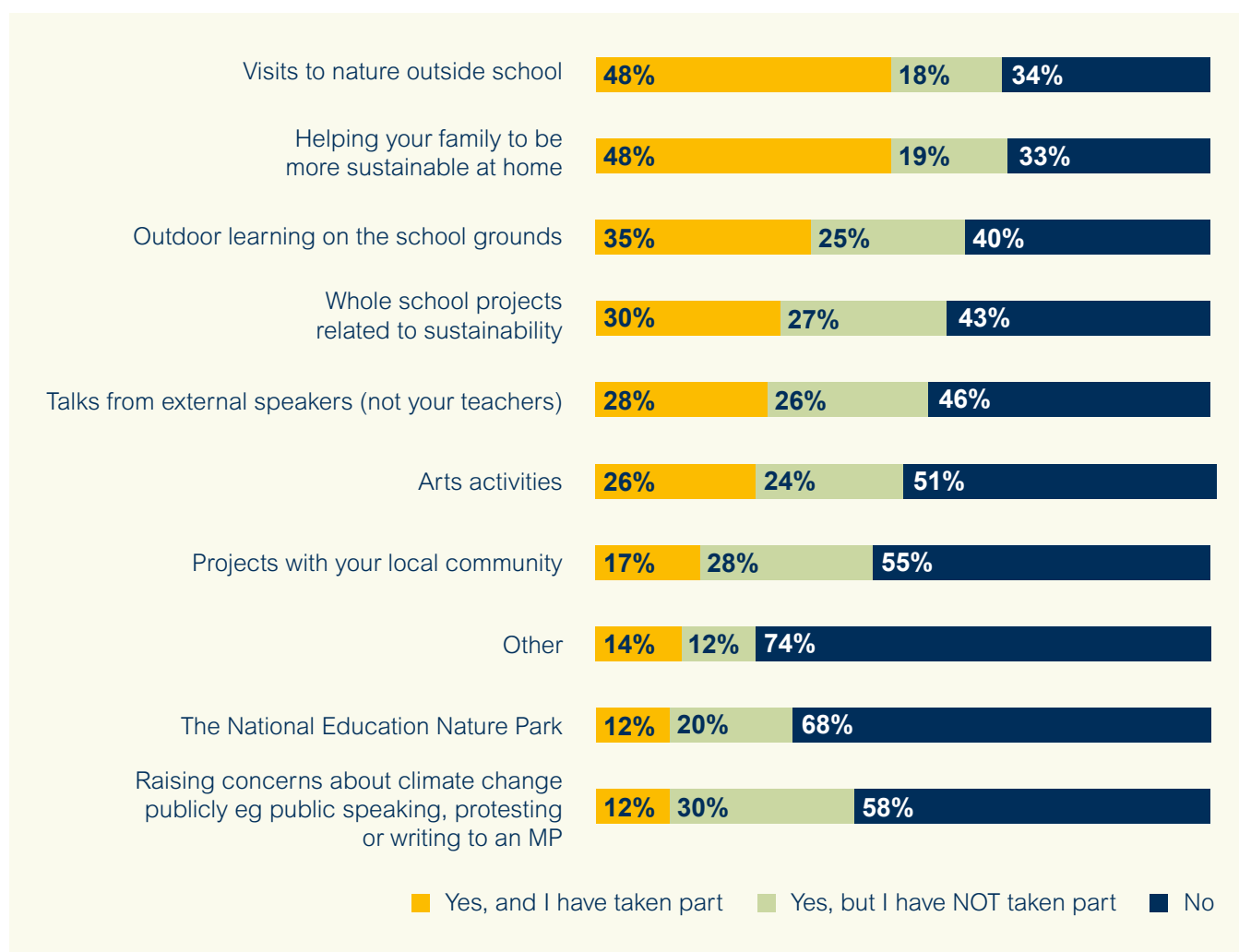


- Students reported opportunities for undertaking a range of activities related to climate change and sustainability, although with extensive disparities in availability and engagement for different activities.
- Students most commonly reported that their schools support them to help their family to be more sustainable (48%) and to visit nature outside school (48%).
- Few students reported engagement with the National Education Nature Park (12%) or undertaking projects with their local community (17%).
- Significant differences were found between students of different gender and home context, with boys and those with fewest books at home reporting lower engagement with the majority of opportunities beyond the curriculum than girls and those with most books at home.

Students were asked if they had the opportunity to take part in various activities in relation to climate change and sustainability education, where students were able to select that the opportunity exists and that they have taken part, the opportunity exists but that they have not taken part, or that the opportunity does not exist (Figure 2). Activities students were most likely to have been given the opportunity to engage with, and they had subsequently taken part in, were *'Helping your family to be more sustainable at home'* (48%) and *'Visits to nature outside school'* (48%). This latter finding is significant as it suggests that over half of the students are not facilitated to visit nature outside school. Students reported relatively little opportunity to engage with the *'National Education Nature Park'*, *'Raising concerns about climate change publicly'* (such as engaging with local organisations) or *'Undertaking projects with their local community'* (12%, 12% and 17% students report having engaged with these activities respectively). Within *'Other'* responses, students predominately referenced taking part in: learning within school (including via their school subjects, fieldtrips and assemblies/tutor time); reading, researching and talking about climate change and sustainability; and engaging with news or media about climate change and sustainability.



Figure 2. Students' opportunity to take part in a range of extra-curricular activities related to climate change and/or sustainability (percentages of those selecting responses).⁸



Some differences in engagement were revealed across groups of students; Table 4 shows the percentages of students selecting 'Yes, and I HAVE taken part' (rather than 'Yes, but I HAVE NOT taken part' or 'No') across the various comparisons. Considering students' home/family circumstances, students with the most books at home (compared to those with the fewest books at home) reported higher engagement for each activity except for engagement with the National Education Nature Park. For example, while 48% of the entire sample selected 'Yes, and I HAVE taken part' for 'Visits to nature outside school', only 34% of those with the fewest books at home selected this compared to 55% of those with the most books at home. With regards gender, boys tended to report lower engagement than girls with five out of nine activities including 'Helping your family to be more sustainable at home', 'Visits to nature outside of school' and 'Arts activities'. Fewer differences across ethnicity groupings were revealed, which included GMH students conveying more engagement than white students for 'Whole school projects related to sustainability' and 'Helping your family to be more sustainable at home'.

