Grades 9–12

3.5.9-12.R Technology and Engineering: Design Thinking in Technology and Engineering Education

Students who demonstrate understanding can *use a design thinking process to design an appropriate technology for use in a different culture.*

Clarifying Statement: High school students can benefit from examining relationships to technology in other cultures, such as the access (or lack of access) to technologies in specific cultures. For example, people in many locations around the world lack ready access to clean water. Strategies to address this problem will vary according to the resources and circumstances of a given location.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	**Interaction of Technology and Humans** • The decision to develop a new technology is influenced by societal opinions and demands. These driving forces differ from culture to culture.	**Making and Doing** • Demonstrates the ability to regulate and improve making and doing skills. **Attention to Ethics** • Assess technological products, systems, and processes through critical analysis of their impacts and outcomes.

Pennsylvania Context: Examples of Pennsylvania context include but are not limited to Pennsylvania's academic and research institutions.

Pennsylvania Career Ready Skills: Explain how you situate yourself in a diverse community.

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	MP.5: Use appropriate tools strategically.
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K–12	N/A