Grades 6–8

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

Students who demonstrate understanding can *apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.*

Clarifying Statement: Design and problem -solving are seen as iterative processes that involve idea generating, making or building possible solutions, testing, and redesign. Creative problem-solving allows for new insights that lead to improvements such as greater efficiency, better performance, lower environmental impacts, and so on. For example, students learning about aerodynamics might devise modifications to a model rocket design to make it more streamlined and accurate.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
Asking Questions and Defining Problems Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. • Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.	**ETS1.C: 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. **Optimism** • Critiques technological products and systems to identify areas of improvement.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to manufacturing businesses and industries.

Pennsylvania Career Ready Skills: Identify and evaluate distractors that impact reaching ones' goals.

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	N/A
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K–12	N/A