⁸ This figure shows the percentage of students who conveyed different engagement ('Yes, and I HAVE taken part', 'Yes, but I HAVE NOT taken part' or 'No') for a range of extra-curricular activities (via the prompt 'Do you have the opportunity to take part in any of the following activities in relation to climate change and/or sustainability?'). It shows results from across all students within the sample (Years 7-9).

Table 4. Students' opportunity to take part in a range of extra-curricular activities related to climate change and/or sustainability (percentages of those selecting 'Yes, and I HAVE taken part').⁹

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
Outdoor learning on the school grounds	35%	* 25%	* 40%	37%	33%	37%	34%
Talks from external speakers (not your teachers)	28%	* 17%	* 34%	* 31%	* 24%	30%	27%
Visits to nature outside school	48%	* 34%	* 55%	* 52%	* 44%	50%	47%
Arts activities	26%	* 16%	* 29%	* 29%	* 21%	28%	24%
The National Education Nature Park	12%	10%	12%	12%	12%	11%	13%
Projects with your local community	17%	* 11%	* 22%	17%	15%	15%	18%
Whole school projects related to sustainability	30%	* 20%	* 36%	* 33%	* 26%	* 35%	* 28%
Raising concerns about climate change publicly	12%	* 8%	* 15%	13%	11%	13%	11%
Helping your family to be more sustainable at home	48%	* 29%	* 62%	* 55%	* 40%	* 52%	* 46%
Other	14%	* 6%	* 22%	14%	12%	15%	13%

Some reasons that were given across a large range of activities included: (i) activities being linked to action or making sustainability personal; (ii) activities being enjoyable; (iii) activities giving greater opportunity for awareness or learning; (iv) activities providing opportunity to understand different perspectives and/ or experiences; (v) activities enabling students to see the nature that needs to be protected or could change in the future; and (vi) activities going into depth, detail or real examples. There were also reasons that were more commonly associated with specific sets of activities.

⁹ This table shows the percentage of students who engaged (those who selected 'Yes, and I HAVE taken part' rather than 'Yes, but I HAVE NOT taken part' or 'No') for a range of extra-curricular activities (via the prompt 'Do you have the opportunity to take part in any of the following activities in relation to climate change and/or sustainability?'). The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistical significance differences are shown through asterisks (***) and shading.

Students suggested that activities helped their learning most when they were able to:

- enjoy or admire nature through *'Outdoor learning on the school grounds'* and *'Visits to nature outside school'*;
- engage with real solutions through *'Talks from external speakers'* and *'Whole school projects related to sustainability'*;
- gain a sense of agency through *'Helping your family to be more sustainable at home'*, *'Raising concerns about climate change publicly'* and *'Projects with local community'*;
- engage in collective action through *'Projects with your local community'*, *'Raising concerns about climate change publicly'*, and *'Whole school projects related to sustainability'*; and
- benefit from teaching others to reinforce learning through *'Helping your family to be more sustainable at home'*, *'Raising concerns about climate change publicly'*, *'Whole school projects related to sustainability'* and *'Projects with local community'*.

3.4 What are student perceptions about the nature of climate change and value of sustainability?

KEY FINDINGS



- Students recognised the value of learning about climate change and sustainability but did not necessarily find it enjoyable: 76% agreed that it is important to learn about climate change and sustainability education, while only 46% agreed that they enjoy learning about it.
- Students tended to convey that their teachers explain how climate change and sustainability are relevant to them and what they can do to make decisions that are more sustainable (60% agreed). However, students much less commonly reported that they were able to influence how their school was responding to climate change and sustainability (29% agreed).
- In relation to looking after the environment, 66% of all students agreed that they know what they can do to look after the environment and 56% agreed that they would like to do more to look after the environment. However, of all students, only 16% agreed that adults are doing enough to look after the environment.
- Relatively few students conveyed aspirations about careers related to climate change and sustainability, with only 17% agreeing that they would like to work in a job related to climate change and sustainability in the future.

The questionnaire asked students about their perceptions of climate change and sustainability, their experiences of climate change and sustainability education, action in relation to climate change and sustainability (both their own and that of adults), and the relevance of climate change and sustainability for future jobs. Table 5 shows the percentage of agreement for a range of these statements (those selecting 'Strongly agree' or 'Agree', where the remaining students selected either 'Neither agree nor disagree', 'Disagree', or 'Strongly disagree').

On average across the sample, 46% of students agreed that they enjoyed learning about climate change and sustainability. Students' reported enjoyment varied across gender (where only 40% of boys agreed that they enjoyed learning about it compared to 51% of girls) and across home/family circumstances (where 54% of those with the most books at home agreed that they enjoyed learning about it compared to 30% of those with the fewest books at home).

Most students recognised the value of learning about climate change and sustainability, with 76% of all students agreeing that *'It is important to learn about climate change and sustainability'*. Gender was again a factor here with 70% of boys agreeing that it is important to learn about these issues compared to 83% of girls. Furthermore, home/family circumstances were a further factor in the value placed on learning about these issues, with 83% of those with the most books at home agreeing that they are valuable compared to 58% of those with the fewest books at home.



Students broadly agreed that *'My teachers explain how climate change and sustainability are relevant to me and what I can do to make decisions that are more sustainable'* (60%), although this also varied across home/family circumstances (where 62% of those with most books at home agreed compared with 47% of those with fewest books at home). However, many students did not report that they were empowered to make change within their school context, with only 29% of all students agreeing that *'I am able to influence how my school is responding to climate change and sustainability'*.

