

Innovate to Mitigate

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This project is designing and conducting a crowd-sourced open innovation challenge to young people of ages 13-18 to mitigate levels of greenhouse gases. The goal of the project is to explore the extent to which the challenge will successfully attract, engage and motivate teen participants to conduct sustained and meaningful scientific inquiry across science, technology and engineering disciplines. Areas in which active cutting edge research on greenhouse gas mitigation is currently taking place include, among others, biology (photosynthesis, or biomimicry of photosynthesis to sequester carbon) and chemistry (silicon chemistry for photovoltaics, carbon chemistry for decarbonization of fossil fuels). Collaborating in teams of 2-5, participants engage with the basic science in these areas, and become skilled at applying scientific ideas, principles, and evidence to solve a design problem, while taking into account possible unanticipated effects. They refine their solutions based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

An interactive project website describes specifications for the challenge and provides rubrics to support rigor. It includes a library of relevant scientific resources, and, for inspiration, links to popular articles describing current cutting-edge scientific breakthroughs in mitigation. Graduate students recruited for their current work on mitigation projects provide online mentoring. Social networking tools are used to support teams and mentors in collaborative scientific problem-solving. If teams need help while working on their challenges, they are able to ask questions of a panel of expert scientists and engineers who are available online. At the end of the challenge, teams present and critique multimedia reports in a virtual conference, and the project provides awards for excellence.

The use of open innovation challenges for education provides a vision of a transformative setting for deep learning and creative innovation that at the same time addresses a problem of critical importance to society. Researchers study how this learning environment improves learning and engagement among participants. This approach transcends the informal/formal boundaries that currently exist, both in scientific and educational institutions, and findings are relevant to many areas of research and design in both formal and informal settings. Emerging evidence suggests that open innovation challenges are often successfully solved by participants who do not exhibit the kinds of knowledge, skill or disciplinary background one might expect. In addition, the greater the diversity of solvers is, the greater the innovativeness of challenge solutions tends to be. Therefore, it is expected that the free choice learning environment, the nature of the challenge, the incentives, and the support for collaboration will inspire the success of promising young participants from underserved student populations, as well as resulting in innovative solutions to the challenge given the diversity of teams.