**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)

#### 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 a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations.

### Disciplinary Core Ideas (DCI)

#### ETS1.C: Optimizing the Design Solution

- 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.

### Technology and Engineering Practices (TEP)

#### Systems Thinking

- Designs and troubleshoots technological systems in ways that consider the multiple components of the system.

#### Making & Doing

- Demonstrates the ability to regulate and improve making and doing skills.

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**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

<table>
<thead>
<tr>
<th>Standard Source</th>
<th>Possible Connections to Other Standard(s) or Practice(s)</th>
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<tbody>
<tr>
<td><strong>PA Core Standards: Reading and Writing in Science and Technical Areas</strong></td>
<td>N/A</td>
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| **PA Core Standards and Practices: Math** | MP.2: Reason abstractly and quantitatively.  
  MP.4: Model with mathematics. |
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<td>Integrated Standards for Science, Environment &amp; Ecology, and Technology &amp; Engineering Standards Grades K–12</td>
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