More specifically in relation to looking after the environment, 66% of students agreed that *'I know what I can do to look after the environment'*, with difference across gender (where 72% of girls agreed compared to 61% of boys) and with notable variation across home/family circumstances (with 75% of students with most books at home agreeing compared with 49% of those with fewest books at home). These demographic differences were further reflected in aspirations in relation to protecting the environment. Of all students, 56% agreed that *'I would like to do more to look after the environment'* with considerable differences across gender (with 66% of girls wanting to do more, as opposed to 46% of boys) and across home/family circumstances (with 68% of students with most books wanting to do more, as opposed to 39% of students with fewest books). Despite these differences in relation to their own knowledge and willingness to act to look after the environment, few students (16% overall) agreed with the statement *'I think adults are doing enough to look after the environment'*.

Relatively few students conveyed aspirations towards careers related to climate change and sustainability, where only 17% agreed with *'I would like to work in a job related to climate change and sustainability in the future'* across the sample. Slightly more students were able to see the value of learning about climate change and sustainability in relation to future job opportunities, with 31% agreeing with *'Learning about climate change and sustainability will give me more job opportunities'*. This varied across home/family circumstances, with 35% of those with most books at home agreeing compared with 25% of those with fewest books at home.

Table 5. Students' perceptions, actions and aspirations in relation to climate change and sustainability (percentages of agreement).¹⁰

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
I enjoy learning about climate change and sustainability	46%	* 30%	* 54%	* 51%	* 40%	45%	47%
It is important to learn about climate change and sustainability	76%	* 58%	* 83%	* 83%	* 70%	76%	77%
My teachers explain how climate change and sustainability are relevant to me and what I can do to make decisions that are more sustainable	60%	* 47%	* 62%	62%	59%	62%	60%
I am able to influence how my school is responding to climate change and sustainability	29%	* 21%	* 30%	* 31%	* 26%	31%	27%
I know what I can do to look after the environment	66%	* 49%	* 75%	* 72%	* 61%	* 69%	* 65%
I would like to do more to look after the environment	56%	* 39%	* 68%	* 66%	* 46%	56%	57%
I think adults are doing enough to look after the environment	16%	* 21%	* 9%	* 13%	* 18%	* 18%	* 14%
I would like to work in a job related to climate change and sustainability in the future	17%	14%	18%	15%	17%	16%	17%
Learning about climate change and sustainability will give me more job opportunities	31%	* 25%	* 35%	* 33%	* 29%	31%	32%

¹⁰ This table shows the percentages of students who conveyed agreement (selecting 'agree' or 'strongly agree') to a series of statements relating to their perceptions, actions and aspirations in relation to climate change and sustainability. The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistically significance differences are shown through asterisks (*) and shading.

