



**Grades 9–12**

**3.5.9-12.Y (ETS) Technology and Engineering:** Design Thinking in Technology & Engineering Education

**Students who demonstrate understanding can** *design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.*

**Clarifying Statement:** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed.

**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>Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations.</li> </ul>	<p><b>ETS1.C: Optimizing the Design Solution</b></p> <ul style="list-style-type: none"> <li>Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed.</li> </ul>	<p><b>Systems Thinking</b></p> <ul style="list-style-type: none"> <li>Designs and troubleshoots technological systems in ways that consider the multiple components of the system.</li> </ul> <p><b>Making &amp; 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 and pursue goals or post-secondary education, employment, and living within the 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	N/A
PA Core Standards and Practices: Math	MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics.



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K-12	N/A