The National Academies of
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With sponsorship from the National Science Foundation, the National Academies of Sciences, Engineering, and Medicine is convening a public symposium to explore ambitions for the future of undergraduate STEM education and identify steps for achieving them.

Prior to the symposium, the National Academies held an idea competition to engage stakeholders with diverse perspectives. Entrants submitted a statement or video addressing some aspect of the symposium's focus: *What should undergraduate STEM education look like in 2040 and beyond to meet the needs of students, science, and society? What should we do now to prepare?*

Entries were evaluated based on their potential to contribute to and advance discussion at the symposium. Entries were also judged on originality and future orientation. Below is one of the winning submissions.

"Critical STEM for Environmental Health and Social Justice"

Sakereh Carter
University of Maryland, College Park
Other Team Member(s): Sacoby Wilson, University of Maryland, College Park

The future of undergraduate STEM education should reflect a Maker and STEM philosophy. The Maker and STEM philosophy promotes collaborative learning, creativity, inquiry-based learning, access to multi-faceted resources, and hands-on learning. STEM students that learn collaboration, the importance of asking questions, and hands-on learning are well-equipped to excel in fast-paced, cross-disciplinary environments. In addition, students engaged in hands-on learning can apply this knowledge to real-world scenarios that affect the world at large. For example, the health of our environment determines the health of humans that inhabit it. Thus, implementing curricula that encompass environmental health, data science, public policy, and citizen science into STEM education is critical for addressing environmental concerns that impact us all.

In order to address pre-existing and impending environmental concerns, educators should implement an interdisciplinary major that coalesces environmental science with community outreach. Apart from their core STEM curriculum, the major would have different “tracks” including molecular biology (comprised of coursework from environmental microbiology, environmental epigenetics, and environmental toxicology disciplines), environmental engineering (coursework in hydrology, environmental remediation, infrastructure, city planning), environmental policy (environmental law, etc.), social science (environmental justice, critical race theory, ethnic studies), and community-based participatory research. Each student is required to choose a track that aligns

with their interests and conduct a research project that intersects with community outreach. Students from different tracks can collaborate with each other on one research project. For example, students studying environmental microbiology can collaborate with environmental engineers to figure out how to implement environmental remediation strategies in a practical manner or larger scale. Additionally, students in the molecular biology track can collaborate with environmental policy students to learn how to accurately convey scientific information to policymakers and incorporate scientific evidence into Environmental Justice cases. All senior undergraduate students are required to take an interdisciplinary environmental studies seminar which requires each student to give a presentation pertaining to their track.

The proposed major would teach students about the collaborative nature of research which is integral to a successful research career and the importance of having a well-rounded knowledge base. Additionally, students would be able to work on topics that resonate with their personal interests and engage in real-world environmental solutions. Students would also learn practical knowledge that can be applied to large-scale dilemmas and learn how to think critically. This will increase their probability of obtaining a job post-graduation, as employers are highly interested in hiring individuals with experience “in the field.” It would also address the esoteric nature of scientific research because students would be required to make scientific knowledge palatable for the general public.