3.5 What do students want to learn in relation to climate change and sustainability?

KEY FINDINGS

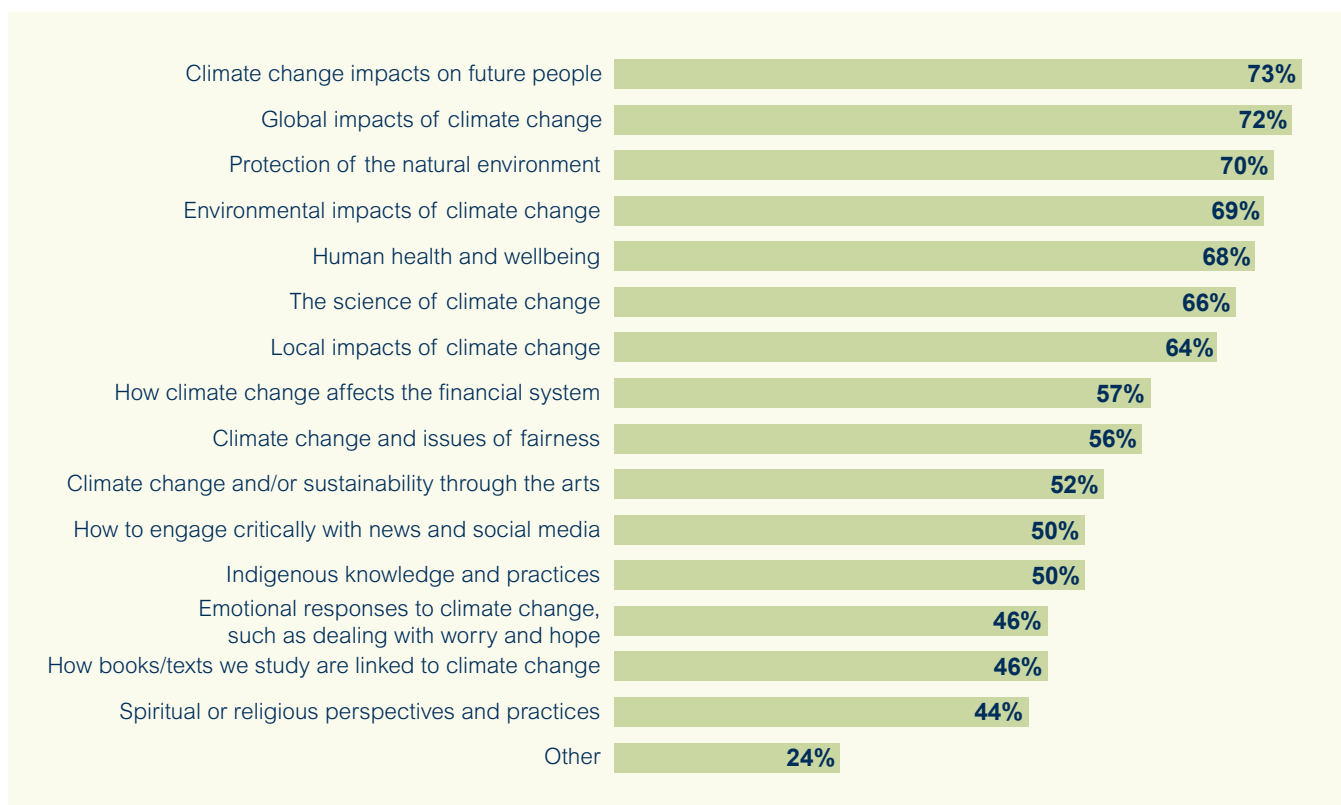


- Many students conveyed that they would like to learn about an array of topics related to climate change and sustainability.
- Students most frequently selected themes of *Climate change impacts on future people*, *Global impacts of climate change* and *Protection of the natural environment* as being of interest to them for studying within climate change and sustainability education.
- There were significant differences in relation to home/family context. Those with most books at home were more interested in learning about all topics than those with fewest books.
- In relation to gender, girls were more interested than boys in learning about most themes, most notably *Human health and wellbeing* and *Climate change and/or sustainability through the arts*.
- Many students conveyed that they would like to spend more time outdoors although they were not necessarily always encouraged to do so: 73% of all students agreed that they would like to spend more time outdoors in nature while at school, while only 32% agreed that their teachers encourage them to spend more time outdoors in nature.

The questionnaire asked students to convey whether they would like to learn about a range of topics in secondary school (Figure 3). Topics that students were most likely to identify as being of interest were '*Climate change impacts on future people*' (73%), '*Global impacts of climate change*' (72%) and '*Protection of the natural environment*' (70%). Least popular themes with students were '*Spiritual or religious perspectives and practices*' (44%), '*How books/texts we study are linked to climate change*' (46%), and '*Emotional responses to climate change, such as dealing with worry and hope*' (46%). Within the 'Other' category, those students who responded commonly requested further information on potential impacts of climate change (e.g. "*what will happen to the planet in the future*" and "*how it affects people*") and on how they can make a difference (e.g. "*how to help stop climate change*" and "*how to influence others*").



Figure 3. Climate change and sustainability themes that students would like to learn about (percentages of those selecting themes).¹¹



Many differences in interests were revealed across groups of students; Table 6 shows the percentages of students selecting that they would like to learn about the various themes in response to the question ‘*At secondary school, I would like to learn about...*’ by demographic characteristics. With respect to home/family circumstances, students with most books at home were more likely to be interested in learning about all topics than those with fewest books at home. Of particular note is that those with most books at home were significantly more interested to learn about ‘*Protection of the natural environment*’ than those with fewest books (80% as opposed to 51%), which mirrors differences in students’ wider interests in doing more to protect the natural environment (identified earlier within this report and shown through Table 5). In relation to gender, girls were more interested in learning about the majority of themes than boys, most notably ‘*Human health and wellbeing*’ (where 75% of girls conveyed interest as opposed to 60% of boys) and ‘*Climate change and/or sustainability through the arts*’ (where 58% of girls conveyed interest as opposed to 43% of boys). This is perhaps unsurprising given that girls tended to convey greater propensity for reporting negative feelings in relation to climate change (Tables 2 and 3), where these various findings suggest that a more affective approach to engaging with issues of climate change and sustainability might be of particular value to mitigate these concerns and worries.

¹¹ This figure shows the percentage of students who selected that they would like to learn about various themes of climate change and sustainability (via the prompt ‘*At secondary school, I would like to learn about...*’). It shows results from across all students within the sample (Years 7-9).

Table 6. Climate change and sustainability related themes that students would like to learn about (percentages of those selecting themes).¹²

	Sample	Books at home		Gender		Ethnicity	
	All	Fewest	Most	Girls	Boys	GMH	White
Climate change impacts on future people	73%	* 55%	* 79%	* 80%	* 66%	75%	73%
Global impacts of climate change	72%	* 55%	* 80%	* 77%	* 67%	73%	72%
Protection of the natural environment	70%	* 51%	* 80%	* 76%	* 64%	70%	71%
Environmental impacts of climate change	69%	* 52%	* 77%	* 76%	* 63%	70%	69%
Human health and wellbeing	68%	* 58%	* 71%	* 75%	* 60%	70%	67%
The science of climate change	66%	* 49%	* 73%	* 69%	* 62%	* 69%	* 64%
Local impacts of climate change	64%	* 49%	* 71%	* 70%	* 56%	64%	65%
How climate change affects the financial system	57%	* 44%	* 61%	* 59%	* 53%	* 64%	* 53%
Climate change and issues of fairness	56%	* 39%	* 65%	* 61%	* 49%	57%	55%
Climate change and/or sustainability through the arts	52%	* 39%	* 59%	* 58%	* 43%	* 55%	* 50%
Indigenous knowledge and practices	50%	* 35%	* 59%	51%	47%	* 54%	* 46%
How to engage critically with news and social media	50%	* 39%	* 55%	* 52%	* 47%	52%	49%
Emotional responses to climate change, such as dealing with worry and hope	46%	* 33%	* 50%	* 50%	* 41%	45%	48%
How books/texts we study are linked to climate change	46%	* 34%	* 55%	* 48%	* 42%	* 49%	* 43%
Spiritual or religious perspectives and practices	44%	* 36%	* 46%	* 46%	* 40%	* 50%	* 40%
Other	24%	21%	28%	25%	22%	25%	24%

¹² This table shows the percentage of students who answered 'yes' to whether they would like to learn about a range of themes in relation to climate change and sustainability (via the prompt 'At secondary school, I would like to learn about...'). The results are presented across all students within the sample ('All'), across groups of those with different extents of books at home (where 'Fewest' refers to 0-10 books and 'Most' refers to more than 200 books), and across those with different genders and ethnicities (where 'GMH' refers to students of a Global Majority Heritage background). Differences across groups were revealed through independent samples tests (t-tests), without assuming equal variances for the groups, where statistically significance differences are shown through asterisks (*) and shading.

