

Quick Reference Guide: Climate Education

How is climate education included in the science standards?

DESE’s [Educational Vision](#) is anchored in our commitment to high-quality teaching and learning in the Commonwealth, and informs the development of the Massachusetts curriculum frameworks. The Frameworks outline key learning standards for all students, including the topic of climate. Climate education plays a critical role in furthering our state’s vision through the inclusion of real-world, interactive, and relevant learning experiences for all students.

To support a deep understanding of climate science, it is critical for students to develop foundational science concepts and skills early on in school. In the Massachusetts [2016 Science and Technology/Engineering \(STE\) Curriculum Framework](#), much of the foundational content that builds to a solid understanding of climate change is found in two disciplinary strands that span PreK-12: **Earth Systems** and **Earth and Human Activity**. Some of the topics within the strands are weather and climate, natural resources, natural hazards, and human impacts on earth systems. Ideas from physical science about the nature of matter and energy, from life science about the needs and behaviors of living things, and from technology/engineering about solution design also contribute to students’ deepening understanding of the causes and effects of climate change. In addition, students develop increasingly sophisticated abilities in the practices of data collection and analysis, interpreting and using scientific models, and obtaining relevant information in order to facilitate deeper conceptual understanding. The table below shows how these disciplinary strands build through the elementary grades, allow for a complex understanding of climate change beginning in middle school, and support deeper understanding in high school. For standard-by-standard connections, [view the science strand maps](#).

Progression of climate-related concepts & skills across grade bands

	Elementary (PreK-5)	Middle School (6-8)	High School (9-12)
Disciplinary Core Ideas	Developing understanding of weather and climate, conservation of energy, the nature of matter, the needs of living things, human impact on the environment, and engineering design.	Integrating understanding of matter and energy, global-historical weather and climate patterns, and global natural systems to recognize the role of human activity in climate change	Specialize understanding of core and advanced science and engineering classes. Understanding micro-to-macro scale relationships about matter, energy, earth systems, and human activity.
Science & Engineering Practices	Developing use of scientific tools, data literacy, identifying scientific questions, setting up investigations, and drawing conclusions grounded in evidence.	Analysis of more complex data, refining scientific questions, developing independence in designing investigations, and defining conclusions and explanations with evidence.	Use of more sophisticated modeling tools and software, developing scientific questions and seeing them through, evaluating competing ideas.
Application to Context	Students apply learning to phenomena in their school and home communities: local weather patterns, use of resources, and solving personally relevant design problems.	Students apply learning at the community-to-global level. They may evaluate and design local climate solutions. They may undertake a climate-related civics or science fair project.	Students apply their learning to the community, globe, and beyond through independent projects and studies, extracurriculars, internships, work study and community organizations.

What science curriculum materials and professional learning can support teaching about climate?

We recommend starting with high-quality instructional materials ([HQIM](#)) as the foundation for all classroom instruction. **HQIM are, by definition, aligned to grade-level standards and will incorporate the necessary concepts and practices to support climate science learning.** At the course level, we recommend starting with materials that receive a “meets expectations” on [CURATE](#), and/or a green/green rating on [EdReports](#). At the unit level, we also refer educators to the [NGSS Design Badge](#) units. Explore units that address any of the weather and climate standards to ensure that students receive comprehensive instruction at all levels.

With the school curriculum as a foundation, and driven by students’ questions and interests, educators may also introduce or adapt additional lessons, projects or activities that explicitly center climate change. Some vetted clearinghouses for these supplemental materials include [Subject to Climate](#), or [CLEAN](#). Additional resources are available at the end of this document.

High-quality, curriculum-based professional learning serves as the entry point for learning for all teachers. The [Professional Learning Partner Guide](#) (PLPG) is a resource to find vetted professional learning providers. The [Teach Climate Network](#) also provides many opportunities for teacher learning around climate, for free and at cost.

What cross-curricular opportunities exist for developing an understanding of climate?

The [Standards Navigator](#) and standards crosswalks tools (downloads for [Math/ELA](#), [Comprehensive Health & PE](#)) can be used to identify connections between a given standard and related cross-content standards, in support of the Frameworks documents. Curriculum guides are available for [Comprehensive Health/Physical Education](#) and [Digital Literacy/Computer Science](#), and some curricula may include climate-related content. This can support planning the scope and sequence for a year across disciplines. Students in grades 8-12 may also wish to pursue a climate-focused student-led civics project. [The Civics Project Guidebook](#) outlines the process. Educators should guide students toward vetted and reliable sources as they undertake research related to their topic of interest.

Centering solutions to support student well-being

Global climate concerns affect everyone and may be particularly salient for students from [historically marginalized populations](#) and other vulnerable groups. Therefore, access to climate education is an equity issue. Topics around climate can be emotionally challenging, so it is critical to ground climate learning focused on [positive solutions](#) and community resilience.

Massachusetts-specific organizations supporting climate education & advocacy

1. [Massachusetts Department of Energy Resources](#) – view state policies and initiatives around our energy supply
2. [Mass Audubon](#) – view programs and professional learning around climate change offered by a local nonprofit organization
3. [Envirothon](#) - Massachusetts natural resource education program with an annual project showcase
4. [Climate Resilient Schools Network](#) - a multigenerational network of stakeholders from schools and districts advocating for climate resilient schools
5. [Green Ribbon Schools](#) - a national recognition program for schools that have made strides in sustainable design and environmental & health education
6. [Massachusetts Science & Engineering Fair](#) (MSEF) - statewide project showcase & competition
7. [MIT Climate Explainers](#) - a library of brief learning resources related to climate education topics
8. [The Hitchcock Center for the Environment](#) – a Western Massachusetts-based organization providing programming and resources around environmental education, including climate education
9. [The Massachusetts Food System Collaborative](#) – focused on building a sustainable local food system, there are connections between food production and food waste and climate topics