**A Curriculum for Climate Literacy**

**Royal Meteorological Society**

**May 2025**

## Introduction

In March 2025, the Royal Meteorological Society invited representatives from broad range of subject and professional organisations to come together in a workshop kindly hosted by the University of Reading.

The aim of the workshop was to begin to agree and define a Curriculum for Climate Literacy which, as part of a much wider curriculum, would equip students with the Climate Literacy needed for their lives as local and global citizens, and with the skills for future careers shaped by a changing climate.

By bringing together those with subject and subject-teaching expertise, a well sequenced, coherent, holistic and progressive curriculum can be developed.

In compiling this Curriculum for Climate Literacy we have drawn on the work done by many organisations including, but not limited to, UNESCO's Greening Education Partnership, TIDE, CAPE and SOS-UK.

The organisations listed in the Appendix supported the development of this Curriculum and we acknowledge, with gratitude, the contributions made by many others.

## Core Principles

- All students should leave school with the necessary climate literacy required to thrive as citizens of a world where the climate is changing, irrespective of their subject choices.
- Climate literacy includes an understanding of climate science as well as the complex social and economic factors which relate to an understanding of the interaction between people and the climate system.
- Climate change is a multi-disciplinary problem that requires a multi-disciplinary approach to both learning and solutions. Systems thinking is key, and the climate system (as well as the Earth's natural, social and political systems) span school subject disciplines.
- We have aimed to create a well sequenced, progressive curriculum where disciplinary or 'substantive' knowledge and understanding is developed progressively and is not repetitive or tokenistic.
- We have supplied very detailed information – so that this can be implemented in any curriculum, whatever its framework. The detail is necessary to ensure equitable provision of high-quality climate education which is not dependent on teacher expertise or awareness.
- We acknowledge the risk of curriculum overload and have endeavoured to suggest an appropriate amount of content in each subject. However, in some subjects, there does need to be a significant proportion of the curriculum dedicated to climate literacy.
- The curriculum should have the flexibility to keep up to date with climate science, climate solutions (adaptation and mitigation) and the current state of the world, not least because this keeps it relevant to the skills for green careers options open to school leavers. A mechanism for regular review and update should be a part of the curriculum approach.
- The curriculum should be flexible enough for teachers to be able to adapt it to local and current contexts.
- Critical thinking should be embedded throughout the curriculum. It has relevance beyond climate literacy but is particularly relevant here.
- Teacher support is critical to delivery of this curriculum. We recognise that significant teacher training and CPD will be required to allow confident delivery of high-quality climate education, as well as classroom resource provision.
- A common language is critical for a curriculum for climate e.g. including consistent definitions at curriculum and setting level and across subjects. For example, when referring to climate actions and

solutions in this document, we include mitigation, adaptation and, where appropriate, loss and damage payments, on a personal to global scale.

- This is a Curriculum for Climate Literacy, not specifically for biodiversity or wider sustainability or environmental issues, whilst recognising that these topics are not entirely separable from climate literacy, because that is where our (RMetS) expertise lies.
- This is a curriculum of hope, focussed as much as possible on actions and solutions as well as students' futures, such as green careers, whilst still developing sound understanding of climate change and its far-reaching implications.
- Subjects with a strong connection to a related career in climate change have these links explicitly developed within them, helping to meet Gatsby Benchmark 4: 'Linking curriculum learning to careers.'
- We have highlighted sequencing links to other subjects but assumed progression within the same subject (e.g. across the sciences).
- Climate literacy supports global and local citizenship.
- Climate literacy supports stewardship of the Earth and its resources.
- This curriculum is focussed on knowledge and understanding. Skills & values constitute an equally vital part of a complete and coherent curriculum.

**Geography**

Geography is unique in its capacity to teach students about why and how climate change is happening, the impacts of those changes and how they differ across environments, places and people around the world, and how these impacts can be adapted to and mitigated against through actions locally and globally.

Geography's integration of physical and human processes provides a distinctive curriculum context for the study of the interconnected aspects of climate change. It is one of few subjects that are also able to explore wider issues such as climate anxiety/ apathy, climate justice, governance and climate action.

The curriculum should embed a 'geography of hope', recognising people's agency and the potential for positive change, whilst developing a sound understanding of the causes, effects, and possible futures of climate change.

Geographical knowledge and understanding are key to laying the foundations for high quality climate education in other subjects and for enabling students to synthesise that information. It is crucial that careful sequencing and interleafing occurs across subject areas as indicated across this document.

In primary education, learning should start with the 'here and now', helping the youngest students to develop a connection with, an appreciation of and a sense of stewardship for their local natural and human environment. As students develop, their thinking will progress to global and longer timescales.

Some students do not study geography to 16, therefore the first few years at secondary school are critical for developing the foundations for climate literacy and an appropriate amount of the curriculum should be devoted to weather and climate to all students at this time.

In geography, climate change should be integrated throughout the curriculum, where appropriate, developing an understanding of the interconnectedness of people and their environments across scales, systems thinking across human and physical geography topics, such as conflict, urbanisation, food security, water security, globalisation, tourism and migration. This is not fully captured in the list below.

We need a geographically literate society to help address a warming climate; decide where to build new houses; tackle inequality at home and abroad; live sustainably; promote biodiversity; and safeguard Britain's place in an uncertain world. It is in their geography lessons where pupils can understand why their school,

home or elsewhere faces the risk of flooding and/ or extreme heat and what can be done to help adapt to and mitigate against these situations.

Key skills in geography include observation, critical thinking about the concepts and information students are being presented with as well as applying data and numeracy skills introduced in mathematics. Nature based learning and geographical fieldwork are crucial to developing an appreciation and understanding of the interconnectedness of our natural world and people's interaction with it.

Some of the concepts listed below require more detail than other concepts in the curriculum to support teachers. Whilst this makes it look like a large proportion of a potential curriculum this need not, in fact, be the case.

Key Knowledge and *Understanding (in italics)*

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| Early Years | Local weather<br>*The weather has an impact on what we should wear*<br>*The weather has an impact on what we do* | |
| 5-7 (KS1) | Observing & communicating local weather & nature<br>*The varying weather has an impact on us, our communities and nature*<br>*Weather influences how we feel about and are able to connect with places and spaces.*<br>Seasons in the UK<br>*The changing seasons have an impact on us, our communities and nature*<br>Weather forecasts and warnings, rain radar and current lightning maps<br>*I can find out what the weather is doing and what it will do in the future* | Measuring weather (science) |
| 7-11 (KS2) | The difference between weather and climate<br>UK climate<br>Climates around the world<br>*Different people experience different weather and seasons to me*<br>Recent extreme weather events in the UK<br>Impact of recent extreme weather events on my school and community. *There are ways my school and community can be resilient to extreme weather.*<br>Water cycle including variability (day-to-day, seasonal, extremes as well as between places around the world)<br>*The climate changes over time.*<br>*Weather, climate, extreme weather and the water cycle are changing because of human activity and this affects us and our communities and environment.* | From science: evaporation rate is linked to temperature<br>From maths: averages<br>From English: bias and misinformation |

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| | *Collectively, we are stewards of our environment from our personal space (homes and schools) to a planetary level (atmosphere, hydrosphere and biosphere).*<br><br>*Globally communities are affected differently by weather and changes to climate and the climate is changing more markedly in some places than others.*<br><br>*Weather and climate have an impact on the natural world.*<br><br>*People depend on the natural world for food, clean water, clean air, cool air, flood protection etc*. (ecosystem services)<br><br>A basic awareness of local strategies in place to mitigate or adapt to climate change e.g. solar panels, electric cars, 'daylighting' rivers, tree planting etc.<br><br>Case studies of green geography careers | |
| 11-14<br>(KS3) | 11-12<br><br>Weather measurements (including precipitation radar, satellite images, lightning maps), microclimates<br><br>Weather and climate: Climate graphs. Definitions of climate & extreme weather.<br><br>Climate in the UK (regional variations, temperature, rainfall, snowfall, wind direction, seasonality).<br><br>The Earth/ climate system including the atmosphere, oceans, cryosphere, soils, lithosphere and biosphere.<br><br>Global warming and climate change – causes, evidence (attribution of climate change since the Industrial Revolution), patterns and climate resilience (examples from the UK and globally).<br><br>12-13<br><br>Atmospheric and Oceanic circulation<br><br>Global climate zones and biomes (including maps & satellite images of current global weather)<br><br>Air masses in the UK<br><br>Water cycle including stores and flows and residence times, clouds/ precipitation.<br><br>Pressure & wind, the Coriolis effect<br><br>Climate change in the UK (projections, impacts on people, places and the environment and political, economic and technological solutions)<br><br>Analyse geographical location of existing and potential renewable energy sources in the UK (wind, solar, wave, hydro, geothermal, biomass) to maximise output and minimise impacts on people and the environment.<br><br>Evaluate current local issues related to climate change and air quality such as wind/ solar energy development, rewilding, pylon | From chemistry: Carbon cycle including stores and fluxes and changes, also composition of the atmosphere, greenhouse gases, definitions of the Anthropocene<br><br>History: Industrial & agricultural revolution & colonialisation, human existence is shaped by the weather and climate.<br><br>From maths: graphs, climate graphs, averages and range, percentages, temperature distributions, trend and variation, probability, fluxes and stores in the water cycle<br><br>From English: identifying mis/ disinformation, greenwashing<br><br>From physics: Atmospheric pressure, Expansion of liquids and gases, reflection, heat capacity, conduction, convection and radiation, structure of the atmosphere, changes of state |

