



CLIMATE CHANGE AND ENVIRONMENTAL JUSTICE PROGRAM SYNOPSIS

Background

The State of California is investing \$6 million dollars to create curricular resources that will help teachers promote their students' understanding of climate change and environmental justice, leading to action in their communities. These resources will be provided as free open education resources, will be standards-based, and will integrate California's Environmental Principles and Concepts (EP&Cs).

Per the language in the [education trailer bill](#) (AB 130, SEC 151), this funding shall be appropriated to the Department of Education and then allocated to the San Mateo County Office of Education. San Mateo County Office of Education will contract with educational nonprofit Ten Strands to arrange for the development of the curricular resources. Ten Strands will oversee and organize the production, testing, and initial dissemination of the curriculum units.

Goals

Short-term, the program seeks to design, create, test, and publish high-quality curricular resources that are educative for both teachers and students. Long-term, the goal is for every child in California, at every grade level, to have a minimum of a once-a-year in-depth experience addressing climate-related environmental issues that impact their local communities and the world — in culturally relevant and responsive ways that activate students' interest, civic engagement, and leadership.

The curricular resources will be for students and for teachers. For students, the resources will provide opportunities to engage in understanding climate change through the lenses of science, history-social science, and other subjects, while building capacity for systems thinking, modeling, and data literacy, as well as opportunities to conduct community inquiry projects that explore issues of climate change and environmental justice. The goal is to provide these opportunities over a series of resources, not necessarily within each resource. For teachers, the resources will provide background materials (e.g., how the units are supportive of existing state standards, guidance for the use of the materials, assessment support, etc.), illuminative cases of community projects, and resources supporting the development of community partnerships.

In summary, this program intends to make an immediate and direct impact on teachers and students, while at the same time laying a foundation for future work.

Our Vision for Curricular Resources

The curricular resources to be developed will adhere to a set of design principles, which together constitute an approach that seeks to engage students in solving problems tied to community-focused projects that provide an authentic context for increasing climate literacy and awareness of environmental injustices.

The current vision of the curricular resources:

1. The curricular resources will be designed to provide significant and appropriate learning experiences for each grade level K–12.
2. The resources will be available for free as an open education resource issued under a Creative Commons license¹.
3. The resources will set a common “floor” of activity that is expected of and feasibly achieved by all teachers and students. This will consist of structured activities where students are introduced to key concepts and examples of climate change and environmental justice leading to action in their communities.
4. The resources will also offer teachers and students a high “ceiling” in terms of helping them develop and engage in local community inquiry projects that lead to learning about climate change and environmental justice and focused civic engagement.
5. The resources will bridge and connect the humanities with the sciences. At each grade level (or within a grade level band — K–2, 3–5, 6–8, 9–12) the resources will be centered in a “home” discipline but will involve inquiries and expressions that are interdisciplinary. We expect that at the upper grade levels the resources may be centered around and presented as primarily science units; at the lower grades there will be a focus on integrating climate and environmental investigative phenomena with English language arts and mathematics, as these are the subjects that are most frequently taught.
6. To the extent possible, the activities at each grade level will build upon each other so that students have cyclical and iterative experiences over the years, or at least within a grade band. These experiences will be grounded in the CCSS and NGSS practice standards.

¹ <https://creativecommons.org/about/cclicenses/>

7. The curricular resources will be structured and offered as resources that allow teachers to extend or replace other units so that teachers can feel confident these materials are helping their students achieve the standards of their grade level.
8. The resources will offer instructional resources that allow for students to engage in fifteen hours (or more) of activity in their school year. This could be sequential or spaced-out activity.
9. The resources will include a comprehensive set of teacher supports — a set of asynchronous online professional learning opportunities for teachers to draw upon to learn about climate science, environmental justice, and the usage of the curricular resources — as well as guidance for successful classroom enactment.
10. The resources will include place-based learning resources, such as real cases, data, and examples of community projects as well as interviews with experts, and teacher advice. All of these will highlight the ways in which teachers can use local resources and agencies to study and take action on local environmental issues.
11. There will be online structures for collaboration — among teachers, among students, and with researchers and community-based partners.
12. The resources will be published in alignment with the California Department of Education’s web standards, including compliance with Section 508 Guidelines.

