

Earth Science Unit 3: Climate Change & Engineering

“Are you part of the problem or part of the solution?”

This multidisciplinary unit (Global Studies and Earth Science) investigates the current state of Earth systems in regards to climate change. In Earth Science, you will be designing and testing a prototype that aims to alleviate a specific problem related to weather patterns and projected climate trends of a certain location. In order to design, test and improve a prototype, you will need these *skills*:

- Creatively **brainstorm** ideas for a prototype
- **Collaborate** with a small team
- **Compromise** your ideas and come to a **consensus** as a small team
- Tactile workmanship to **create** a prototype
- **Test** out the prototype and **make** improvements
- **Use** statistics to **analyze** the data you collect from a prototype trial
- Public speaking to **present** your prototype to the class (the potential investors of your design)

In order to design, test and improve a prototype, you will need these *scientific understandings*:

- How the greenhouse effect works and the role of greenhouse gases
- The role that the sun plays on Earth systems
- The role that humans play on Earth systems, specifically greenhouse gases

In order to design, test and improve a prototype, you will need these *cultural understandings*:

- The specific impacts of climate change in regards to your location (problems)
- The specific constraints of your location (financial, geographical, access to materials, time to construct the prototype, ability to implement the prototype)
- Solutions that are actually feasible for your location

How I will get feedback on my learning in this unit:

Transferable Skill 4: Think Independently and Collaboratively

Skill	Beginning	Developing	Proficient	Advanced
Target for TS 4A: I demonstrate leadership, share roles and responsibilities, and proactively contribute when working collaboratively.	I can... -identify what effective teamwork looks and sounds like -participate with consistent reminders from adults/classmates	When given minor reminders from adults/classmates , I can... -contribute my own ideas to the group -participate in the task of my group	I can... -work well with others -complete an equitable share of the work -balance sharing my own ideas and listening to the ideas of others	I can... -facilitate small and large group interactions -build on others' ideas and/or help the group reach consensus while expressing my own ideas clearly and persuasively

How I will get feedback on my learning in this unit:

Science 4 and 5: Sustainability and Engineering

Target: I design, evaluate and refine a technological solution that will reduce the human impacts on Earth systems.

Content or Skill	Beginning	Developing	Proficient	Advanced
Sustainability 4E: I can assess the impact of the human activities on Earth systems.	When given a scenario and options, I match the human activity to its appropriate impact.	When choosing a scenario, I describe the human impacts on the Earth system(s).	When given a scenario, I explain the human impacts on Earth systems.	When given a scenario, I predict current and possible future human impacts on Earth systems.
Engineering 5C: I can construct a device or solve a design problem by appropriately applying scientific and mathematical knowledge.	I can identify the appropriate solution to a given problem.	I can design a unique solution to a given problem. OR I can evaluate the effectiveness of a given solution.	I can design, evaluate and refine a unique technological solution that is pertinent to a given problem.	I can assess my unique and long-term solution to the given problem while foreshadowing the impacts of my solution.

Transferable Skill 5: Critical Thinking

Skill	Beginning	Developing	Proficient	Advanced
Target for TS 5C: I can use a statistical tool to draw conclusions related to a set of data.	I recognize patterns in the data set. (Ex. increase, decrease)	I calculate a statistic from the data set. (Ex. average, difference)	I apply a set of statistics to the data set that is appropriate and yields meaningful numerical value(s). I can draw conclusions from the statistical analysis. (Ex. average difference and brief conclusion)	I predict which statistical analysis to use on a future set of data to yield meaningful value(s) or can make future projections based on the data. The conclusions I make are based in my statistical analysis and demonstrate future projections. (Ex. standard deviation and implications on the greenhouse effect)