



## 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)
<b>Obtaining, Evaluating, and Communicating Information</b> 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. <ul style="list-style-type: none"> <li>Gather, read, and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source.</li> </ul>	<b>Ecosystem Dynamics, Functioning, and Resilience</b> <ul style="list-style-type: none"> <li>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.</li> </ul> <b>Natural Resources</b> <ul style="list-style-type: none"> <li>Resource availability has guided the development of human society.</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>Connections to Nature of Science</b> <b>Science Addresses Questions About the Natural and Material World</b> <ul style="list-style-type: none"> <li>Not all questions can be answered by science.</li> <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:** 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)
<b>Agriculture (AFNR)</b>	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.
<b>Science, Environmental Literacy and Sustainability (NAAEE)</b>	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.
<b>PA Core Standards: ELA</b>	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. 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. CC.3.6.9-12.B: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. CC.3.6.9-12.H: Draw evidence from informational texts to support analysis, reflection, and research. 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.
<b>PA Core Standards and Practices: Math</b>	MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. CC.2.4.HS.B.2: Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.4: Recognize and evaluate random processes underlying statistical experiments. CC.2.4.HS.B.5: Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.
<b>PA Standards: Social Studies</b>	6.1.9.D: Explain how incentives cause people to change their behavior in predictable ways. 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.)
<b>Educational Technology (ISTE)</b>	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.
<b>Technology and Engineering (ITEEA)</b>	STEL-6H: Evaluate how technology has been a powerful force in reshaping social, cultural, political, and economic landscapes throughout history.