

<b>Grade Band</b>	<b>International Technology and Engineering Educators (ITEEA) Standards for Technological and Engineering Literacy (STEL) Benchmarks</b>
<b>STEL 1 Nature and Characteristics of Technology and Engineering</b>	
<b>Pre-K-2</b>	<b>1A.</b> Compare the natural world and human-made world.
<b>Pre-K-2</b>	<b>1B.</b> Explain the tools and techniques that people use to help them do things.
<b>Pre-K-2</b>	<b>1C.</b> Demonstrate that creating can be done by anyone.
<b>Pre-K-2</b>	<b>1D.</b> Discuss the roles of scientists, engineers, technologists, and others who work with technology.
<b>3-5</b>	<b>1E</b> Compare how things found in nature differ from things that are human made, noting differences and similarities in how they are produced and used.
<b>3-5</b>	<b>1F.</b> Describe the unique relationship between science and technology, and how the natural world can contribute to the human-made world to foster innovation.
<b>3-5</b>	<b>1G.</b> Differentiate between the role of scientists, engineers, technologists, and others in creating and maintaining technological systems.
<b>3-5</b>	<b>1H.</b> Design solutions by safely using tools, materials, and skills.
<b>3-5</b>	<b>1I.</b> Explain how solutions to problems are shaped by economic, political, and cultural forces.
<b>6-8</b>	<b>1J.</b> Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.
<b>6-8</b>	<b>1K.</b> Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems.
<b>6-8</b>	<b>1L.</b> Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations.

<b>6-8</b>	<b>1M.</b> Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.
<b>9-12</b>	<b>1N.</b> Explain how the world around them guides technological development and engineering design.
<b>9-12</b>	<b>1O.</b> Assess how similarities and differences among scientific, mathematics, engineering, and technological knowledge and skills contributed to the design of a product or system.
<b>9-12</b>	<b>1P.</b> Analyze the rate of technological development and predict future diffusion and adoption of new technologies.
<b>9-12</b>	<b>1Q.</b> Conduct research to inform intentional inventions and innovations that address specific needs and wants.
<b>9-12</b>	<b>1R.</b> Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system.

### STEL 2 Core Concepts of Technology and Engineering

<b>Pre-K-2</b>	<b>2A.</b> Illustrate how systems have parts or components that work together to accomplish a goal.
<b>Pre-K-2</b>	<b>2B.</b> Safely use tools to complete tasks.
<b>Pre-K-2</b>	<b>2C.</b> Explain that materials are selected for use because they possess desirable properties and characteristics.
<b>Pre-K-2</b>	<b>2D.</b> Develop a plan to complete a task.
<b>Pre-K-2</b>	<b>2E.</b> Collaborate effectively as a member of a team.
<b>3-5</b>	<b>2F.</b> Describe how a subsystem is a system that operates as a part of another, larger system.
<b>3-5</b>	<b>2G.</b> Illustrate how, when parts of a system are missing, it may not work as planned.
<b>3-5</b>	<b>2H.</b> Identify the resources needed to get a technical job done, such as people, materials, capital, tools, machines, knowledge, energy, and time.
<b>3-5</b>	<b>2I.</b> Describe the properties of different materials.

<b>3-5</b>	<b>2J.</b> Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing.
<b>3-5</b>	<b>2K.</b> Describe requirements of designing or making a product or system.
<b>3-5</b>	<b>2L.</b> Create a new product that improves someone's life.
<b>6-8</b>	<b>2M.</b> Differentiate between inputs, processes, outputs, and feedback in technological systems.
<b>6-8</b>	<b>2N.</b> Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used.
<b>6-8</b>	<b>2O.</b> Create an open-loop system that has no feedback path and requires human intervention.
<b>6-8</b>	<b>2P.</b> Create a closed-loop system that has a feedback path and requires no human intervention.
<b>6-8</b>	<b>2Q.</b> Predict outcomes of a future product or system at the beginning of the design process.
<b>6-8</b>	<b>2R.</b> Compare how different technologies involve different sets of processes.
<b>6-8</b>	<b>2S.</b> Defend decisions related to a design problem.
<b>9-12</b>	<b>2T.</b> Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making.
<b>9-12</b>	<b>2U.</b> Diagnose a flawed system embedded within a larger technological, social, or environmental system.
<b>9-12</b>	<b>2V.</b> Analyze the stability of a technological system and how it is influenced by all the components in the system, especially those in the feedback loop.
<b>9-12</b>	<b>2W.</b> Select resources that involve tradeoffs between competing values, such as availability, cost, desirability, and waste while solving problems.

<b>9-12</b>	<b>2X.</b> Cite examples of the criteria and constraints of a product or system and how they affect final design.
<b>9-12</b>	<b>2Y.</b> Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.
<b>9-12</b>	<b>2Z.</b> Use management processes in planning, organizing, and controlling work.