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| | construction, low emission zones, sea/ flood defences, electric vehicle charging points.<br><br>Recent global extreme weather events including floods, droughts. Attribution of these extreme events to global warming.<br><br>*The weather can have a devastating effect on people and environments around the world which can be minimised.*<br><br>13-14<br><br>Global Climate change – projections, global treaties and recent negotiations to limit climate change and promote climate justice & education, impacts (on people, places and the environment), adaptation and mitigation including the relative effectiveness of different mitigation actions, food and water security, green economy.<br><br>Carbon footprint of goods and services.<br><br>Anticyclones & recent heat waves in the UK<br><br>Depressions & recent extreme wind/ flooding (winter and flash)/ storm surges in the UK<br><br>*Weather forecasts and climate projections are based on observations, our understanding of the climate system, computer modelling and human interpretation and prepare us and our communities for normal and extreme weather.*<br><br>Where are there 'green careers' options that use geography skills for adapting to and mitigating climate change and how may this change in the future? | From biology: photosynthesis as part of the carbon cycle, ecosystems<br><br>From primary science: clouds form when there is more condensation than evaporation |
| 14-16 (KS4) | **Weather** UK normal and extreme (heat, wind and precipitation), global extreme e.g. ENSO, floods, droughts, monsoons, Tropical Cyclones including compound hazards<br><br>**Climate** global atmospheric and oceanic circulation, climate zones linked to biomes (developed from previously), Urban climate<br><br>**Climate change**:<br><br><u>Causes</u> (natural & global warming – sources of anthropogenic greenhouse gases), evidence, rate, climate feedback mechanisms (including water vapour, ice, ocean carbon uptake, vegetation etc), the Kaya identity.<br><br><u>Impacts</u> (UK and global, current and projected, environmental, social, economic, changing frequency/ strength of some extreme weather events, attribution of extreme weather events to global warming, specifically looking at current, 1.5/ 2°C projections)<br><br>Feedback loops (water vapour and ice) and tipping points<br><br><u>Solutions</u>:<br><br>Adaptation (UK and global, nature based and engineered),<br><br>Mitigation (national and international political mechanisms as well as examples of mitigation in the UK and globally, indigenous | From biology: photosynthesis, ecosystems, biodiversity, evapotranspiration<br><br>From chemistry: (enhanced) Greenhouse effect, greenhouse gases, ocean acidification & carbon store, net zero, fossil fuels, artificial fertilisers, cement, composition of the atmosphere, biofuels, water quality assessment, mitigation pathways<br><br>From physics: albedo, electromagnetic spectrum, absorption, reflection and emission of EM radiation, orbital motion, heat capacity, latent heat, renewable |

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| | adaptation and mitigation practice). Global distributions of fossil and renewable energy as well as other natural resources.<br><br>Climate finance. Loss and damage (international political mechanisms)<br><br>Climate justice including current and historical national, per capita and per GDP emissions of greenhouse gases, vulnerability and responsibility.<br><br>Social, cultural, religious, economic and political determinants of climate action in the local, national and global community<br><br>Fieldwork at this level should not be restricted to microclimate but could explore current and potential local climate change adaptation and mitigation strategies.<br><br>*Geographers can deliver climate change solutions*. | energy supply & stores, heat pumps, nuclear energy, internal energy, Earth observation, Earth's energy/ radiation budget, solar, orbital and volcanic forcing of climate change<br><br>From citizenship: sustainability, global development goals, local & global inequalities and climate justice<br><br>From maths: distributions and range, data literacy, uncertainty, attribution, emission reduction pathways, probability distributions<br><br>From history: climate justice<br><br>From PSHE: climate economics |

**Sciences (Biology, Chemistry, Physics)**

The sciences are the other key set of subjects where the foundations will be laid for high quality climate education in other subjects and where important elements of climate literacy and skills for green careers will be developed as well as understanding of climate science and the climate system.

In addition, many basic ideas in the sciences underpin understanding of climate related concepts in other subjects – sequencing with these subjects is critical and can be strengthened by appropriate choice of examples and activities in the sciences.

This curriculum has been framed by considering progressive development of understanding of climate change causes, issues, solutions and lives in a sustainable world.

As with other subjects, detail, in this case about contexts and examples, is central to ensuring that teachers make use of the opportunities for climate education within the science curriculum and in ensuring equitable access to a high-quality climate education.

Data & statistical literacy, critical thinking and identifying misinformation as well as practical science skills and green careers should be embedded throughout the science curriculum.

Numerical skills are also crucial, for example, in physics, in calculating rates and accumulation (power calculations), energy transfers, energy storage capacities of different systems and power outputs from different land uses.

A science curriculum should develop an understanding of the practices and ways of thinking within the sciences, including asking questions, providing explanations that are consistent with evidence, setting up

experiments, testing conclusions, peer review (including specifically the IPCC process) and assessments (ethical, environmental and risk).

Key Knowledge and *Understanding (in italics)*

| Level | | Prior Learning from Other Subjects |
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| Early Years | Nature & weather enjoyment | |
| 5-7 (KS1) | Weather measurements (temperature, rainfall, windiness) and recording<br>*The weather varies from day to day and season to season*<br>Habitats<br>Nature engagement | Links to geography and maths at this level |
| 7-11 (KS2) | *Earth/ climate is a connected system (air, water, ice, life, rocks, soil)*<br>The atmosphere contains the mix of gases required for life on Earth and which maintain the Earth's climate.<br>Carbon dioxide in the air is used to build plant mass and plants produce oxygen.<br>Oxygen is required for all life processes and carbon dioxide is a waste product.<br>*By planting or cutting down trees we can have an impact on the amount of carbon in the biosphere and atmosphere, as well as having an impact on biodiversity, weather, climate and people.*<br>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature (N.B. current guidance in National Curriculum for England to investigate the effect of temperature on washing drying does not work).<br>*Clouds form when there is less evaporation than condensation*.<br>Evaporative cooling<br>*We sweat to cool us down when it is hot*<br>*Water bodies can cool urban areas down*<br>How we generate electricity in the UK<br>*In the summer and when the sky is clear we generate more electricity from solar panels*<br>*When it is windy we generate more electricity from wind turbines*<br>Energy (electricity/ gas) audit for a school or household linked to current weather<br>How to stay safe in extreme weather (heat, flood, snow & lightning)<br>*The Sun's light warms different surfaces by different amounts depending on their colour* (link to reflection)<br>Thermal Conduction<br>*The design of buildings and the materials they are made of has an impact on how much energy they lose by heating the surroundings.* | From geography: Weather, climate, water cycle and ecosystem services<br>Link to PSHE<br>From maths – many numeracy skills |

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| | Adaptation of plants and animals to their environment.<br>*The climate is changing too fast for many animals and plants to evolve/ adapt*<br>Case studies of green science careers | |
| 11-14 (KS3) | **Biology**<br>Photosynthesis – factors determining rate, linked to the carbon cycle<br>Respiration and decomposition linked to the carbon cycle, including annual cycle in atmospheric carbon dioxide concentrations and organic matter in soils.<br>*The balance between photosynthesis, respiration and decomposition controls the amount of carbon in the biosphere and has an impact on the amount of carbon dioxide in the atmosphere*.<br>Evapotranspiration linked to the water cycle, factors determining rate.<br>*Temperature, atmospheric carbon dioxide concentrations and water availability control photosynthesis and are related to global warming*.<br>Ecosystems as (inefficient) fluxes of energy and matter from the Sun, soil and water cycle. *This means that it is more efficient to feed the world on a vegetarian diet than on a meat-based diet. When fossil fuels form, they lock away carbon and store energy.*<br>How ecosystems are affected by the changing climate including changing phenology<br>Land use change as a significant source of greenhouse gas emissions<br>Past climate information from sediments (pollen), fossils, trees and leaves<br>**Chemistry**<br>The carbon cycle, including stores and flows and residence times<br>The composition of the atmosphere<br>Carbon dioxide as a greenhouse gas<br>The enhanced greenhouse effect<br>The relationship between atmospheric concentrations of greenhouse gases and surface temperature. The Keeling Curve.<br>Combustion of fossil fuels and other human activities which change the carbon cycle.<br>Definitions of the Anthropocene<br>*People are having an impact on the climate through increasing the amount of carbon dioxide in the atmosphere*<br>*'Net zero' is when people put as much carbon dioxide into the atmosphere as is removed*.<br>Past climate information from ice cores<br>*Synoptic learning with biology: we can learn about what the climate was in the past from a variety of sources. Uncertainty in this data increases* | Climate change from geography<br>From maths: fluxes and stores in the carbon cycle<br>Climate change water cycle, atmospheric and oceanic circulation from geography<br>From maths: fluxes and stores in the carbon cycle, net zero |

