



**Grades 9–12**

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

**Students who demonstrate understanding can safely apply an appropriate range of making skills to a design thinking process.**

**Clarifying Statement:** Students independently identify and safely use appropriate tools and processes to complete a design making task. Students recognize their own knowledge and skill gaps, pursue opportunities to develop necessary skills, and become more confident and competent in making.

**Assessment Boundary:** N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
<p><b>Constructing Explanations and Designing Solutions</b></p> <p>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.</p> <ul style="list-style-type: none"> <li>Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.</li> </ul>	<p><b>ETS1.B: Developing Possible Solutions</b></p> <ul style="list-style-type: none"> <li>Both physical models and computers can be used in various ways to aid in the engineering design process.</li> </ul> <p><b>ISTE 4C</b></p> <ul style="list-style-type: none"> <li>Students develop, test and refine prototypes as part of a cyclical design process.</li> </ul>	<p><b>Making and Doing</b></p> <ul style="list-style-type: none"> <li>Demonstrates the ability to regulate and improve making and doing skills.</li> </ul>

**Pennsylvania Context:** N/A

**Pennsylvania Career Ready Skills:** Establish pro-social relationships to support self and others.

**Connections to Other Standards Content and Practices**



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
<p><b>PA Core Standards: Reading and Writing in Science and Technical Areas</b></p>	<p>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.</p>
<p><b>PA Core Standards and Practices: Math</b></p>	<p>MP.1: Make sense of problems and persevere in solving them.                      MP.5: Use appropriate tools strategically.</p>
<p><b>Integrated Standards for Science, Environment &amp; Ecology, and Technology &amp; Engineering Standards Grades K–12</b></p>	<p>N/A</p>