In addition to considering themes that students would like to learn about in the future, students were also asked about the amount of time they would like to spend in nature. In response, 73% of all students strongly agreed or agreed that they would like to spend more time outdoors in nature while at school, and 56% strongly agreed or agreed that they would like to spend more time outdoors in nature when they are not at school. However, only 32% strongly agreed or agreed that teachers encourage them to spend more time outdoors in nature. Girls were slightly more likely than boys to strongly agree or agree that they would like to spend more time in outdoors in nature at school (where 77% of girls conveyed agreement as opposed to 70% of boys) or at home (63% as opposed to 48%). In relation to home/family circumstances, students with most books at home were more likely than those with fewest books to strongly agree or agree that they would like to spend more time in outdoors in nature at school (where 78% of those with the most books at home conveyed agreement as opposed to 64% of those with the fewest books at home) or at home (63% as opposed to 46%). Finally, 67% of students strongly agreed or agreed with the statement *'My parents/carers encourage me to spend time outdoors in nature'*, with girls being more likely to strongly agree or agree than boys (72% as opposed to 63%) and students with most books at home more likely to strongly agree or agree than those with fewest books (76% as opposed to 52%).



4. Inequalities in access, experience and aspiration: Opportunities for climate change and sustainability education policy and practice

The United Nations (UN) Committee on the Rights of the Child has published authoritative guidance on children's rights and the environment with a particular focus on climate change (UN, 2023), which particularly articulates the right to education that is “transformative, inclusive, child-centred, child-friendly and empowering” (UN, 2023, p.9). However, the Committee noted that, in many countries, children encounter barriers which limit their means of asserting their rights in relation to the environment. While this would frequently mean barriers for children and young people within Global South countries, this research highlights inequalities in access, experience and aspiration within England. This section firstly considers two areas of significant inequality identified: gender and socio-economic circumstances (reflected through the number of books at home). It then goes on to consider five opportunities for policy and practice in relation to climate change and sustainability which, we argue, would shift the system towards reducing these inequalities for children and young people within England.

4.1 Inequalities in access, experience and aspiration

Gender

Our findings highlight that boys tend to convey lower engagement than girls across many areas within and relevant to climate change and sustainability education. Specifically, boys were statistically significantly less likely than girls to worry about climate change (Tables 2 and 3) and less likely to enjoy or see the value of learning about climate change (Table 5). They were less likely to know what to do to protect the environment than girls, and they were less likely to want to do more to protect the environment (Table 5). Boys were less likely than girls to want to learn about all climate change and sustainability related content (Table 6), and less likely to engage with activities beyond formal learning, such as helping their family be more sustainable at home (Table 4). Only 29% of boys who answered the questionnaire believed that learning about climate change and sustainability will give them more job opportunities, and even fewer (17%) would like to work in a job related to climate change and sustainability (Table 5). This presents a worrying picture of inequality of engagement and aspiration between boys and girls.

Socio-economic circumstances

Students' socio-economic circumstances were considered through numbers of books at home, given that students may not necessarily know details of their family income and finances and given that numbers of book at home accords with other indicators of socio-economic circumstances. In England, students' reports of numbers of books at home have been shown to inversely scale with their eligibility for free school meals: students with the most books at home include the lowest proportion of students eligible for free school meals, while students with the fewest books at home include the highest proportion of students eligible for free school meals (Richardson et al., 2020). Essentially, students with fewest books can be inferred to have less advantaged socio-economic circumstances while those with most books can be inferred to have more advantaged socio-economic circumstances (Sutton Trust,

2023). We acknowledge that using this measure may misclassify individuals as it relies on students' knowledge of how many books they have at home; nevertheless, in agreement with Richardson et al. (2020) we believe it allows us to offer insights into the extent of potential educational inequalities.

Our findings show lower engagement in relation to climate change and sustainability education from students with less advantaged socio-economic circumstances. Those students were less likely than more advantaged students to enjoy learning about or see the value of climate change and sustainability education (Table 5). They were less likely to know what to do to protect the environment, and reported being less likely to want to protect the environment (Table 5). They were also less likely than more advantaged students to be encouraged to spend more time outdoors by their parents, as well as being less likely to engage with activities beyond formal learning in schools (Table 4). These findings accord with existing research that has shown patterned provision of extra-curricular activities within education, including where young people with fewer resources face particular barriers around participation (Donnelly et al., 2019). Only 14% of students of less advantaged socio-economic circumstances stated that they would like to work in a job related to climate change and sustainability, with 25% believing that learning about climate change and sustainability will give them more job opportunities. The availability and accessibility of careers support in England reflects wider inequalities, with students with less advantaged socio-economic circumstances often having less access to, and avenues for, support (Moote & Archer, 2018). As such, this data suggests a concerning context of inequality of experience and aspiration for those students who are from the poorest echelons of our society in England.

With these stark differences in mind, through the next section we explore a series of opportunities for policy and practice with the aim of supporting teachers, school leaders and policy makers to improve the quality of climate change and sustainability education for all students, whatever their background.



4.2 Opportunities for climate change and sustainability education policy and practice

Opportunity 1. Embed climate change and sustainability education across all school subjects

The first opportunity is to formally recognise the distinctive role of all school subjects in providing young people with a holistic understanding of climate change and sustainability, including through a revised National Curriculum.

The UN suggests that “School curricula should be tailored to children’s specific environmental, social, economic and cultural contexts and promote understanding of the contexts of other children affected by environmental degradation” (UN, 2023, p.9). Significantly, the data from our student survey suggests that this is not happening sufficiently in England. Students tended to report that they currently learnt about climate change and sustainability through geography, assemblies or tutor time, and science; however, students expressed desires to learn more about various themes, including the impacts of climate change on future people, the global impacts of climate change, and human health and wellbeing, which could be approached through many more, if not all, curricula subjects. Students also conveyed interest in exploring broader areas, including the effects of climate change on the financial system, issues of fairness, climate change and sustainability through the arts, and Indigenous knowledge and practices.