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| | *with time from the present. The climate is warming faster now than in the past.*<br><br>Changes of state<br><br>As the temperature of the Earth's climate system is rising, ice is melting and there is more evaporation driving an enhanced water cycle.<br><br>*The melting of ice caps and glaciers is contributing to sea level rise*<br><br>*Clouds form when there is more evaporation than condensation*<br><br>**Physics**<br><br>Reflection and albedo, linked to surface heating, Arctic climate change amplification as well as ways to reduce urban heat<br><br>Expansion of gases and liquids<br><br>*The expansion of water as it gets warmer is leading to sea level rise*<br><br>Conduction<br><br>*Thermal insulation can reduce energy loss from buildings by heating and improve their efficiency*<br><br>Convection<br><br>*The movement of the atmosphere and oceans is driven by convection*<br><br>Radiation<br><br>*The Sun and Earth emit radiation in different parts of the EM spectrum*<br><br>Structure of the atmosphere<br><br>Heat capacity<br><br>*The temperature of the oceans is rising as the temperature of the atmosphere rises, but it takes a longer time for deep ocean water to adjust to climate change.*<br><br>*The relatively high heat capacity of building materials contributes to the development of urban heat islands*<br><br>Renewable and non-renewable energy sources<br><br>UK and global electricity generation and energy demand. The intermittency of renewable energy sources and need for energy storage and international electricity supply.<br><br>*Our current energy source mix in the UK is changing and is different on a day-to-day basis*<br><br>Domestic fuel use<br><br>*Fuel bills can be reduced through improving efficiency*<br><br>Vehicles: petrol/ diesel/ electric, efficiency, carbon dioxide emissions & other air pollution, how these can be minimised.<br><br>*As the number of electric vehicles increases, there are changes to electricity demand patterns.*<br><br>Design & location of wind turbines | |

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| | *Wind turbines are raised or are over the ocean because friction with land slows the wind down*<br><br>Atmospheric pressure<br><br>Solar radiation – unequal distribution across the Earth's surface, light & infra-red & UV, how pattern of distribution changes with the seasons, Earth's tilted axis, sunspots, solar flares, aurora, impact of space weather on satellites, astronauts and communications.<br><br>The Earth's energy/ radiation budget<br><br>*The global balance between solar power and the power the Earth emits to space determines global climate*<br><br>*The Earth's climate system has many components*<br><br>*The carbon cycle is a complex system with many components*<br><br>**Across the sciences**: Where are there 'green careers' options that use science skills for adapting to and mitigating climate change and how may this change in the future? | |
| 14-16 (KS4) | **Biology**<br><br>Minimising environmental impact of a healthy diet including farming practices to minimise methane emissions from rice and cattle, reducing agricultural reliance on fertiliser, minimising carbon/ water/ nutrient loss from soils, carbon footprint of food products, maximising food security for all<br><br>Impacts of climate change (specifically current and 1.5/ 2°C warming) on habitats.<br><br>*Climate change has an impact on ecosystems, biodiversity & ecosystem services and on agriculture directly and indirectly e.g. through ocean acidification, sea level rise or changing pests and diseases.*<br><br>Photosynthesis: Role of photosynthesis in climate change solutions (including reforestation/ afforestation, blue carbon), impact of climate change on photosynthesis & evapotranspiration. Biomass as a store of carbon.<br><br>*Photosynthesis plays a key part in the global carbon cycle. The concentration of carbon dioxide in the atmosphere only falls while the total amount of biomass increases.*<br><br>Anaerobic respiration<br><br>Impacts on and adaptation of ecosystems and agriculture to climate change including shifting biomes, extreme weather (e.g. coral bleaching events and impact on ocean ecosystems), changing phenology (e.g. on UK Puffins), evolution and changing pests & diseases (including malaria).<br><br>Nature-based solutions to climate change in the UK (e.g. reintroduction of beavers, saltmarshes, rewetting peatlands).<br><br>Impact of extreme heat on health and how to minimise the impact<br><br>*Climate change is leading to local & global extinctions and also to the spread of some species, including but not limited to pests and diseases* | Sustainable diet – food technology<br><br>Climate and climate change from geography<br><br>From maths-numeracy, data and statistical skills |

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| | *Biological systems can offer solutions to climate change*<br><br>**Chemistry**<br><br>The carbon cycle is a key part of the Earth's climate system, including net zero (global & for individual countries, organisations, products and people), carbon budgets (global & national), mitigation pathways, carbon footprints (of products, organisations and individuals), Carbon capture and storage, Direct Air Capture<br><br>Greenhouse gases ($H_2O$, $CO_2$, $CH_4$, $N_2O$), $CO_2$ equivalence, global warming potential, linking emissions to atmospheric and oceanic concentrations, atmospheric lifetimes & mixing, temperature feedback on oceanic absorption of carbon, ocean acidification, absorption bands<br><br>*The climate is changing because of the impact of people on the Earth's climate system*<br><br>Methane sources and sinks– natural & human, including from anaerobic digestion facilities & methane clathrates.<br><br>Composition of the atmosphere – recent changes to concentrations of greenhouse gases and oxygen.<br><br>Water security – how to assess water quality.<br><br>Fossil fuels.<br><br>Hydrogen as a fuel, 'green' hydrogen.<br><br>Biofuels, sustainable biofuels, BECCS.<br><br>Batteries in renewable energy systems.<br><br>Cement production as a significant source of $CO_2$ and ways to mitigate.<br><br>Fertiliser production and use as a significant source of greenhouse gases and ways to mitigate this.<br><br>Enhanced weathering to mitigate climate change.<br><br>Atmospheric pollutants (sulphur dioxide, $NO_x$, particulates and CFCs/HCFCs), sources, impacts and ways to reduce their production and concentration.<br><br>Life cycle assessment including the energy & water costs of producing/ recycling materials.<br><br>*Science and technology can offer solutions to climate change.*<br><br>*Lab work in Chemistry has an environmental impact which can be minimised.*<br><br>**Physics**<br><br>*Atmospheric pressure varies with altitude, location and time*<br><br>*Local variations in atmospheric pressure lead to wind and to storm surges*<br><br>Black body radiation linked to emissions from the Sun, Earth's surface and Top of the Atmosphere, as well as Urban Heat Islands.<br><br>Global atmospheric and oceanic temperatures as an indicator of rising internal energy of the climate system | From maths: emission reduction pathways, CO2e<br><br>From maths: Sankey diagrams, |

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| | EM spectrum from the Sun and the Earth, and absorption, scattering, reflection by the Earth/ climate system. Greenhouse effect as absorption and emission of IR radiation.<br><br>Heat capacity *The world's oceans are a heat sink; Urban Heat Islands are partly generated by urban land use and construction materials*<br><br>Latent heat *Storms can be more destructive in a warmer world*<br><br>*Evaporative cooling (by evaporation and evapotranspiration) can be used as a climate change solution in urban areas*<br><br>Volcanic, solar and orbital causes of past climate change, including timescales and relative importance<br><br>*Volcanic, solar and orbital mechanisms can't explain the climate change the Earth has experienced since the Industrial Revolution*<br><br>Electricity generation, how energy use is changing and is projected to change in the future<br><br>Renewable (focussing on solar PV and wind) and non-renewable (focussing on fossil fuel and nuclear - fission and fusion) energy sources<br><br>*The current rate of UK wind electricity generation (i.e. power output) is linked to wind speed*<br><br>Factors effecting the efficiency of wind turbines – blade length & weight<br><br>*The current rate of UK solar electricity generation is linked to season and weather*<br><br>Storing energy (chemically and gravitationally in batteries and hydroelectric schemes)<br><br>*To be reliant on renewable energy sources, the UK needs to develop new energy stores*<br><br>Electric vehicles<br><br>Energy efficiency and building efficiency. Passivhaus.<br><br>Building Heating by Geothermal (including mines) and 'spare' heat (e.g. Deep Green, London Underground).<br><br>*Air conditioning is a maladaptation to warmer temperatures*.<br><br>Natural ventilation, green roofs and walls.<br><br>Appliance efficiency.<br><br>Heat pumps<br><br>*Science and technology can offer solutions to climate change*<br><br>Earth observation<br><br>**Across the sciences**: *Science and engineering careers have an environmental impact which can be minimised; Careers in science and engineering can deliver climate change solutions.* | uncertainty, as well as many numerical, data and statistical skills |

**Mathematics**

The mathematical and data skills needed in the world will drive some of the biggest public policy solutions of the age, including tackling the climate and biosphere crises.

