Connections to the standards.

Next Generation Science Standards (NGSS Lead States 2013)

Field Experiences: Conducting water quality and quantity field experiments, analyzing data, and presenting results to peers

HS-ESS2: Earth Systems

Performance Expectation

HS-ESS2-5: Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

Disciplinary Core Ideas

HS-ESS2.C: The Roles of Water in Earth's Surface Processes

The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store and release large amounts of energy, transit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting point of rocks.

Crosscutting Concepts

- **Cause and effect:** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects
- **Stability and Change:** Feedback (negative or positive) can stabilize or destabilize a system)

Science and Engineering Practices

- Planning and carrying out investigations
- Analyzing and interpreting data
- Engaging in argument from evidence

Water Resource Projects: Defining a water resource challenge, using evidence to design and evaluate solutions:

HS-ETS1: Engineering Design

Performance Expectations

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.

Disciplinary Core Ideas

- **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 global challenges also may have manifestations in local communities. (HS-ETS1-1)

Crosscutting Concept

- Systems and System Models: Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions…

Science and Engineering Practices

- Asking Questions and Defining Problems: Formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
- Constructing Explanations and Designing Solutions: Explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories; design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations; and evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Influence of Science, Engineering, and Technology on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology

HS-LS2 Ecosystems: Interactions, Energy, and Dynamics

Performance Expectations

HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Disciplinary Core Ideas

- **LS4.D: Biodiversity and Humans**

  Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.

Crosscutting Concepts

- Stability and Change: Much of science deals with constructing explanations of how things change and how they remain stable.

Science and Engineering Practices

- Constructing Explanations and Designing Solutions: explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories; design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations; and evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Common Core State Standards Alignment

Developing abstract and final product using evidence from data, technical reports, and scientific articles

Writing

- **CC 6-12.W.5:** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- **CC 6-12.W.8:** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Presenting final product to peers and community partners and engaging in a ten minute discussion with community partners

Speaking and Listening

- **CC 9-12.SL.5:** Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
- **CC 11-12.SL 1c:** Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
- **CC 11-12.SL.4:** Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.

Reading Informational Text

- **CC 6.11-12.RI.7:** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Science and Technical Subjects

- **CC 11-12. RST.1:** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- **CC 11-12. RST.8:** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- **CC 11-12. RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.