



**Grades 9–12**

**3.5.9-12.HH Technology and Engineering:** Nature and Characteristics of Technology and Engineering

**Students who demonstrate understanding can** *analyze how the Industrial Revolution resulted in the development of mass production, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.*

**Clarifying Statement:** Major developments of this period included the continuous-process flour mill, power loom and pattern-weaving loom, steam engine, electric motor, gasoline and diesel engines, vulcanized rubber, airplane, telegraph, telephone, radio, and television. The concepts of Eli Whitney’s interchangeable parts and Henry Ford’s movable conveyor added to advances in the production of goods. Extended free time was possible for some people as a result of increased efficiency and updated labor laws, and eventually led to more widespread access to education.

**Assessment Boundary:** N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
<p><b>Obtaining, Evaluating, and Communicating Information</b></p> <p>Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.</p> <ul style="list-style-type: none"> <li>Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</li> </ul>	<p><b>NAEP T.12.2</b></p> <ul style="list-style-type: none"> <li>Changes caused by the introduction and use of a new technology can range from gradual to rapid and from subtle to obvious, and can change over time. These changes may vary from society to society as a result of differences in a society’s economy, politics, and culture.</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>

**Pennsylvania Context:** Examples of Pennsylvania context include but are not limited to Pennsylvania’s coal, oil, and natural gas industries.

**Pennsylvania Career Ready Skills:** Evaluate how societal conventions may influence the perspectives of individuals.

**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.</p>
<p><b>PA Core Standards: Reading and Writing in Science and Technical Areas (continued)</b></p>	<p>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.2: Reason abstractly and quantitatively.</p>
<p><b>Integrated Standards for Science, Environment &amp; Ecology, and Technology &amp; Engineering Standards Grades K–12</b></p>	<p>3.3.9-12.O: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.</p>