Design Principles for Curriculum Resources

The design principles underlying the resources will include:

1. An inquiry-based approach where students (and teachers) are engaged in projects where they are provided opportunities to make observations and ask questions that lead to deeper understandings about environmental issues and then take action in their own communities. This will involve identifying local problems and issues and:
 - a. Inquiring into their history and roots
 - b. Inquiring into the science and data underlying the issue
 - c. Inquiring into the economics surrounding the problem
 - d. Inquiring into local agencies and organizations working on the problem
 - e. Inquiring into local policies and practice, and how to influence them

In these projects students and teachers examine the interaction of physical, social, and economic phenomena centered around environmental change and social challenges.

2. An integration of the core content and skills outlined in the Common Core State Standards (CCSS), Next Generation Science Standards (NGSS), California's Environmental Principles and Concepts (EP&Cs), and other relevant standards and frameworks, e.g., history-social science, math, health, and the arts.
3. The use of equity-focused frameworks found in (but not limited to):
 - a. Culturally Relevant and Responsive Pedagogy
 - b. Universal Design for Learning
 - c. California curriculum frameworks in each subject area
 - d. Indigenous Ways of Knowing (i.e., traditional ecological knowledge, unveiling necessary dispositions, developing habits of mind, understanding holistic worldviews, exploring how colonial land-use patterns and the nature of science in the Western tradition have contributed to environmental injustices, etc.); and
 - e. Honoring and celebrating the knowledge and perceptions students walk into class with.
4. An interdisciplinary approach where themes, concepts, skills, and content knowledge across multiple disciplines are required to meet the challenges of the project in an effort to provide students practice with authentic approaches to problem-solving in the 21st century. This approach will also deepen student understanding in the respective disciplines. The discipline reveals a problem that needs solving, the problem necessitates more learning in the discipline to be able to solve the problem, and so on.
5. A data literacy approach where teachers and students identify potential local issues and look for patterns in local data sets, and develop and use models and other explanations that illuminate these issues to provide for authentic STEM experiences.
6. A focus on helping students acquire and develop the skills of:
 - a. Data science, including learning how to use models to make predictions and explain the effects of climate change on communities
 - b. Data analysis and interpretation
 - c. Expression (speaking, writing, multimedia, public presentations)
 - d. Inquiring into environmental phenomenon, including impacts on communities
 - e. Taking informed action and participating in or leading civic engagement
7. An explicit focus on the ways in which environmental issues are disproportionately benefiting or harming some populations more than others and creating injustices that ultimately impact everyone.

In these ways the program will create a curricular example that is innovative, exemplary, and illuminative for future curriculum development efforts.

Instructional Approaches: Opportunities for All Students to Learn

The resources and the project-based activities they support will seek ways to offer all students the opportunity to:

1. Learn about environmental issues and challenges in ways that are relevant and engaging to them and to develop a sense of possibility and optimism.
2. Be provided with authentic ways to share their projects, data, analyses, and presentations with other students accessing the same resource and with their community and key stakeholders. Student data privacy and anonymity, where needed, will be important to address.
3. Research and engage with local community organizations that students belong to in order to support students as they pursue their inquiries and plan their active responses to what they learn.
4. Be active in policy formulation for their own school system and communities and interact with administration and local government agencies in ways that build their sense of individual and collective efficacy. There is increasingly an empowering, student-centered synthesis between education and system and community engaged action. This approach readies students for more of this kind of educational work as well as college- and career-readiness pathways to address climate change and environmental justice issues as lifelong learners.

Strategies to Develop Resources and Professional Learning Networks

New instructional materials, even the best resources, don't automatically show up in schools and classrooms without engineering classroom enactment and providing ongoing coaching support (including building teacher and administrator leadership and opportunities for collaboration). Thus, Ten Strands and our partners in this work will design the effort to engineer the adoption, usage, refinement, and growth of these resources, and will immediately begin to seek funding to support these particular efforts.

Ten Strands will pursue a development and implementation strategy where:

1. Teachers are central. A small group of leading teachers will pilot and help co-develop the curricular resources. Teacher networks will study, adapt, and implement the activities, further illustrating how the units may be refined and supported. New networks centered around climate change and environmental justice may emerge.
2. The developers involved from the start (including teachers) must fully include communities on the margins who are most impacted by climate change and

environmental injustice. Equally important is that solving challenges that occur as a result of climate change and environmental injustice requires diverse input. We need and value the contributions of diverse voices at the table.

