



Grades 6–8

3.4.6-8.C Environmental Literacy and Sustainability: Agricultural and Environmental Systems and Resources

Students who demonstrate understanding can *develop a model to describe how watersheds and wetlands function as systems, including the roles and functions they serve.*

Clarifying Statement: Examples of models could include pictorial (2D), abstract, concrete (3D), and computer-simulated models.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. <ul style="list-style-type: none"> Develop a model to predict and/or describe phenomena. 	Interdependent Relationships in Ecosystems <ul style="list-style-type: none"> Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. Ecosystem Dynamics, Functioning, and Resilience <ul style="list-style-type: none"> Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. The Roles of Water in Earth's Surface Processes <ul style="list-style-type: none"> Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. 	Systems and System Models <ul style="list-style-type: none"> Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. Structure and Function <ul style="list-style-type: none"> Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to Pennsylvania waterways, watersheds, stormwater runoff, erosion, sediment, nutrient load, flooding, and wetlands.

PA Career Ready Skills: Analyze various perspectives on a situation.



Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.06.01.01.a: Research and explain the foundational cycles in AFNR (e.g., water cycle, nutrient cycle, carbon cycle, etc.).
Science, Environmental Literacy and Sustainability (NAAEE)	5-8 Strand 1.F. Working with models and simulations: Learners use models to analyze information that support their environmental investigations. They explain the purposes and limitations of these models. 5-8 Strand 2.1.A. Earth's physical systems: Learners describe the physical processes that shape Earth, including weather, climate, plate tectonics, and the hydrologic cycle. They explain how matter cycles and energy flows among the abiotic and biotic components of the environment. They describe how humans affect and are affected by Earth's physical systems.
PA Core Standards: ELA	CC.3.5.6-8.G: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
PA Core Standards and Practices: Math	MP.2: Reason abstractly and quantitatively. CC.2.4.7.B.3: Investigate chance processes and develop, use, and evaluate probability models. CC.2.4.7.B.1: Draw inferences about populations based on random sampling concepts.
PA Standards: Social Studies	7.4.7.A: Describe and explain the effects of the physical systems on people within regions.
Educational Technology (ISTE)	1.6. Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
Technology and Engineering (ITEEA)	STEL-2N: Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used.