Grades 6–8

3.5.6-8.R Technology and Engineering: Design Thinking in Technology and Engineering Education

Students who demonstrate understanding can *develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.*

Clarifying Statement: For example, the news is full of stories about young innovators such as Marie Elena Grimmett, who at age 14 developed a system for using recyclable plastic beads to filter out a harmful antibiotic used to treat livestock and commonly found in water supplies in rural areas. This development process entails the important step of problem finding, which often results from needs or wants that students have identified in their own lives or the lives of family members.

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 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. • Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.	**Developing Possible Solutions** • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. • Models of all kinds are important for testing solutions. • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.	**Making and Doing** • Exhibits safe, effective ways of producing technological products, systems, and processes.

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

Pennsylvania Career Ready Skills: Interact with others demonstrating respect, cooperation, and acceptance.

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	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.1: Make sense of problems and persevere in solving them.
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K–12	N/A