Many numerical, data and statistical skills developed in maths are fundamental to underpin climate literacy in other subjects as well as to developing the skills for green careers and for solving the climate crisis.

Most areas of maths could be taught with extreme weather or climate (science or social, local or global) contexts. Whether they are or not should not be down to the awareness of an individual teacher – it should be set out as a requirement in the curriculum to ensure equitable access to this part of a climate education, ensuring that all students leave school able to apply their mathematical skills to the weather and climate contexts they encounter in their personal and professional lives. This is one way in which the relevance of maths to the lives and careers of students can be demonstrated.

Some very specific examples are detailed below:

| Level | | Prior Learning from Other Subjects |
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| 7-11 (KS2) | Climate graphs<br>Wind roses<br>Risk matrix for extreme weather events<br>Simplified ratios, graphs or pie charts e.g. of greenhouse gas emissions by sector, electricity generation by type in the UK | Weather & climate (geography)<br>Weather measurements (science) |
| 11-14 (KS3) | Temperature distributions – what is climate, what is extreme weather (average and range).<br>Temperature trend and variation.<br>Rates of change (gradient) e.g. of temperature, $CO_2$ concentration etc.<br>Financial literacy – costs of mitigation v adaptation at a personal and national level, including relating to the energy efficiency of buildings and appliances<br>Understanding vehicle fuel efficiency/ battery storage/ solar cell output<br>Probability - chances of extreme weather events.<br>Data – fluxes and stores in the water and carbon cycles and specifically looking at greenhouse gas emission and concentration data, $CO_2e$ and defining net zero. Carbon footprints: of individuals, products, organisations, countries (incl. per capita and per GDP).<br>Use/ misuse of data in climate and environmental messaging.<br>Where are there 'green careers' options that use maths skills for adapting to and mitigating climate change? | From geography: GDP/ GNP, the water cycle, weather/ climate, extreme weather<br><br>From chemistry: the carbon cycle, net zero |
| 14-16 (KS4) Including Statistics where offered | Carbon budgets.<br>Uncertainty – quantifying and understanding climate risk (related to insurance, compound risk), attribution of extreme weather events. Uncertainty in past climate data, weather forecasts and climate projections (as a combination of internal variability, model uncertainty, scenario uncertainty).<br>Emission reduction pathways. | |

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| | Sankey diagrams with contexts including renewable energy generation.<br>Data literacy – identifying the most appropriate statistical tools and data visualisation as well as misleading statistics.<br>Probability distributions. | |

**Computer Science**

In computer science, the numerical, data and statistical skills introduced in mathematics are brought together with subject knowledge from the sciences, geography and elsewhere to explore the potential for computing to help us understand the climate system as well as the environmental impact of computing, AI, data centres and digital communications.

Through the cross-curricular concepts of computational thinking that underpin the discipline, it is possible to decompose and abstract problems to produce computational solutions through algorithmic thinking, generalisation and evaluation.

The use of computers and other devices to access data and information, to interrogate, analyse and display data and to communicate are key skills which can be developed in computer science lessons and made use of in climate learning across all subjects.

| Level | | Prior Learning from Other Subjects |
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| 7-11 (KS2) | Data modelling skills to collect, analyse and visualise weather data. *The role of variables and collections of data to organise, manipulate and visualise data*.<br>Make use of a variety of input and output components or devices to collect weather and environmental data.<br>Very simple weather/ climate models, simulations and games.<br>*How to use the internet to identify reliable and credible sources of weather and climate information*.<br>*The climate and sustainability information we are presented with is influenced by computer algorithms*.<br>Explore digital representations of current weather including rainfall radar, satellite images and lightning and understand how this information is shared and communicated. | Weather, climate, weather warnings and how to stay safe in extreme weather from geography<br><br>Data and numeracy skills from Maths<br><br>Identifying misinformation from English |
| 11-14 (KS3) | Data modelling skills to interrogate, represent and display weather and climate (geographical, scientific and social) data<br>Make use of sensors through physical computing to monitor weather and the environment. How to make use of a range of sensors to help triangulate.<br>Develop visualisations for data and use digital communication to creatively present data and other information about the climate system and wider sustainability issues appropriately for specified audiences. | A wide range of concepts at this level from across the sciences, geography, PSHE/ related subjects, citizenship, maths and English. |

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| | Explore digital representations of current weather including rainfall radar, satellite images and lightning and understand how this data is collected, stored and assimilated.<br><br>Use simple weather/ climate models and carbon footprint calculators<br><br>Use the internet to obtain accurate weather and climate information.<br><br>Carbon footprint of data centres, AI and digital communication including social media and how to reduce this<br><br>Where are there 'green careers' options that use computing skills for adapting to and mitigating climate change and how may this change in the future? | |
| 14-16 (KS4) | Carbon footprint of data centres, AI and digital communication including social media and how to reduce this.<br><br>Use the internet and AI to obtain accurate weather and climate information. *The ethical/ moral considerations of using AI.*<br><br>*Understand the role of a range of sensors used for the collection of weather and environmental data and the role of thresholds and testing to highlight erroneous and outlier data within sets.*<br><br>*Understand how data is collected, transmitted, shared and assimilated and the climate system is coded (including the use of machine learning and AI) in order to generate weather forecasts and climate projections as well as to develop mitigation/ adaptation solutions.*<br><br>Showcase green careers linked to weather forecasting and understanding the climate system. | |

**English, Drama, Media Studies**

In English, Drama and Media Studies students should have the opportunity to

- Develop critical thinking and specifically media/ social media literacy, learning to identify bias and, specifically, to identify credible sources of information as well as mis/ disinformation about climate change.
- Develop the ability to communicate creatively about climate change including expressing their own understanding and/ or hopes and anxieties related to environmental and other local and global issues and dilemmas.
- Collaborate, fostering empathy and developing communication, understanding and creativity.
- Critically consider the role of language and storytelling in representations and understandings of climate change.
- Explore the role of creative writing across different genres and subgenres in expressing viewpoints on and changing understanding of climate change, as well as the relationship between people and the natural world.

As with other subjects, and to ensure equity in climate literacy, these opportunities should be specified in the curriculum and not depend on teacher awareness.

| Level | | Prior Learning from Other Subjects |
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| 5-7 (KS1) | Listen to and discuss stories, poetry and non-fiction related to the weather and the natural world.<br>Talk, discuss and write about current weather and the local natural world and how it affects us and our communities. | |
| 7-11 (KS2) | Have an opportunity to speak, work in-role through drama and the spoken word to explore local and global environmental issues including climate change impacts & solutions which they have researched.<br><br>Read and discuss a diverse variety of texts related to weather, climate and the natural world including from the media, social media, poetry/ spoken word and literature and start to explore purpose, opinion, bias and misinformation in those texts and how they are presented/ illustrated.<br><br>Persuasive and creative writing relating to local climate solutions (mitigation and adaptation) as well as other local environmental issues.<br><br>Use dramatic simulation to take on a variety of viewpoints to explore the complexity of environmental issues. | Weather, climate and climate change from geography |
| 11-14 (KS3) | Read and critically analyse a variety of texts overtly and covertly involving climate and environmental change including from the media, social media, poetry/ spoken word, non-fiction, prose and drama.<br><br>Learn to identify and challenge bias and mis-/disinformation, as well as information generated by AI. Explore greenwashing and the use of emotive language to communicate environmental issues.<br><br>Develop an understanding of a range of local and global viewpoints related to environmental issues, motivated by cultural, social, political and religious differences and how these viewpoints inform resilience, action and justice.<br><br>Use drama, debate and writing to communicate persuasively and creatively about climate change including expressing their own understanding and/ or hopes and anxieties related to environmental justice, stewardship and other global issues. This could include transformed/ alternative futures. | Climate change causes, impacts and solutions from geography, science, PSHE/ related subjects and citizenship<br><br>Communication links to the creative arts |
| 14-16 (KS4) | Critically analyse linguistic techniques used to convey positions and arguments about climate change.<br><br>Explore the role of climate change and its causes in different fictional, dramatic and poetic texts from different periods and regions, considering relationships between climate, people, animals, plants and environments in these texts.<br><br>Critically analyse narratives of climate change and narratives which obscure or misrepresent climate change and/ or its causes.<br><br>Develop skills in different kinds of oral communication about climate change, e.g., storytelling, informing, persuading, counterarguing, etc. | |

**Modern Languages**

Through the study of modern languages, students should develop a sense of connectedness, empathy and responsibility as active citizens of this world.