### STEL 3 Integration of Knowledge, Technologies, and Practices

<b>Pre-K-2</b>	<b>3A.</b> Apply concepts and skills from technology and engineering activities that reinforce concepts and skills across multiple content areas.
<b>Pre-K-2</b>	<b>3B.</b> Draw connections between technology and human experiences.
<b>3-5</b>	<b>3C.</b> Demonstrate how simple technologies are often combined to form more complex systems.
<b>3-5</b>	<b>3D.</b> Explain how various relationships can exist between technology and engineering and other content areas.
<b>6-8</b>	<b>3E.</b> Analyze how different technological systems often interact with economic, environmental, and social systems.
<b>6-8</b>	<b>3F.</b> Apply a product, system or process developed for one setting to another setting.
<b>6-8</b>	<b>3G.</b> Explain how knowledge gained from other content areas affects the development of technological products and systems.
<b>9-12</b>	<b>3H.</b> Analyze how technology transfer occurs when a user applies an existing innovation developed for one function for a different purpose.
<b>9-12</b>	<b>3I.</b> Evaluate how technology enhances opportunities for new products and services through globalization.
<b>9-12</b>	<b>3J.</b> Connect technological progress to the advancement of other areas of knowledge and vice versa.

### STEL 4 Impacts of Technology

<b>Pre-K-2</b>	<b>4A.</b> Explain ways that technology helps with everyday tasks.
<b>Pre-K-2</b>	<b>4B.</b> Illustrate helpful and harmful effects of technology.
<b>Pre-K-2</b>	<b>4C.</b> Compare simple technologies to evaluate their impacts.
<b>Pre-K-2</b>	<b>4D.</b> Select ways to reduce, reuse, and recycle resources in daily life.
<b>Pre-K-2</b>	<b>4E.</b> Design new technologies that could improve their daily

	lives.
<b>3-5</b>	<b>4F.</b> Describe the helpful and harmful effects of technology.
<b>3-5</b>	<b>4G.</b> Judge technologies to determine the best one to use to complete a given task or meet a need.
<b>3-5</b>	<b>4H.</b> Classify resources used to create technologies as either renewable or non-renewable.
<b>3-5</b>	<b>4I.</b> Explain why responsible use of technology requires sustainable management of resources.
3-5	<b>4J.</b> Predict how certain aspects of their daily lives would be different without given technologies.
6-8	<b>4K.</b> Examine the ways that technology can have both positive and negative effects at the same time.
<b>6-8</b>	<b>4L.</b> Analyze how the creation and use of technologies consumes renewable and non-renewable resources and creates waste.
<b>6-8</b>	<b>4M.</b> Devise strategies for reducing, reusing, and recycling waste caused from the creation and use of technology.
<b>6-8</b>	<b>4N.</b> Analyze examples of technologies that have changed the way people think, interact, and communicate.
<b>6-8</b>	<b>4O.</b> Hypothesize what alternative outcomes (individual, cultural, and/or environmental) might have resulted had a different technological solution been selected.
<b>9-12</b>	<b>4P.</b> Evaluate ways that technology can impact individuals, society, and the environment.
<b>9-12</b>	<b>4Q.</b> Critique whether existing or proposed technologies use resources sustainably.
<b>9-12</b>	<b>4R.</b> Assess a technology that minimizes resource use and resulting waste to achieve a goal.
<b>9-12</b>	<b>4S.</b> Develop a solution to a technological problem that has the least negative environmental and social impact.
<b>9-12</b>	<b>4T.</b> Evaluate how technologies alter human health and capabilities.

## STEL 5 Influence of Society on Technological Development

<b>PreK-2</b>	<b>5A.</b> Explain the needs and wants of individuals and societies.
<b>PreK-2</b>	<b>5B.</b> Explore how technologies are developed to meet individual and societal needs and wants.
<b>PreK-2</b>	<b>5C.</b> Investigate the use of technologies in the home and community.
<b>3-5</b>	<b>5D.</b> Determine factors that influence changes in a society's technological systems or infrastructure.
<b>3-5</b>	<b>5E.</b> Explain how technologies are developed or adapted when individual or societal needs and wants change.
<b>6-8</b>	<b>5F.</b> Analyze how an invention or innovation was influenced by its historical context.
<b>6-8</b>	<b>5G.</b> Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.
<b>9-12</b>	<b>5H.</b> Evaluate a technological innovation that arose from a specific society's unique need or want.
<b>9-12</b>	<b>5I.</b> Evaluate a technological innovation that was met with societal resistance impacting its development.
<b>9-12</b>	<b>5J.</b> Design an appropriate technology for use in a different culture.

## STEL 6 History of Technology

<b>PreK-2</b>	<b>6A.</b> Discuss how the way people live and work has changed throughout history because of technology.
<b>3-5</b>	<b>6B.</b> Create representations of the tools people made, how they cultivated to provide food, made clothing, and built shelters to protect themselves.
<b>6-8</b>	<b>6C.</b> Compare various technologies and how they have contributed to human progress.
<b>6-8</b>	<b>6D.</b> Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.

<b>6-8</b>	<b>6E.</b> Verify how specialization of function has been at the heart of many technological improvements.
<b>9-12</b>	<b>6F.</b> Relate how technological development has been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge.
<b>9-12</b>	<b>6G.</b> