Grades 9–12

3.5.9-12.CC Technology and Engineering: Integration of Knowledge, Technologies, and Practices

Students who demonstrate understanding can *analyze how technology transfer occurs when a user applies an existing innovation developed for one function for a different purpose.*

Clarifying Statement: For example, aerospace composite materials were used to design an advanced, lightweight, and easy-to-maneuver wheelchair. Similarly, memory foam was originally invented as a means of improving safety in aircraft seating. Students can engage in passive research related to this standard as well as actively engaging in it through tasks such as conducting strength testing with novel building materials.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
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 the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Make and defend a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge and student-generated evidence.	**HS-PS3-3** • Design, build, and refine a device that works within given constraints to convert on form of energy into another form of energy. **NAEP T.12.4** • Analyze cultural, social, economic, or political changes (separately or together) that may be triggered by the transfer of a specific technology from one society to another. Include both anticipated and unanticipated effects.	**Critical Thinking** • Uses evidence to better understand and solve problems in technology and engineering including applying computational thinking.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to Pennsylvania's inventors and inventions.

Pennsylvania Career Ready Skills: Evaluate behaviors in relation to the impact on self and others.

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.
PA Core Standards: Reading and Writing in Science and Technical Areas (continued)	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	3.2.9-12.Q: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.