Grades 6–8

3.5.6-8.II Technology and Engineering: Nature and Characteristics of Technology and Engineering

Students who demonstrate understanding can *predict outcomes of a future product or system at the beginning of the design process.*

Clarifying Statement: Careful designers consider possible outcomes of a technological product before the product is completed. This is a habit of mind that students should continually expand through design, problem solving, ideation, and systems thinking.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
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. Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena.	**Optimizing the Design Solution** • The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately an optimal solution.	**Making and Doing** • Exhibits safe, effective ways of producing technological products, systems, and processes. **Systems Thinking** • Uses the systems model to show how parts of technological systems work together.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to the environmental impact of Pennsylvania's sources of energy, such as wind, fossil, and hydroelectric power.

Pennsylvania Career Ready Skills: Make a decision based upon anticipated consequences.

Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
PA Core Standards: Reading and Writing in Science and Technical Areas	CC.1.2.3.G: Use information gained from text features to demonstrate understanding of a text. CC.1.2.4.G: Interpret various presentations of information within a text or digital source and explain how the information contributes to an understanding of text in which it appears. CC.1.2.5.G: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. CC.1.4.3.V: Conduct short research projects that build knowledge about a topic. CC.1.4.4.V: Conduct short research projects that build knowledge through investigation of different aspects of a topic. CC.1.4.5.V: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. CC.1.4.3.W: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. CC.1.4.4.W: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. CC.1.4.5.W: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
PA Core Standards and Practices: Math	MP.3: Construct viable arguments and critique the reasoning of others. MP.7: Look for and make use of structure.
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K–12	N/A