They should learn about the climate impacts, actions and attitudes in the countries in which the language being studied is spoken – developing understanding, empathy & intercultural awareness which in turn supports respect, dialogue, collaboration and global citizenship.

Learners should also develop an understanding of the historical developments, including colonisation, industrialisation and globalisation, that have caused global warming and explore the impact of these developments, also in relation to social justice. The exploration of key concepts, scaled at an appropriate level from primary onwards, supports both linguistic developments as well as intercultural awareness. In tandem with knowledge, skills and understanding developed in geography, science, citizenship, PSHE/ related subjects, and RE, discussions are promoted as students gain enhanced understanding of life in other parts of the world. Students are encouraged to listen, empathise and respond to others which enables wider perspectives to be gained.

Greater tolerance and understanding of the needs of other people in other countries and the impact of climate change on them can be developed. During secondary education, as further progress in the taught language is made, students develop the ability to communicate their thoughts about climate change in more complex ways. They begin to express their own opinions on environmental issues in more depth and can undertake research into areas of interest, working independently and collaboratively to gain understanding of potential solutions, nurturing their creative and critical thinking, as well as their intercultural understanding, in line with a curriculum of hope.

| Level | | Prior Learning from Other Subjects |
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| 7-11 (KS2) | Begin to develop some weather and nature- related words and simple phrases in the studied language.<br>With links to geography, and through listening, reading, writing and speaking, explore the weather and natural environment in the countries in which the studied language is spoken, as well as an appreciation of the cultures, lifestyles and historical legacy using appropriate authentic resources. | |
| 11-14 (KS3) | Learn about and discuss the impact of recent extreme weather events and climate change in the countries in which the language of study is spoken and make comparisons with the UK. | Geography and science – fundamentals of climate science, impacts and actions and the corresponding English vocabulary<br><br>Links to history, RE, citizenship and PSHE related to climate & social justice and drivers of climate awareness and action<br><br>Links to English and the Arts – communicating hopes and anxieties about global environmental issues |
| 14-16+ (KS4) | Exploring and developing empathy for the attitudes to climate change and other environmental and social issues as well as | |

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| | examples of the climate action and sustainable living being taken in the countries in which the language is spoken.<br>This should include the cultural, religious, political, economic, social and historical drivers of these attitudes and actions.<br>Make comparisons with the UK.<br>Explore the power of communication to enable social and environmental action.<br>The relationship between tourism, weather, climate change and the environment in the countries in which the language is spoken. | |

**History and Classical Subjects (Ancient History, Classical Civilisation, Latin & Greek)**

History & Classics should provide resonance with real-world issues and events in order to support greater understanding of the challenges of our time, such as climate change.

Key ideas and environmental perspectives on history which can be developed through the history and classics curricula to support the development of climate literacy include that:

- Humans and the natural world are inter-related and humans are critically reliant on a healthy biosphere to survive and thrive.
- The role of the environment (including weather & climate) as a factor in shaping human history. Humans have adapted to climate change and extreme weather events in the past.
- Beliefs about/ attitudes to and understanding of the natural world have changed over time and vary between civilisations and cultures. These civilisation and cultural distinctions have helped generate and/ or reinforce regressive cultural stereotypes and attitudes.
- There are a variety of sources of evidence about weather & climate in the historical past and its impact on people, and evidence of humanity's impact on the environment.
- Human actions in the past have long-lasting positive or negative impacts on the environment and climate system. Historical case studies of when people lost sight of the consequences of taking from the environment without making sure there were enough resources for future generations. Historical case studies of efforts to advance social equality and social justice that can be compared to contemporary efforts to achieve climate justice.
- Some people today have benefited from human actions in the past, while others have suffered. Climate justice as an understanding that those most responsible for the current climate crisis are not those experiencing the worst impacts. Climate injustice today is an extension of economic and political thinking and practices that have structured local and global social and economic inequalities across modern human history. Some people, communities, and countries are less able to cope with and/or to adapt to the impacts of climate change because of unfair events in history that have either made them more exposed to climate hazards or have diminished their ability to adapt or to cope with its impacts.

In history & the classics, students have the opportunity to learn about the relationship between ancient civilisations and their natural environment and, in particular, the impact of natural disasters including extreme weather and climate change on those civilisations. Connected impacts include involuntary migrations, biodiversity loss, and natural resource shortages. Students should have the opportunity to make comparisons with the modern world and explore the legacies of the ancient past.

Some specific examples are given below, acknowledging that, in history, the ideas and perspectives detailed above can and should be developed progressively through the curriculum:

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| 7-11 (KS2) | Stories from modern and ancient history where collective action helped to advance equality, inclusion, justice, and/or human rights<br><br>Stories from modern and ancient history where the weather and climate had an impact on people.<br><br>Local land use change over time and its impact on climate, people and the environment. | Links from science, PSHE/ related subjects and geography at this level |
| 11-14 (KS3) | Land use change over millennia, farming (the Neolithic Revolution, enclosure), globalisation/ colonisation, the Enlightenment, the Agricultural and Industrial Revolutions and the Great Acceleration have had significant consequences for our weather, climate and environment.<br><br>When did the Anthropocene start?<br><br>Weather, extreme weather and natural disasters have played a role in historical events in the UK and around the world (e.g. impact of weather on D Day, the Spanish Armada, the 'year with no summer') | Weather and climate from geography, including climate zones and extreme weather<br><br>From science: Carbon cycle, photosynthesis, fossil fuels , definitions of the Anthropocene |
| 14-16 (KS4) | Climate change has contributed to shaping history and civilisations in the UK and around the world (e.g. the spread and retreat of the Vikings, Milankovitch cycles/ greening of the Sahara as a catalyst for ancient Egyptian civilisation, the impact of the Little Ice Age on Europe or of Icelandic volcanic activity on post-Roman Britain) | Links to geography – including natural causes of climate change, climate change as a driver of migration & conflict, climate justice<br><br>Links to science including Milankovitch cycles and volcanic causes of climate change<br><br>Links to PSHE & citizenship |

**RE**

Religious education should play a key role in developing climate literacy, with clear links to the understanding and skills developed in citizenship, history and PSHE/ related subjects, in particular exploring cultural awareness and global citizenship with links to climate justice and drivers of climate action.

Key ideas to be developed progressively through the curriculum include:

- Exploring the concepts of religion and belief and their impact on attitudes towards environmental and social responsibility and justice.
- The role of religion and beliefs in the spiritual, moral and cultural lives of people in a diverse society which help individuals develop moral awareness and social understanding.
- The impact of religious leadership and charities on climate action.
- Religious and other perceptions of dominion/ stewardship of the Earth, related to creation/ Earth origin stories.
- The impact of extreme weather and climate change on pilgrimages/ reducing the environmental impact of pilgrimages and other religious events.

**Personal, Social, Health and Economic (PSHE) education/ Health and Wellbeing/ Health and Well-being/ Personal Development and Mutual Understanding/ Learning for Life and Work**

These are subjects where there are many opportunities for understanding and knowledge about current climate change and wider sustainability issues to be synthesised and made relevant to individuals, their future careers and their communities.

As with all subjects, the opportunities and examples should be formalised in the curriculum to ensure equity in the delivery of a high-quality climate education.

Across the curriculum, the following points should be developed:

Health and Wellbeing

- The different emotions people experience in response to climate change (e.g. 'climate anxiety' and 'climate apathy') and the cultural, religious, political, economic, social and historical drivers of these emotions.
- How to manage emotional responses to climate change and look after mental health and wellbeing. Resilience to climate anxiety. Developing empowerment, efficacy and agency to take climate action (mitigation or adaptation) and/ or develop skills for and awareness of green careers.
- The benefits of nature connection for mental health and wellbeing.
- The impact of extreme weather (e.g. extreme heat or flooding) on individuals and communities and how to prepare and stay safe. Resilience to extreme weather.
- Balancing health, cost, sustainability and ethical reasons for diet choices (see also Food Technology section below)
- The environmental impact of substances.
- Some ways individuals can help to prevent the spread of infectious diseases & pests especially those linked to climate and environmental change.
- Responding to change and uncertainty through developing agency and skills.

Relationships

- Recognising that different people will have different views about the environment and climate change, shaped by cultural, religious, political, economic, social and historical drivers.
- Discussing and debating topical issues, listening and responding respectfully to other people's point of view and constructively challenging those they disagree with.
- Working collaboratively, making group decisions and evaluating their contribution to the group.

Living in the wider world

- Awareness of and connection with the natural world – locally and globally. Developing a sense of equity for access to nature.

- Shared responsibilities for caring for other people, living things and the natural world. Carbon footprints (of goods, services and individuals) as well as the impact of human activities on biodiversity and the local and global environment. Developing a sense of climate and environmental justice.
- Developing a sense of stewardship of the Earth for future generations and for wildlife.
- Actions that can help to protect the environment, support biodiversity and tackle climate change (e.g. 3 / 4 / 5 Rs, transport and diet)
- Clarifying and developing personal values and the ability to make decisions in line with values
- Understanding that our behaviour as consumers, producers, influencers, organisational members, and citizens has an impact on our local and global communities and environment.
- Understanding that our behaviour as consumers, producers, influencers, organisational members, and citizens can drive climate action
- Understanding the influence that the media and algorithms have on the climate and sustainability information we are presented with.
- Understanding how to assess bias, reliability and accuracy of information related to climate and sustainability. Resilience to mis/ dis/ fake information.
- Influences on financial decision-making, including sustainability and ethics.
- The cost of mitigation, adaptation or not acting to mitigate or adapt to climate change for an individual or household.
- An understanding of insurance and risk relating to extreme weather events at a personal/household level.
- Develop an understanding of, and empathy for, a range of local and global viewpoints (including indigenous peoples) related to environmental issues motivated by cultural, social, political and religious differences and how this informs and drives attitudes, resilience, action, behaviours, values and justice, leading to an understanding of the importance of belonging and local and global community building.
- Developing an understanding that transformed/ alternative futures are possible.

In these subjects, critical thinking can be developed, as well as communication skills, data literacy and financial literacy aligned with social and environmental responsibility. Other valuable skills which can be fostered include managing influence and personal decision making/ choices.

Some specific examples are given below:

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| Early Years | Connecting with and enjoying nature and weather. | Links to geography at this level |
| 5-7 (KS1) | Local nature and weather appreciation and engagement.<br>How the weather (normal and extreme) affects how we feel and what we do.<br>Understanding that we are part of nature, not separate from it. | Geography (weather)<br>Maths (risk matrix for extreme weather)<br>Science (How to stay safe in extreme weather) |
| 7-11 (KS2) | *Understand that we are part of nature, not separate from it; everything humans do and make depends on the Earth and climate systems and has an impact on them.*<br><br>Appreciation of ecosystem services for health and well-being and nature connection. *We can feel anxious or disconnected from nature and social* | Ecosystem services from geography |

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| | *or environmental issues like climate change.* Begin to appreciate what causes these emotions and how to address them.<br><br>Appreciation of the health of the local environment (including air quality, water quality, litter, biodiversity etc) and how individuals can help to improve it.<br><br>Local adaptations and strategies for staying safe in extreme weather.<br><br>Observe the impacts of extreme weather on local communities and the environment.<br><br>*Understanding that our actions (as individuals and communities) have an impact on the environment, and that products & actions have a financial and environmental cost.*<br><br>Consumer choice; recognising and beginning to manage influences on choices. Business responsibility (e.g. through advertising).<br><br>Case studies of green careers. | English – persuasive writing<br><br>Creative expression in drama, music, art, dance |
| 11-14 (KS3) | Understand the factors affecting human health and wellbeing including ecosystem services as well as the impacts of extreme weather and climate change.<br><br>Understand that we are part of nature, not separate from it; everything humans do and make depends on the Earth and climate systems and impacts their function.<br><br>The cultural, religious, political, economic, social and historical drivers of our emotions about, attitudes to environmental and social issues and the drivers of climate action.<br><br>Explore the carbon footprints of goods, services, organisations and individuals relevant to their own lives and communities. Including analysis of which actions have a significant impact as well as the social limitations of the concept of personal carbon footprints.<br><br>Cost/ benefit analysis related to personal and business (e.g. school) climate actions such as installing solar panels.<br><br>Energy efficiency presents an enormous potential to mitigate climate change while contributing to sustainable development and resource efficiency and sufficiency.<br><br>Greenwashing and misinformation. Analysing and managing influences when making choices as a consumer.<br><br>What is a 'green career', where are there currently skills gaps in the UK workforce and where are there 'green careers' | Learning from across science, geography, citizenship, English and other subjects<br><br>Creative expression in drama, music, art, dance |
| 14-18 | Exploring green careers and how every career will be impacted as we mitigate and adapt to climate change.<br><br>Food choices for health, cost, sustainability and ethical reasons.<br><br>The financial cost of extreme weather events and of insuring against those costs for individuals and households.<br><br>The relative costs and timescales of mitigation v adaptation on a personal, school and community as well as global level. | From English – identifying trustworthy sources/ misinformation<br><br>Learning from across science, geography, citizenship, |

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| | | English and other subjects |

**Sociology & Psychology**

The subjects of Psychology & Sociology build on earlier learning and are subjects where there are many opportunities for understanding and knowledge about climate change and wider sustainability issues can be synthesised and made relevant to individuals and their communities. Sociology is focused on the relationship between people and the environment and on how climate change is affecting people and societies.

- Well-being, mental health and anxiety, in particular related to nature-connectedness and climate action, developing agency, dealing with uncertainty.
- Our behaviour/ actions as consumers, producers, influencers, organisational members, and as citizens has an impact on our local and global communities and environment.
- Our behaviour as consumers, producers, influencers, organisational members, and as citizens can drive climate action.
- Reasons for the knowledge – action gap.
- Responsible consumption related to social, cultural and political determinants of consumption. Global trade.
- Empathy and community building, in particular empathizing with the different groups of people, communities, and/ or countries that are more likely to experience the worst effects of heatwaves, extreme storms, flooding, or other locally relevant climate events.
- The impact of global warming and environmental change on war, conflict, migration, food & water security.
- Develop an understanding of, and empathy for, a range of local and global viewpoints (including indigenous peoples) related to environmental issues motivated by cultural, social, political and religious differences and how this informs and drives attitudes, resilience, action, behaviours, values and justice.
- Developing a sense of climate and environmental justice, specifically relating to local, national and global power systems and fairness.
- Developing a sense of equity for access to nature, to climate adaptation and mitigation practices & technology and to sustainable living spaces.
- The climate and sustainability information we are presented with is socially constructed through media, algorithms, culture and the political economy. Echo chambers validate our positions.
- Empowerment to communicate about environmental issues and take climate action (adaptation and mitigation).
- Develop a sense of connectedness with the local and global community as well as with the natural world.
- Understanding the link between various socio-economic inequalities and environmental degradation.
- Environmental crime & greenwashing.
- The tactics & effectiveness of climate activism.
- Develop a sense of stewardship of the Earth for future generations and for wildlife and an understanding that transformed/ alternative futures are possible with knowledge, understanding and technology.
- Awareness that ideas of technological salvation and individual behaviour change are tied to Western cultures of individualism and these can offer both opportunities and barriers to climate action.

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| 14-18 | Understand the factors affecting human health and wellbeing including ecosystem services as well as the impacts of extreme weather and climate change.<br><br>The functions of the state to guide large-scale, system-wide action for climate change mitigation and adaptation, as well as reducing the inequalities accelerating environmental degradation by supporting essential human needs.<br><br>Understand that society is part of nature, not separate from it; everything humans do and make depends on the climate and Earth system and impacts their function.<br><br>Stakeholder perspectives – consumer, government, industry, employee.<br><br>Global development goals. The relationship between socio-economic inequalities and environmental degradation.<br><br>The role of the commons in managing and protecting shared resources, building local resilience, and improving social cohesion and equity. | From English – identifying trustworthy sources/ misinformation<br><br>Learning from across science, geography, citizenship, English and other subjects<br><br>Learning from PSHE/ related subjects at this and earlier stages |

**Economics and Business Studies**

The subjects of Economics/ Business Studies can build on earlier learning and are subjects where there are many opportunities for understanding and knowledge about climate change and wider sustainability issues can be synthesised and made relevant to individuals and their communities.

- Understanding that the economy is embedded in social and ecological systems, both dependent on those systems and impacting them.
- The cost of mitigation, adaptation or not acting to mitigate or adapt to climate change. Economic drivers of action.
- An understanding of insurance and risk relating to extreme weather events.
- Understand the dynamic interaction between households, markets, government and the commons, and the perspectives of different economic agents in those four provisioning systems.
- The ethics and sustainability implications of business activity.
- An evaluation of various economic systems. How we organise our economies and societies impacts the levels of human cooperation, reciprocity and care.
- Understanding that the economy includes interconnected provisioning institutions including households (unpaid care and domestic work), markets, commons (self-organised management of shared resources) and state, each of which has their own and overlapping roles that are critical for a healthy, resilient society.

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| 14-18 | Economic development. Evaluating the drivers and impacts of economic growth. Just transitions.<br><br>How business performance and assets are impacted by weather/ extreme weather.<br><br>The relative costs and timescales of mitigation v adaptation on a personal, school and community as well as global level.<br><br>Some business areas are/ will be significantly affected by climate change. | From English – identifying trustworthy sources/ misinformation<br><br>Learning from across science, geography, citizenship, English and other subjects |

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| | Cost/ benefit analysis related to business climate actions such as installing solar panels.<br><br>The changing cost of renewable energy, other green technologies and fossil fuels. Improving efficiency & the rebound effect.<br><br>Government fiscal and environmental policy and legislation. The functions of the state to guide large-scale, system-wide action for climate change mitigation and adaptation, as well as reducing the inequalities accelerating environmental degradation by supporting essential human needs.<br><br>Green finance/ Green climate fund/ loss and damage payments at a national and international level<br><br>Green investment (and other ethical considerations which asset managers and financial advisors face)<br><br>Possible market mechanisms for mitigation of and adaptation to climate change and their limitations. Carbon trading/ pricing (how it works and an evaluation of its efficacy and alternatives). International trade, resources, carbon and political power. Market pressure as a driver for mitigation action.<br><br>Insurance/ quantifying climate risk for businesses and activities. The financial cost of extreme weather events and of insuring against those costs<br><br>The responsibility of businesses to meet human needs within planetary boundaries and how they can adapt their purpose, networks, ownership, governance and finance to have a positive impact on human and wider environmental wellbeing.<br><br>Everything humans do and make depends on the climate and Earth system and impacts their function. The socially and ecologically embedded economy, and its four vital and interconnected institutions (households, commons, markets and state) for meeting human needs within planetary boundaries.<br><br>Planetary boundaries, the concept of sufficiency. Circular/ regenerative/ doughnut economics, Green/ blue economy, post-carbon economy.<br><br>Stakeholder perspectives – consumer, government, industry, employee<br><br>Sustainable economic development related to global development goals. The relationship between socio-economic inequalities and environmental degradation. | Learning from PSHE or related subjects at earlier stages |

**Food Technology**

This subject empowers young people to design a better world, whilst at school and in their future careers.

The curriculum should go beyond looking at the energy/ carbon/ environmental resource footprint of food to looking for solutions to the climate crisis and global food security.

| Level | | Prior Learning from Other Subjects |
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| 5-7 (KS1) | Understand what happens to waste (landfill or recycling) and some ways in which waste can be reduced (reduce, reuse, composting). | |
| 7-11 (KS2) | Begin to understand the provenance, seasonality and environmental impact (through production and transport) of different types of food and how to avoid waste (food and packaging).<br><br>Appreciate local wild foods and how to collect and consume them safely and sustainably (e.g. blackberries, elderflower), where possible extending to growing/ cultivating food outside, with an understanding of the impacts of the weather and seasons. | Weather and seasons from geography<br><br>From science - plants need water and sunlight to grow |
| 11-14 (KS3) | Evaluate the energy/ carbon/ environmental/ resource footprint of food and understand how to reduce it.<br><br>Understand that sustainable diets refer to eating healthy, accessible, affordable, secure, local, and culturally relevant food produced and delivered in a way that reflects conscious awareness of its impact on the planet and people.<br><br>Identify the impact of recent extreme weather locally and around the world on food supply and demand.<br><br>Explore and evaluate very local, regional, national and global food choices for health, cost, sustainability and ethical reasons including emerging technologies for low carbon food. | Links in particular to PSHE/ related subjects, science and geography at this level |
| 14-16 (KS4) | Continue to develop the ideas introduced at earlier stages.<br><br>Commercial solutions to food waste including anaerobic digestion and biofuel and as well as using forecasting techniques to predict sales and reduce waste.<br><br>Commercial solutions to low carbon/ environmental footprint of food procurement.<br><br>Careers in environmentally and socially responsible food production, processing and catering. | From biology – food security, energy flow in ecosystems |

**Design & Technology / Engineering**

These and related subjects empower young people to design a better world, whilst at school and in their future careers.

The curriculum should go beyond looking at the energy/ carbon/ environmental resource footprint of products and processes to looking for technical solutions to the climate crisis. Through clear and well-sequenced links particularly with the sciences, the causes, impact and – crucially – the emerging solutions to environmental problems, particularly climate change, can be integrated throughout the curriculum, clearly demonstrating career opportunities.

Key skills which can be developed in this area relate to careers, communication, and creative thinking. Data, statistics and numeracy skills introduced in mathematics can be developed.

| Level | | Prior Learning from Other Subjects |
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| Early Years | Use natural materials creatively | |

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| 5-7 (KS1) | Understand the difference between natural and synthetic materials<br>Understand what happens to waste (landfill or recycling) and some ways in which waste can be reduced (reduce, reuse, composting, reselling/ giving away). *There are different ways to deal with things you no longer need*. | |
| 7-11 (KS2) | Begin to evaluate the environmental impact of the materials they use and how to avoid waste; re-using, re-purposing and upgrading/ mending.<br><br>Some examples of green careers including real-life examples of how human ingenuity has worked alongside and with nature to create more sustainable products, with a focus on examples that the students can themselves see or use. | |
| 11-14 (KS3) | Understand that there are resources which humans depend on (clean air, clean water, food, minerals, fuel) and that technology depends on these, and can both help deliver and impact them.<br><br>Evaluate the energy/ carbon/ environmental/ resource footprint of materials, products and processes and understand how to reduce it. Lifecycle assessment. Balance cost, performance, and footprint.<br><br>Study some technical solutions including emerging technologies for climate change mitigation and adaptation including buildings (e.g. Passivhaus, better than net zero homes), energy, products and processes.<br><br>Avoiding waste (including packaging); re-using, re-purposing and upgrading/ mending.<br><br>What is a 'green career', where are there currently skills gaps in the UK workforce and where are there 'green careers'. | Many concepts including life cycle assessment, efficiency, net zero, renewable energy and fossil fuels from science<br><br>Also links to citizenship, geography and PSHE/ related subjects at this level |
| 14-16 (KS4) | Evaluate the energy/ carbon/ environmental/ resource footprint of products and processes and understand how to reduce it. Lifecycle assessment and the circular economy.<br><br>Study more technical solutions including emerging technologies for climate change mitigation and adaptation including buildings, living spaces, energy, transport, waste, products and processes.<br><br>Eco-design; market forces and client design brief. The interactions between cost, environmental footprint and market forces. Greenwashing.<br><br>Some specific significant materials including (green) steel, cement and alternatives to it, plastics and alternatives.<br><br>Avoiding obsolescence, the Right to Repair. | Many concepts including life cycle assessment, efficiency, net zero, renewable energy and fossil fuels from science<br><br>Also links to PSHE/ business, geography, English, and citizenship at this level |

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| | Case studies of green careers and training opportunities in design/ technology. | |

**Citizenship**

Citizenship lessons develop knowledge, understanding and skills for engaging with climate change as a contemporary challenge that affects people, communities and nations differently across the world. When exploring climate change in Citizenship, students build understanding of the political, legal, economic, technological and social solutions that are needed to tackle the effects of climate change. Learning in Citizenship lessons should consolidate and develop learning from other subjects and are therefore key to equipping students with climate literacy and developing systems/ synoptic thinking about climate change and its solutions.

In citizenship, students can develop climate empowerment and agency (a belief that people can act together to try to make things better) - helping pupils to play a part in the solutions to climate change through local to global actions in neighbourhoods, communities and society. Also, by definition, it is in citizenship lessons that students develop the understanding of climate change needed to equip them as local and global citizens. There are multiple roles that individuals, groups and communities can play in driving climate action, as consumers, influencers, producers, organisational and community members, and citizens.

At each stage, stage, learning should be devoted to developing and deepening understanding and connections between concepts, including in relation to:

- Rights,
- Justice,
- Power,
- Active citizenship,
- Migration,
- Finance & economy,
- The role of the UN,
- The role of NGOs,
- Politics and law, the impact of government on economic activity including agriculture and industry
- Media & communications,
- Voting & elections,
- The UK and the wider world

within the context of climate change, sustainability and the environment.

In citizenship, as in many subjects, critical thinking can be developed, as well as communication skills and financial & data literacy skills introduced in mathematics.

