



Grades 9–12

3.4.9-12.B Environmental Literacy and Sustainability: Agricultural and Environmental Systems and Resources

Students who demonstrate understanding can apply research and analytical skills to evaluate the conditions and motivations that lead to conflict, cooperation, and change among individuals, groups, and nations.

Clarifying Statement: Emphasis is on the effects of agriculture and natural resource availability, quality, control, and utilization.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<p>Obtaining, Evaluating, and Communicating Information</p> <p>Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.</p> <ul style="list-style-type: none"> Gather, read, and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source. 	<p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none"> A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. <p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> Resource availability has guided the development of human society. <p>ESS3.C: Human Impacts on Earth Systems</p> <ul style="list-style-type: none"> The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. 	<p style="text-align: center;">Connections to Nature of Science</p> <p>Science Addresses Questions About the Natural and Material World</p> <ul style="list-style-type: none"> Not all questions can be answered by science. 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. Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues.

Pennsylvania Context: N/A

PA Career Ready Skills: Evaluate a situation to identify skills and strategies to prevent and resolve conflicts.



Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.02.02.02.b: Assess how people within societies on local, state, national and global levels interact with AFNR systems on daily, monthly or yearly basis.
Science, Environmental Literacy and Sustainability (NAAEE)	9-12 Strand 3.1.D. Working with flexibility, creativity, and openness: Learners engage each other in evidence-based peer review and work collaboratively and cooperatively in the spirit of open deliberation, especially in contexts that bring to the surface deeply held priorities and values.
PA Core Standards: ELA	<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> <p>CC.1.5.11-12.D: Present information, findings, and supporting evidence, conveying a clear and distinct perspective; organization, development, substance, and style are appropriate to purpose, audience, and task.</p>
PA Core Standards and Practices: Math	<p>MP.2: Reason abstractly and quantitatively.</p> <p>MP.4: Model with mathematics.</p> <p>CC.2.4.HS.B.2: Summarize, represent, and interpret data on two categorical and quantitative variables.</p> <p>CC.2.4.HS.B.4: Recognize and evaluate random processes underlying statistical experiments.</p> <p>CC.2.4.HS.B.5: Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.</p>
PA Standards: Social Studies	<p>6.1.9.D: Explain how incentives cause people to change their behavior in predictable ways.</p> <p>5.1.W.B: Analyze how conflict and cooperation among groups and organizations have influenced the history and development of the world. (Reference History Standards 8.3.9.D.)</p>
Educational Technology (ISTE)	1.3. Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
Technology and Engineering (ITEEA)	STEL-6H: Evaluate how technology has been a powerful force in reshaping social, cultural, political, and economic landscapes throughout history.