All school subjects offer avenues for students to gain valuable knowledge and skills that contribute to their understanding of and ability to respond to the climate and ecological crises (Greer et al., *in review*). While there are concepts that all young people need to understand in relation to climate change, such as the link between greenhouse gas emissions and climate change (Stevenson et al., 2017), there are also specific ideas rooted in disciplinary foundations that students can apply to understand global challenges and their related responsibilities as a (global and also national) citizen (Markwick & Reiss, 2024). Power and Kitson note that “Climate science is diagnostic, but climate change is not a ‘science’ problem. It is a societal problem, a human problem. Technology-based ‘solutions’ are not, as often depicted, cleanly separate from the messiness of real life, but will be developed and deployed according to (some) human values, priorities and judgements” (2024, p.2). Within the context of England’s subject-based curriculum, exploring climate change and sustainability issues across all subjects provides multiple lenses to critically view and respond to the climate and ecological crises. Subjects typically associated with climate change and sustainability, such as science and geography (Dawson et al., 2022), can be complemented by perspectives from subjects, such as history (Power & Kitson, 2024), mathematics and music (Purves & Himonides, 2024).

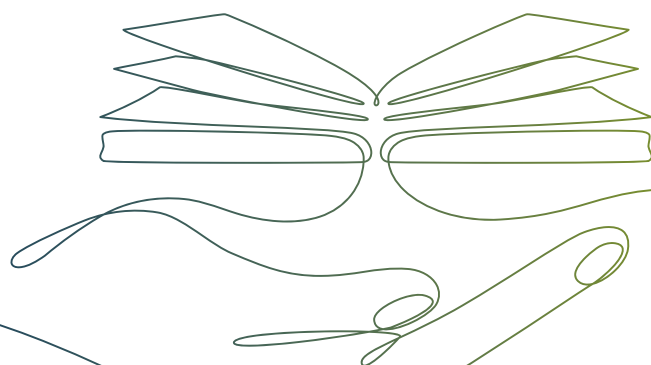
Incorporating climate change and sustainability across multiple subjects has the potential to comprehensively address the implications that follow from the research findings that have been presented through this report. First, a multidisciplinary approach would help students consider the climate and ecological crisis in different ways, reflecting its wide-ranging implications on all aspects of life; this would allow students to learn about the broader aspects that interest and matter to them. Second, exploring these issues through different disciplinary lenses would provide students with a more comprehensive understanding of the nature and scope of climate change and sustainability and, in doing so, open up thinking around the importance and diversity of ‘green careers’ for all students. Third, engaging

students with climate change and sustainability through a broader range of subjects would create more opportunities to reach those students who appear to be currently disengaged or uninterested – namely boys and those of lower socio-economic background – thereby reducing inequalities in relation to climate change and sustainability education. While the National Curriculum in England currently affords teachers some flexibility to incorporate climate change and sustainability into their lessons, this relies heavily on the knowledge, expertise and motivation of individual teachers (and their schools), leading to inconsistent coverage across schools (Greer et al., 2023). As such, formal and explicit incorporation into the National Curriculum of all school subjects, along with discipline-specific professional development for teachers, would support all teachers in effectively teaching about climate change and sustainability, ensuring a more equitable experience for children and young people in their care.

Opportunity 2. Extend outdoor learning within and beyond the formal curriculum for all students

The second opportunity is to extend the scope for outdoor learning, and other engagement with nature and the outdoors, within and beyond the formal curriculum and for all students.

Previous studies have found that while young people report spending some time outdoors at school, which may include recreation during lunch and other times, relatively few tend to report that they have outdoor activities in lessons that are not physical education (Natural England, 2022). This is of particular concern because, where they do promote nature engagement through outdoor learning, schools have been found to achieve improvements in children's development, motor skills, attention restoration, and social, emotional, and behavioural difficulties (Lovell et al., 2020). Furthermore, learning in natural environments has been linked with higher engagement in reading, science, mathematics, physical education, and social studies (Browning & Rigolon, 2019). However, despite this evidence, opportunities for nature engagement and outdoor learning have substantially decreased in recent years. For example, the MENE survey (Natural England, 2014) found that, in an average month, only 8% of children in England visit natural environments with their schools. In deprived areas, rather than schools serving to 'level up' (HM Government, 2022), instead this exacerbates inequalities for children who are already less likely to have access to nature. As such, schools have the potential to facilitate equity of access to nature, thereby playing a crucial role in addressing health inequalities too (Moula et al., 2023).



In this research, only 35% of students reported having taken part in outdoor learning on the school grounds while 73% conveyed they would like to spend more time in nature while they are at school. However, both these figures vary significantly between students of different gender and socio-economic backgrounds, with boys and disadvantaged students being significantly less likely to have either taken part in outdoor learning in school or report wanting to do more. More significant discrepancies were found in relation to time spent in nature outside school; 48% of students reported having undertaken visits to nature outdoors, although more advantaged students were significantly more likely than those of low socio-economic backgrounds to have done so (55% as opposed to 34%). More advantaged students and girls were also more likely to convey that they wanted to spend more time outdoors in nature while they were not at school (63% of advantaged students and 63% of girls, in contrast with 56% of all students). School provision for students to engage with outdoor environments is of substantial importance, as there are considerable inequalities in opportunities for students to engage with nature and the outdoors outside school. Within our survey, 67% agree that their parents or carers encourage them to spend time outdoors in nature, but this varies considerably between those of high and low socio-economic background (76% as opposed to 52%) and girls and boys (72% as opposed to 63%). As such, schools have a responsibility to address these inequalities, and yet only 32% of students in our research agree that their teachers encourage them to spend outdoors in nature.

Where children and young people spend time outdoors in school, such as through field trips or residential experiences, evidence further suggests they have increased nature connection (e.g. Barrable & Booth, 2020); this incorporates people's personal affinities towards nature, including inherently valuing experiences of nature, and feeling responsibility towards it. This is important because engaging with nature and nature connection have both been found to correlate with undertaking actions to support and protect the environment (e.g. Lengieza & Swim, 2021). However, 85% of the UK population lives in urban areas with less access to nature (World Bank Group, 2023). Research suggests that girls tend to convey stronger nature connection than boys, and inequalities limit nature connection for those from lower socio-economic backgrounds (Beery et al., 2023). Within our data, 56% of all students agreed that they would like to do more to look after the environment; however, this varies, with disadvantaged students being substantially less likely to do so than more advantaged students (39% as opposed to 68%), and boys being considerably less likely to do so than girls (46% as opposed to 66%). 70% of all students agreed that they would like to learn more about protection of the environment, but there is significant variation with disadvantaged students being markedly less likely to want to than more advantaged students (51% as opposed to 80%), and boys being less likely to do so than girls (64% as opposed to 76%).

