Grades 6–8

3.3.6-8.M Earth and Space Science: Human Impacts

Students who demonstrate understanding can *apply scientific principles to design a method for monitoring and minimizing human impact on the environment.*

Clarifying Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. • Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system.	**Human Impacts on Earth Systems** • Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. • Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.	**Cause and Effect** • Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** • The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to design methods for monitoring and maximizing the sustainable use of agricultural soils, collecting data from streams related to human impact on water, and methods for minimizing the impact of land use.

PA Career Ready Skills: Identify and select coping skills relevant to adverse situations.

Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.04.01.01.c: Devise strategies for stewarding natural resources at home and within community.
Science, Environmental Literacy and Sustainability (NAAEE)	5-8 Strand 2.3.A. Human-environment interactions: Learners describe human-caused changes that affect the immediate environment as well as other places, other people, and future times. 5-8 Strand 3.1.C. Identifying and critiquing alternative solutions and courses of action: Learners identify and develop action strategies, including design solutions, appropriate for addressing a range of environmental issues at community and regional levels. They describe how their action strategies and design solutions might impact environmental quality and other people now and in the future.
PA Core Standards: ELA	CC.3.6.6-8.F: Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. CC.3.6.6-8.G: Gather relevant information from multiple print and digital resources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of other while avoiding plagiarism and following a standard format for citation.
PA Core Standards and Practices: Math	CC.2.1.6.D.1: Understand ratio concepts and use ratio reasoning to solve problems. CC.2.1.7.D.1: Analyze proportional relationships and use them to model and solve real-world and mathematical problems.
PA Standards: Social Studies	7.4.6.B: Describe and explain the effects of people on the physical systems within regions.
Educational Technology (ISTE)	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.
Technology and Engineering (ITEEA)	STEL-4M. Devise strategies for reducing, reusing, and recycling waste caused from the creation and use of technology. STEL-7U: Evaluate the strengths and weaknesses of different design solutions.