



Grades 9–12

3.4.9-12.I Environmental Literacy and Sustainability: Sustainability and Stewardship

Students who demonstrate understanding can *analyze and interpret data on a regional environmental condition and its implications on environmental justice and social equity.*

Clarifying Statement: Emphasis is on formulating a conclusion supported by data. Interpretation could be constructed using primary and secondary sources. Examples include both current and historical conditions due to systemic inequalities, including but not limited to human health impacted by Superfund sites, air quality, urban heat islands, acid mine drainage, access to green space, and water quality.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Engaging in Argument From Evidence Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed worlds. Arguments may also come from current scientific or historical episodes in science. <ul style="list-style-type: none"> Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. 	Ecosystem Dynamics, Functioning, and Resilience <ul style="list-style-type: none"> Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. Human Impacts on Earth Systems <ul style="list-style-type: none"> The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. 	Cause and Effect <ul style="list-style-type: none"> Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. <hr/> Connections to Nature of Science Science Addresses Questions About the Natural and Material World <ul style="list-style-type: none"> 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.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to Environmental Justice Area designations and Environmental Health Indicators.

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)
Agriculture (AFNR)	CS.01.01.01.b: Analyze and summarize AFNR issues and their impact on local, state, national and global levels.
Science, Environmental Literacy and Sustainability (NAAEE)	9-12 Strand 1.E. Organizing and analyzing information: Learners organize, analyze, and display data and information from their environmental investigations for a variety of audiences and purposes.



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
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>
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	7.4.12.B: Analyze the global effects of human activity on the physical systems.
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-4P: Evaluate ways that technology can impact individuals, society, and the environment.