3. In a coordinated effort, Ten Strands, San Mateo County Office of Education, the curriculum developers, select counties and district partners will develop groups of teachers who are in “early adopter schools” and who work together to develop, field test, improve, and report on the curriculum units. These teachers and their students must be diverse in terms of their backgrounds, socioeconomic status, communities, and subject areas they teach.
4. An educative, challenging, and innovative curriculum can help foster teacher leaders and champions; it can be the focal point for the formation and fostering of teacher networks.
5. Ten Strands, which is positioned and skilled at working with existing teacher professional learning providers, e.g., California Subject Matter Project (CSMP), WestEd’s K-12 Alliance, county offices of education etc., will support professional learning provider networks, and, with additional funding, build the capacity to help teachers across the state access and use the resources.
6. Teacher champions and student advocates together are not enough to create a supportive educational and community context that will accept, even demand, the curriculum units be adopted and used. Ten Strands and its partners will also market and promote these curriculum units, not only at the teacher level, but also at the school site, and district curriculum coordinator, county, and state level.
7. Students, we believe, will also be a key driver in creating demand for the curriculum. As classes engage with the curriculum units and as they undertake local community projects and studies, they will become engaged and committed to the need for their peers to be involved in addressing climate illiteracy and environmental injustices. We believe that students can become, and are becoming, advocates for environmental action — and create demands for future curricular change.
8. Examples, cases, community-based partners, and other assets from communities that have been marginalized can be included in the resources and will also provide evidence of the ways in which, and the extent to which, the resources can add significant value to their students’ learning.

Equity Focus: Involving and Serving Students and Teachers from Marginalized Communities

How can we best serve and involve students and teachers from rural, urban, and suburban communities that are low-income and historically marginalized as well as communities of color? Some strategies might include:

1. In a genuine attempt, ask participating county offices of education to identify individuals or organizations within their county who might engage in the development work.
2. Involve people in focus groups to learn from them and to enroll them in the effort.
3. Involve special education leaders.
4. When possible, include Multilingual Language Specialists or Dual Language Specialists.
5. Emphasize trauma informed practices — people who are experiencing trauma and anxiety can be triggered when learning about and discussing climate change and racial injustices.
6. Utilize the [Universal Design for Learning Framework](#) as it is connected to [California's Multi-Tiered System of Supports](#) and [Equity by Design](#) frameworks.

Garnering Support to Teach About Real-World Issues

The successful reception of these units depends heavily upon the quality and inclusiveness of the process that is used to create them. The units do not get developed in isolation and then “marketed.” Key groups and individuals will be involved in the development process itself throughout the design and implementation phases.

This means that ideas and materials need to be developed *in situ* — the materials must draw upon and be developed from real examples of success in the field.

The materials not only need to be field tested but also reviewed formally and informally at all stages of development by the diverse audiences they are intended for.

There may well also be backlash to these materials. (Some say backlash is inevitable, especially if the units provide significant and meaningful experiences in environmental inquiries).

There are several strategies to avoid and navigate community opposition to these materials:

1. Pick environmental topics and issues carefully for each community and take into account issues specific to that community.

2. Work with networks of university partners to connect with researchers across the regions who can identify the phenomena that are relevant to the communities they study.
3. Be as inclusive as possible when conceptualizing, designing, implementing, and sharing the curriculum.
4. Emphasize concepts of clean air, water, and food — these are basics common to the health and well-being of everyone. Climate change threatens those basics.
5. Take an evidence-based approach.
6. Ground inquiry in data from science and strategically selected primary and secondary sources. Focus on generating positive civic interactions with local governmental agencies (e.g., city hall, conservation districts, water boards, etc.).
7. Communicate about climate and environmental justice issues in ways that are backed by research and known to be effective (e.g., metaphors, making it personally relevant, etc.).
8. Emphasize a systems approach; environmental problems are the result of certain ways of thinking and values held within social systems, depersonalizing environmental narratives.

The Role of Research and Evaluation

Ten Strands will oversee investment in appropriate forms of research and evaluation in two ways. One is to get independent feedback from the users — the districts, county offices of education, and community partners — but mostly from the teacher users and the students themselves.

The second form of research is evaluative — to gather evidence that demonstrates this is productive, not only for students, but for teachers in classrooms and for building a foundation of further environmental literacy programs and efforts. Ten Strands will also oversee the research and study efforts needed to understand who is using the units, and how they perceive their quality and value, their comparative advantage, their cost, complexity, and the value contributed to their students.