The 5E instructional model was used to develop a sequence of activities designed to build on students’ knowledge to enable them to prepare for the following high school performance expectations for life science, earth science and/or engineering design. This unit, if successfully completed, integrates multiple science and engineering practices, disciplinary core ideas, and cross cutting concepts. For more information see the National Research Council’s report *A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas.*

<table>
<thead>
<tr>
<th>NGSS Performance Expectations</th>
<th>Disciplinary Core Ideas</th>
<th>Science and Engineering Practices</th>
<th>Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Life Science</strong></td>
<td><strong>Life Science</strong></td>
<td><strong>Exploring the Links Between the Living World And the Physical World</strong></td>
<td><strong>Patterns</strong></td>
</tr>
<tr>
<td>HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</td>
<td>From Molecules To Organisms: Structures And Processes (Ls1)</td>
<td>Analyzing and interpreting data</td>
<td>Cause and Effect</td>
</tr>
<tr>
<td>HS-LS4-6. Create or revise a simulation to test solutions for mitigating adverse impacts of human activity on biodiversity.</td>
<td>Ls1.A: Structure And Function</td>
<td>Asking questions and defining problems</td>
<td>Scale, proportion and quantity</td>
</tr>
<tr>
<td>Earth Science</td>
<td>Ecosystems: Interactions, Energy, And Dynamics (Ls2)</td>
<td>Constructing explanations</td>
<td>Stability and change</td>
</tr>
<tr>
<td>HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth’s surface can create feedbacks that cause changes to other Earth systems.</td>
<td>Ls2a: Interdependent Relationships In Ecosystems</td>
<td>Using mathematics and computational thinking</td>
<td>Structure and Function</td>
</tr>
<tr>
<td>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.</td>
<td>Ls2.B: Cycles Of Matter And Energy Transfer In Ecosystems</td>
<td><strong>Engage</strong></td>
<td><strong>Patterns</strong></td>
</tr>
<tr>
<td>HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.</td>
<td>Ls2.C : Ecosystem Dynamics, Functioning, And Resilience</td>
<td><strong>Explore</strong></td>
<td><strong>Cause and Effect</strong></td>
</tr>
<tr>
<td>Engineering Design</td>
<td><strong>LS3: Heredity: Inheritance And Variation Of Traits (Ls3)</strong></td>
<td>Asking questions and defining problems</td>
<td>Scale, proportion and quantity</td>
</tr>
<tr>
<td>HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for</td>
<td>Ls3.B: Variation Of Traits</td>
<td>Constructing explanations</td>
<td>Stability and change</td>
</tr>
<tr>
<td></td>
<td>Biological Evolution: Unity And Diversity (Ls4)</td>
<td>Developing and using models</td>
<td>Structure and Function</td>
</tr>
<tr>
<td></td>
<td>Ls4.B: Natural Selection</td>
<td>Obtaining, evaluating, and communicating information</td>
<td>Systems and System Models</td>
</tr>
<tr>
<td></td>
<td>Ls4.C: Adaptation</td>
<td><strong>Explain</strong></td>
<td><strong>Patterns</strong></td>
</tr>
</tbody>
</table>
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.

HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

**Earth And Space Science**

**Earth's Systems (Ess2)**
- Ess2.A: Earth Materials And Systems
- Ess2.C: The Roles Of Water In Earth’s Surface Processes
- Ess2.D: Weather And Climate
- Ess2.E: Biogeology

**Earth And Human Activity (Ess3)**
- Ess3.A: Natural Resources
- Ess3.B: Natural Hazards
- Ess3.C: Human Impacts On Earth Systems
- Ess3.D: Global Climate Change

**Extend**

Constructing explanations (for science) and designing solutions (for engineering)
Engaging in argument from evidence
Obtaining, evaluating, and communicating information

**Evaluate**

Asking questions (for science) and defining problems (for engineering)
Constructing explanations (for science) and designing solutions (for engineering)
Engaging in argument from evidence
Obtaining, evaluating, and communicating information
Planning and Carrying Out Investigations
Using mathematics and computational thinking

**Cause and Effect**

Scale, proportion and quantity
Stability and change
Structure and Function
Systems and System Models

**Patterns**

Cause and Effect
Scale, proportion and quantity
Stability and change
Structure and Function
Systems and Model