



## Grades 9–12

### 3.4.9-12.H Environmental Literacy and Sustainability: Sustainability and Stewardship

**Students who demonstrate understanding can** *design and evaluate solutions in which individuals and societies can promote stewardship in environmental quality and community well-being.*

**Clarifying Statement:** Examples of design solutions could include theoretical or tangible plans, as well as implementing project actions.

**Assessment Boundary:** N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. <ul style="list-style-type: none"> <li>Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.</li> </ul>	<b>Human Impacts on Earth Systems</b> <ul style="list-style-type: none"> <li>The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources.</li> </ul> <b>Developing Possible Solutions</b> <ul style="list-style-type: none"> <li>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.</li> </ul>	<b>Connections to Nature of Science</b> <b>Science Addresses Questions About the Natural and Material World</b> <ul style="list-style-type: none"> <li>Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge.</li> <li>Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues.</li> </ul>

**Pennsylvania Context:** Examples of Pennsylvania context include but are not limited to Environmental Justice Area designations, Environmental Health Indicators, local nature centers, Pennsylvania Conservation Districts, and science museums and centers.

**PA Career Ready Skills:** Explain how you situate yourself in a diverse community.

### Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
<b>Agriculture (AFNR)</b>	CS.04.01.01.c: Devise strategies for stewarding natural resources at home and within community.
<b>Science, Environmental Literacy and Sustainability (NAAEE)</b>	9-12 Strand 3.1.A. Identifying and investigating issues: Learners apply their research and analytical skills to systematically investigate environmental issues ranging from local issues to those that are regional or global in scope.



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
<b>PA Core Standards: ELA</b>	<p>CC.3.5.9-12.A: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>CC.3.5.11-12.A: 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.</p> <p>CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p>CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research.</p>
<b>PA Core Standards and Practices: Math</b>	<p>MP.2: Reason abstractly and quantitatively.</p> <p>MP.4: Model with mathematics.</p> <p>CC.2.1.HS.F.3: Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data display.</p> <p>CC.2.1.HS.F.4: Use units as a way to understand problems and to guide the solution of multistep problems.</p> <p>CC.2.1.HS.F.5: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p>
<b>PA Standards: Social Studies</b>	<p>6.1.9.B: Identify the origin of resources and analyze the impact on the production of goods and services. Analyze how unlimited wants and limited resources affect decision making.</p>
<b>Educational Technology (ISTE)</b>	<p>1.4. Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.</p>
<b>Technology and Engineering (ITEEA)</b>	<p>STEL-7Z: Apply principles of human-centered design.</p>