As such, our data illustrates the importance of outdoor learning as a mechanism for connecting all students with nature, which may facilitate pro-environmental behaviours, as well as wider improvements in health and wellbeing. This might be achieved through greater opportunities for outdoor learning beyond those subjects which might typically be associated with it, such as geography and science, and could include field trips, outdoor adventure education, forest school activities, traditional school subjects taught in natural environments, or arts-in-nature experiences (Mann et al., 2022; Walshe et al., 2022).

Opportunity 3. Develop student agency through opportunities for engagement, action and making a difference

The third opportunity is to foster a sense of agency for all students by building specific occasions for meaningful engagement and action, both within and beyond the curriculum.

Within our data many students conveyed that they knew what they could do to look after the environment (66% agreed), but students also reported that they would like to do more to look after the environment (56% agreed), and few thought that adults are doing enough to look after the environment (16% agreed). Despite this, few students reported participating in activities which provide opportunities to foster a sense of agency or promote action, for example engaging with the National Education Nature Park (12% students), undertaking projects with their local community (17% students) or raising concerns about climate change publicly (12%). This is significant because, according to the students themselves, participation in these activities appears to contribute to students' learning about climate change and sustainability through fostering a sense of agency and empowerment. For example, where students identified that undertaking projects with their local community most effectively contributed to their learning about climate change and sustainability, many articulated this was because they could see their actions could make a difference both individually and collectively. The capacity for students to gain awareness of what can be done, and conceive that personal and collective actions can make a difference, has the potential to contribute to more positive emotions and more constructive responses to climate change (Ojala, 2012; Ojala et al., 2021). The development of teachers and other professionals that facilitate these activities also warrants further attention. Given the known barriers to student participation in activities beyond the formal curriculum (Donnelly et al., 2019), there is a critical need to enhance the availability and accessibility of these opportunities for all students, including considerations of financial accessibility, transportation and accommodation of students and families with diverse needs.

Participating in certain activities, such as helping families to be more sustainable at home, raising concerns about climate change, and undertaking projects within local communities, helped students to see that their actions made a difference. The inclusion of the activity of raising concerns about climate change here is significant given the importance of children and young people seeing that their actions can contribute to societal impact. There is, therefore, greater potential to consider how other cross- or extra-curricular activities (e.g. Nature Education Nature Park and whole school projects related to sustainability) are widely accessed and designed to offer opportunities for young people to take action and make a difference. Alongside this, seeing nature that could be lost or is already changing, engaging with real solutions, taking part in collective action, and teaching others (e.g. family, friends) to reinforce learning about sustainability and climate change, were more common reasons why students felt certain activities had most helped their learning about climate change and sustainability. Where there is national investment to support students' learning about climate change and sustainability beyond the formal curriculum, it is imperative to design opportunities that align with what students find helpful for their learning. Additionally, these opportunities should build on the successful examples set by other organisations and schools.

As part of children’s right to a clean, healthy and sustainable environment, the UN states that “access to information, participation in decision-making and child-friendly access to justice, with effective remedies, have equal importance to the empowerment of children, including through education, to become agents of their own destiny” (UN, 2023, p.12). From the findings presented here, although 60% of students agreed that their teachers explain how climate change and sustainability are relevant to them and what they can do to make decisions that are more sustainable, only 29% of students reported that they were able to influence how their school is responding to climate change and sustainability. This suggests that students do not feel fully empowered even within their schools. This is important given that the DfE’s climate change and sustainability strategy includes the guiding principle of “increasing opportunities for all children and young people to: spend time in nature and learn more about it; and become actively involved in the improvement of their local environment” (2022, n.p.). To achieve this, it is imperative that school leaders have the resources and professional development to address climate change and sustainability in a comprehensive manner. These survey findings underscore the importance of revisiting recommendations, informed by young people, to incorporate whole-school approaches to sustainability that actively involve young people in decision-making processes (British Educational Research Association, 2021; National Association for Environmental Education, 2022).



Opportunity 4. Develop green careers provision

The fourth opportunity is to provide greater support for schools and teachers to develop green careers provision. This includes embedding an understanding of green careers across subjects and within educational opportunities beyond the formal curriculum. Given the lack of research on future studies and career pathways of young people in relation to climate change and sustainability, this area should also be incorporated into future research agendas.

This research illustrates that relatively few students believe that learning about climate change and sustainability will provide more job opportunities (31%), and even fewer indicate an interest in working in a job related to climate change and sustainability in the future (17%). This echoes previous research which found that while many young people convey an interest in learning about the natural environment, few convey aspirations towards studies and careers involving nature or supporting the environment, and even fewer would like to have a future job or career that will help reduce the impact of climate change (Hamlyn et al., 2024; Sheldrake & Reiss, 2023). These findings are significant as they suggest that few students recognise the importance of jobs for contributing to ‘preserving or restoring the environment and our planet’ (green jobs: National Careers Service, n.d.), and even fewer would be interested in working in this area. This potentially restricts aspirations for wide-ranging future careers in a context where the UK government has stated a commitment to reaching net zero in all sectors of the economy by 2050 (National Careers Service, n.d.).

If jobs related to climate change and sustainability are perceived as (only) being jobs within science, then these may be perceived as less accessible by and for many young people. Some young people, especially those with characteristics or backgrounds that continue to be under-represented within science, recognise and feel that science is less accessible and feasible for them (DeWitt & Archer, 2017; Hamlyn et al., 2024). Alongside work to address this, it is also essential for educators to highlight the diverse range of green careers beyond traditional scientific roles; this may also be approached through industry partnerships that give students the opportunity to gain hands-on experience and undertake projects and initiatives that enable them to explore diverse (and green) careers within different fields. Awareness campaigns are also needed that educate students and families about the breadth of green careers available and the importance of sustainability in all sectors of the economy.

