Figure 2
Next Generation Science Standards

HS-ESS3 Earth and Human Activity
HS-ETS1 Engineering Design

Performance Expectation(s)
The chart below makes one set of connections between the instruction outlined in this article and the NGSS. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The activities outlined in this article are just one step toward reaching the performance expectations listed below.

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Dimension	Name and *NGSS* code/citation	Specific Connections to Classroom Activity
Science and Engineering Practices	**Constructing Explanations and Designing Solutions** ● Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. *(HS-ESS3-1)* ● Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. *(HS-ESS3-4) (HS-ETS1-2)* **Asking Questions and Defining Problems** ● Analyze complex real-world problems by specifying criteria and constraints for successful solutions. *(HS-ETS1-1)*	Students gather and analyze evidence from the water filter design challenge, class investigations, *A Long Walk to Water*, and scholarly sources in order to creatively synthesize their evidence-based responses to their compelling questions pertaining to global water and sanitation issues. Students critically evaluate and revise their evidence-based responses to their compelling questions based on teacher and external expert feedback. As part of students' evidence-based responses to their compelling questions, teams must advocate for taking action to make a meaningful and sustainable impact on their specified global water and sanitation issue.
Disciplinary Core Ideas	**ESS3.A: Natural Resources** ● Resource availability has guided the development of human society. *(HS-ESS3-1)* **ESS3.C: Human Impacts on Earth Systems** ● Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. *(HS-ESS3-4)* **ETS1.A: Defining and Delimiting Engineering Problems** ● Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These	With students' inquiry focusing on UN Sustainable Development Goal 6: Clean Water and Sanitation, teams develop compelling questions and provide evidence-based responses to issues centering on the intersections of sustainable development and access to water and sanitation. As part of building students' background knowledge as well as gathering and analyzing sources toward their inquiry response, teams will engage in a water filter design challenge with a focus on developing an effective, sustainable, and scalable filter using commonly available materials. Students develop an evidence-based response to a compelling question related to UN Sustainable Development Goal 6: Clean Water and Sanitation; the response must include supporting evidence from the water filter design challenge, class investigations, *A Long Walk to Water*, and

	global challenges also may have manifestations in local communities. *(HS-ETS1-1)* **ETS1.B: Developing Possible Solutions** ● When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. *(secondary HS-ESS3-4) (HS-ETS1-3)*	scholarly sources. Additionally, students will be addressing how stakeholders can take action to make a meaningful and sustainable impact on their specified global water and sanitation issue. They consider both global and local contexts of these issues. As part of the water filter design challenge and students' inquiry, teams must evaluate the viability of their design and their recommended actions for meaningful and sustainable impact in differing community contexts.
Crosscutting Concept(s)	**Cause and Effect** ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. *(HS-ESS3-1)*	Students gather and analyze sources, including evidence from the water filter design challenge, class investigations, *A Long Walk to Water*, and scholarly sources, to creatively synthesize claims and evidence in response to their compelling questions.