



SOUTHERN LEHIGH SCHOOL DISTRICT
 5775 Main Street
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Scope and Sequence for **Grade 6 STEM**

The Nature of Technology

National Standards for Technological Literacy	PA Standards for Science and Technology and Engineering Education
<p>1. The characteristics and scope of technology. 3-5.C Things that are found in nature differ from things that are human-made in how they are produced and used. 3-5.D Tools, materials, and skills are used to make things and carry out tasks. 3-5.E Creative thinking and economic and cultural influences shape technological development. 6-8.H Technology is closely linked to creativity, which has resulted in innovation.</p>	<p>1. Characteristics of Technology 3.4.6.A1 Identify how creative thinking and economic and cultural influences shape technological development.</p>
<p>2. The core concepts of technology. 3-5.H Resources are the things needed to get a job done, such as tools and machines, materials, information, energy, people, capital, and time. 3-5.L Requirements are the limits to designing or making a product or system. 6-8.T Different technologies involve different sets of processes.</p>	<p>2. Core Concepts of Technology 3.4.6.A2 Describe how systems thinking involves considering how every part relates to other.</p>
<p>3. The relationships among technologies and the connections between technology and other fields. 6-8.D Technological systems often interact with one another. 6-8.E A product, system, or environment developed for one setting may be applied to another setting.</p>	<p>3. Technology Connections 3.4.6.A3 Explain how knowledge from other fields of study (STEM) integrate to create new technologies.</p>

Technology and Society

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<p>4. The cultural, social, economic, and political effects of technology. 6-8.D The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology’s development and use. 6-8.F The development and use of technology poses ethical issues.</p>	<p>1. Effects of Technology 3.4.6.B1 Describe how economic, political, and cultural issues are influenced by the development and use of technology.</p>
<p>5. The effects of technology on the environment. 3-5.B Waste must be appropriately recycled or disposed of to prevent unnecessary harm to the environment. 6-8.D The management of waste produced by technological systems is an important societal issue.</p>	<p>2. Technology and Environment 3.4.6.B2 Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems.</p>
<p>7. The Influence of technology on history. 6-8.C Many inventions and innovations have evolved using slow and methodical processes of tests and refinements.</p>	<p>4. Technology and History 3.4.6.B4 Demonstrate how new technologies are developed based on people’s needs, wants, values, and/or interests.</p>

Design

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<p>8. The attributes of design.</p> <p>3-5.C The design process is a purposeful method of planning practical solutions to problems.</p> <p>3-5.D Requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design.</p> <p>6-8.E Design is a creative planning process that leads to useful products and systems.</p> <p>6-8.F There is no perfect design.</p> <p>6-8.G Requirements for design are made up of criteria and constraints.</p>	<p>1. Design Attributes</p> <p>3.4.6.C1 Recognize that requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design.</p>
<p>9. Engineering design.</p> <p>3-5.C The engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating it, and presenting the results.</p> <p>3-5.D When designing an object, it is important to be creative and consider all ideas.</p> <p>3-5.E Models are used to communicate and test design ideas and processes.</p> <p>6-8.F Design involves a set of steps, which can be performed in different sequences and repeated as needed.</p> <p>6-8.G Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.</p> <p>6-8.H Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.</p>	<p>2. Engineering Design</p> <p>3.4.6.C2 Show how models are used to communicate and test design ideas and processes.</p>
<p>10. The role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.</p> <p>3-5.C Troubleshooting is a way of finding out why something does not work so that it can be fixed.</p> <p>3-5.D Invention and innovation are creative ways to turn ideas into real things.</p> <p>6-8.G Invention is a process of turning ideas and imagination into devices and systems. Innovation is the process of modifying an existing product or system to improve it.</p> <p>6-8.H Some technological problems are best solved through experimentation.</p>	<p>3. Research & Development, Invention & Innovation, Experimentation / Problem Solving and Troubleshooting</p> <p>3.4.6.C3 Explain why some technological problems are best solved through experimentation.</p>

Abilities for a Technological World

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<p>11. Apply the design process.</p> <p>3-5.D Identify and collect information about everyday problems that can be solved by technology, and generate ideas and requirements for solving a problem.</p> <p>3-5.E The process of designing involves presenting some possible solutions in visual form and then selecting the best solution(s) from many.</p> <p>3-5.F Test and evaluate the solutions for the design problem.</p> <p>3-5.G Improve the design solutions.</p> <p>6-8.H Apply a design process to solve problems in and beyond the laboratory-classroom.</p> <p>6-8.I Specify criteria and constraints for the design.</p> <p>6-8.J Make two-dimensional and three-dimensional representations of the designed solution.</p> <p>6-8.K Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.</p>	<p>1. Applying the Design Process</p> <p>3.4.6.D1 Apply a design process to solve problems beyond the laboratory classroom.</p>
<p>12. Use and maintain technological products and systems.</p> <p>3-5.E Select and safely use tools, products, and systems for specific tasks.</p> <p>3-5.F Use computers to access and organize information</p> <p>6-8.H Use information provided in manuals, protocols, or by experienced people to see and understand how things work.</p> <p>6-8.J Use computers and calculators in various applications.</p>	<p>2. Using and Maintaining Technological Systems</p> <p>3.4.6.D2 Use computers appropriately to access and organize and apply information.</p>

The Designed World

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<p>17. Information and communication technologies. 3-5.G Letters, characters, icons, and signs are symbols that represent ideas, quantities, elements, and operations. 6-8.K The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas.</p>	<p>4. Information and Communication Technologies 3.4.6.E4 Illustrate how communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination. Examine how communications information technologies are used to help humans make decisions and solve problems.</p>
<p>19. Select and use manufacturing technologies 6.8.H The manufacturing process includes the designed, development, making, and servicing of products and systems.</p>	<p>6. Manufacturing Technologies 3.4.6.E6 Identify key aspects of manufacturing systems that use mechanical processes to change the form of natural materials (e.g., separating, forming, combing, conditioning).</p>
<p>20. Select and use construction technologies 6-8.F The selection of designs for structures is based on factors such as building laws and codes, style, convenience, cost, climate, and function. 6-8.G Structures rest on a foundation. 6-8.H Some structures are temporary, while others are permanent.</p>	<p>7. Construction Technologies 3.4.6.E7 Explain how the type of structure determines the way the parts are put together.</p>