Alongside embedding climate change and sustainability into all school subjects (Opportunity 1), there is a potential to link curriculum learning to careers (Gatsby Benchmarks; Holman, 2014) to show how green careers are relevant to all subject areas. This requires investment in professional development programmes to equip teachers with the knowledge and tools to integrate this effectively into their subject teaching, rather than treating it as an ‘add-on’. This could further help address gender differences in interest, relevance, or perceived barriers in specific subject areas where climate change and sustainability are traditionally incorporated (e.g. science: Hamlyn et al., 2024).

In summary, to support the UK’s commitment to net zero and to prepare students for future green careers, it is imperative to enhance career guidance and integrate green career pathways into the curriculum. This involves enhancing awareness around the nature and accessibility of green careers, ensuring equitable access to career support, and linking curriculum content to diverse career opportunities in sustainability. We also suggest a need for further research which explores the career aspirations of young people in relation to climate change and sustainability by conducting longitudinal studies that track students’ interests and career choices over time. This research would inform educational interventions and policy decisions, ultimately supporting the development of green career pathways.

Opportunity 5. More explicitly address students' anxiety, hopelessness and anger

The fifth opportunity is to more explicitly address the affective dimensions of climate change and sustainability education, including climate anxiety, with children and young people.

Previous studies have found that children and young people in England, and other countries, have expressed worry and concern about climate change (Hickman et al., 2021; NHS England, 2023). Climate change can evoke various feelings, including anxiety, hopelessness, anger, and sadness. These emotions tend to be more common among younger people, those who care about environmental issues, and those who have experienced some impacts of climate change (Clayton, 2020).

In our research, students reported generally positive health and wellbeing (e.g. 64% generally feel happy: Table 1), while concurrently conveying worry and concern around climate change (87% of all students said they worry 'all of the time', 'a lot' or 'a little' about what the world will be like in the future because of climate change, with only 13% reporting they worry 'not at all'). Climate change further evoked many other negative emotions, including sadness (67%), anxiety (53%), and guilt (50%). While a certain degree of anxiety may indicate understanding of the critical nature of the situation, overwhelming negative emotions can be debilitating. However, levels of anxiety varied significantly between students of different gender and socio-economic background, with girls and more advantaged students being more likely to report that climate change makes them feel negative emotions. Given the broader mental health and wellbeing crisis in England, with 18% of children and young people having a probable mental disorder (NHS Digital, 2022), addressing these negative emotions is crucial to mitigate the risk of overwhelming climate anxiety, especially among girls who have shown a higher prevalence of such concerns (McCurdy & Murphy, 2024).



There are a range of approaches which might be implemented to address this. Firstly, climate change and sustainability education within and beyond the formal curriculum can be developed to inherently include emotionally responsive pedagogies that enable transformative education (Dunlop & Rushton, 2022; Walshe & Sund, 2022), which can be complemented with further professional development for teachers and professionals in order to foster socio-emotional competencies in children and young people. Attending to the emotions in climate change and sustainability education is challenging, with teachers also reporting experiencing an 'emotional load' when teaching about it (Rushton, 2021). However, research has highlighted the importance of understanding students' psychological responses to climate change both to promote wellbeing and to improve constructive engagement with climate change and sustainability education (Dunlop & Rushton, 2022; Trott, 2020). This might include, for example, affective approaches through engagement with art, imagery and narrative (e.g. Walshe & Tait, 2020).

A second approach which is likely to mitigate anxiety in relation to climate change is the use of constructive strategies which provide students with the opportunity to gain awareness of what can be done around climate change and environmental issues at various scales, and which also support their agency to take personal and collective action; this includes contributing to broader societal change, as outlined in Opportunity 3. Fear in relation to climate change can be exacerbated by feelings of powerlessness; within our research, only 29% agreed that they are able to influence how their school is responding to climate change and sustainability. As such, teachers should develop opportunities for engagement and action within schools, as well as demonstrating how small individual actions can make a systemic difference (Rousell & Cutter-Mackenzie-Knowles, 2020).

Finally, as more than half of the surveyed students were interested in learning more about human health and wellbeing (75% for girls and 60% for boys), there is potential for more explicit engagement with this theme through climate change and sustainability education across the curriculum. Climate change has numerous health and wellbeing impacts on children and young people in relation to changes in temperature, humidity, precipitation and/or extreme weather events, both directly and indirectly via food security and nutrition, education, employment, conflict and displacement (Clayton et al., 2017). Being given the opportunity to constructively explore these, and students' psychological responses, through careful, affective pedagogies has further potential to mitigate anxiety.



5. Concluding remarks

This research provides a new baseline for understanding student perspectives and experiences of climate change and sustainability education in England, with a focus on students in Years 7, 8 and 9, identifying five key opportunities to enhance policy and practice. These findings can be used by teachers, teacher educators and organisations who support teachers in their important contribution to society's transformation to sustainability. However, to fully realise the opportunities identified here, further professional development for teachers of all disciplines and phases is needed, as suggested by our survey of teachers (Greer et al., 2023). As such, UCL's Centre for Climate Change and Sustainability Education will use these findings, and further analyses from the survey data, to inform the development of our suite of teacher professional development programmes for teachers, tailored by subject and age-phase: [Teaching for Sustainable Futures](#). We will also work with our school network to co-develop support for sustainability leadership in schools as they develop and implement climate change action plans. Furthermore, these findings will inform policy discussions, including those with the DfE, in relation to climate change and sustainability education, professional development for teachers and green careers. Through these mechanisms, we will strive towards an education system which enables all our children and young people to learn for and from the environment, and to develop capabilities and skills which enable them to contribute to a more sustainable and just future.



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