Given non-specialist teachers typically delivering citizenship lessons, some specific detail is required in the curriculum to ensure equity in the delivery of a high-quality climate education. Some examples are given below:

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| 11-14 (KS3) | 11-12 | Impact of climate change on us, our communities and |

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| | Collect memories about past extreme weather events and their impacts from the communities students identify with, and identify impacts on individuals, communities and the environment.<br><br>What is sustainability?<br><br>*Our consumer choices have impacts around the world*<br><br>12-13<br><br>Why are different people in the UK affected differently by climate change?<br><br>What climate adaptation/ extreme weather preparedness solutions are appropriate for the school and local community?<br><br>Evaluate current local issues related to climate change and air quality such as wind/ solar energy development, rewilding, pylon construction, low emission zones, sea/ flood defences, electric vehicle charging points<br><br>What is climate activism?<br><br>*We can advocate for, lobby and contribute to the development of policy at local, national and international levels that promotes action on climate change and sustainability*<br><br>13-14<br><br>Global development goals (SDGs and others) and international policy frameworks. The role government, business and organisations, including schools, play in supporting progress towards these goals. Barriers to progress.<br><br>Globally, why are different people affected differently by climate change?<br><br>Local, national and global rights and responsibilities relating to climate change and air quality.<br><br>What is Climate Justice?<br><br>What is climate literacy?<br><br>Why do we hear different messages about the importance of addressing the climate crisis?<br><br>Why should we do anything about climate/ environmental issues?<br><br>What climate mitigation solutions are appropriate for the school and local community?<br><br>Evaluate current national issues related to climate change and specifically the COP process such as emission targets, legislation, climate education, climate finance etc. Barriers to progress.<br><br>Evaluate the concepts of carbon and environmental footprints.<br><br>Evaluate policy and the role of local government in supporting actions to address climate change through sustainability plans, extreme weather action plans etc. Barriers to progress. | the world (from geography)<br><br>Causes of climate change and solutions (from science, geography, food tech etc)<br><br>Identifying biased or dis/ misinformation in media/ social media from English<br><br>The cost of mitigation and adaptation (from PSHE/ related subjects) |
| 14-16 (KS4) | Global citizenship involves taking climate action in our communities, countries and in line with global needs. Why our choices and actions matter. | Religious perspectives of stewardship from RE |

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| | Stewardship of the Earth and its resources; legacy<br><br>Political (national and international) mechanisms for mitigation of, adaptation to and loss and damage as a result of climate change.<br><br>Social, cultural, economic and political determinants of climate action in the local, national and global community.<br><br>Evaluate current international issues related to climate change and specifically the COP process<br><br>What is a Just transition?<br><br>Evaluate the efficacy of climate action we can take as individuals, communities and countries, including those related to politics/ democracy.<br><br>Can/ should geo-engineering solve the climate crisis?<br><br>The responsibility of businesses to meet human needs within planetary boundaries and how they can adapt their purpose, networks, ownership, governance and finance to have a positive impact on human and wider environmental wellbeing. | Links with PSHE/ related subjects, English, Business etc. |

**Art & Design**

Art and Design is a powerful tool for expression, social commentary and communication. It transcends language barriers and can convey complex emotions and ideas, making it an ideal medium for exploring global issues such as climate change. By integrating climate education into Art and Design lessons, we can help students develop a deeper understanding of sustainability while also enhancing their creative skills.

Through expressive arts such as music, art, dance, drama and the spoken word, young people have a unique opportunity to communicate about climate change, as well as think creatively and express their viewpoints, hopes and anxieties. This in turn supports well-being.

In addition, students can learn to think critically about the information about the natural world and people's interrelationships with it, as well as the sustainable use of materials, in existing works from other times and places as well as their own. This in turn can help develop feelings of empathy, cultural understanding, community, global citizenship and place. How can art inspire social or climate action?

The CAPE curriculum making guidance for primary art recommends three levels of engagement with art and climate change: climate engagement in art, climate engagement with art and climate engagement through art.

Some examples which could be progressively developed in art & design are listed below:

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| Early Years | Use natural materials creatively | |
| 5-7 (KS1) | Observe and depict our human and natural environment including weather and nature. What colour are trees? What shape are clouds?<br><br>Communication and creative expression about weather and nature. | Weather from science and geography<br><br>Links to D&T at this level |

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|---|---|---|
| | Learn to minimise waste and creatively reuse materials.<br><br>Appreciate local natural materials and how to collect and use them safely and sustainably (e.g. for dye). | |
| 7-11 (KS2) | Look at and think reflectively about contemporary art, craft, photography and design from around the world which expresses understanding of, care or hope for local or global environmental issues and sparks dialogue.<br><br>Demonstrate their connectedness/ appreciation/ relatedness to the natural world through their art.<br><br>Begin to evaluate the environmental impact of the materials they use and how to minimise waste and creatively reuse materials. | Links to well-being and nature awareness and connectedness in PSHE and geography |
| 11-14 (KS3) | Individual and collaborative art & design to express or communicate global world issues including climate change, biodiversity loss and other sustainability issues and their interrelationships with people. This could include depictions of transformed futures.<br><br>Study a range of art from across periods, styles, major movements and cultures which communicate about nature & environmental issues and their interrelationships with people. How can art inspire action?<br><br>Develop an awareness of the environmental impact of the media used. | Climate change causes, impacts and solutions from geography, science, D&T and PSHE/ related subjects<br><br>Links to well-being and nature awareness in PSHE and geography<br><br>Links to communication in English and Drama<br><br>From PSHE/ related subjects: The climate and sustainability information we are presented with is socially constructed through media and culture. Echo chambers validate our positions. |
| 14-16 | Builds on the earlier curriculum | |

**Music**

Music, as an art form, has always been a powerful tool for expression and communication. It transcends language barriers and can convey complex emotions and ideas, making it an ideal medium for exploring global issues like climate change. By integrating climate education into music lessons, we can help students develop a deeper understanding of sustainability while also enhancing their creative and collaborative skills.

Through expressive arts such as music, art, dance, drama and the spoken word, young people have a unique opportunity to communicate about authentic contexts such as climate change, as well as think creatively and express their viewpoints, hopes and anxieties. This in turn supports well-being.

In addition, students can learn to think critically about the information about the natural world and people's interrelationships with it in existing works from other times and places as well as their own. This in turn can help develop feelings of empathy, cultural understanding, community, global citizenship and place.

Some key concepts which could be progressively developed in music lessons are listed below:

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| 5-7 (KS1) | Making sounds based on weather and nature.<br>*Focused listening to the outside world to gain a deeper understanding of local natural and human environments.* | Geography/ science: weather |
| 7-11 (KS2) | Listen to and think reflectively about contemporary and historic songs and music from around the world which express understanding of or care or hope for local or global environmental issues<br>Create music in response to students' own understanding of their local environments. | Links to well-being and nature awareness and connectedness in PSHE/ related subjects and geography |
| 11-14 (KS3) | Individual and collaborative composition and performance – song or instrumental writing to express or communicate global world issues including climate change, biodiversity loss and other sustainability issues and their interrelationships with people.<br>Listening – a range of compositions from across a broad range of genres which communicate environmental issues. How can music inspire action?<br>The environmental impact of music festivals and tours, instruments and equipment and how to reduce it. | Climate change causes, impacts and solutions from geography, science, D&T and PSHE/ related subjects<br><br>Links to well-being and nature awareness in PSHE/ related subjects and geography<br><br>Links to communication in English and Drama<br><br>From PSHE/ related subjects: The climate and sustainability information we are presented with is socially constructed through media and culture. Echo chambers validate our positions. |
| 14-16 (KS4) | Builds on the earlier curriculum. | |

**PE**

In PE lessons, and particularly for those looking to go into careers in the sports & fitness industry, it is important to develop an understanding of the impact of weather on exercise, performance and sporting events, as well as an understanding of the impact of sporting events on the environment.

| Level | | Prior Learning from Other Subjects |
|---|---|---|
| 7-11 (KS2) | Impact of weather and air quality on exercise.<br>The benefits of being active outdoors for physical health and well-being. | From geography: weather, how to stay safe in extreme weather |
| 11-14 (KS3) | Impact of weather and air quality on physical performance. | |
| 14-16 (KS4) | Impact of extreme weather and air quality on physical performance and sporting events. | From geography: climate change |

| | | |
|---|---|---|
| including GCSE | Reducing the environmental impact of sporting activities and events locally, nationally and globally. | and extreme weather, carbon footprint of services |

**Geology**

Where taught, geology provides an opportunity to integrate and develop learning about past climate change, the Earth's climate system (including the atmosphere, oceans, cryosphere, soils, lithosphere and biosphere), the carbon cycle, the environmental consequences of fossil fuel and mineral extraction as well as some mitigation solutions, challenges and careers.

It has links to learning in geography, science and computer science as well as design & tech/ engineering and history.

Key components include opportunities for outdoor learning, through fieldwork linked to climate change evidence and mitigation, data literacy through working with past climate data and understanding of the links between climatic change, evolution, adaptation and extinctions in the past.

**Appendix: Organisations who Contributed to the Development of this Curriculum**

Association for Language Learning
Association for Physical Education
Association for Science Education
British Computing Society
British Sociological Association
Classical Association
Climate Adapted Pathways for Education – CAPE Alliance
Design & Technology Association
Earth Science Teachers' Association
Economics, Business and Enterprise Association
EngineeringUK
English Association
Geographical Association
Institute of Mathematics and Its Applications
Institute of Physics
Joint Mathematical Council
Media Education Association
National Drama
PSHE Association
Regenerative Economics
Royal Geographical Society
Royal Economic Society
Royal Meteorological Society
Royal Society of Biology
Royal Society of Chemistry
Royal Statistical Society
SOS-UK
University of Reading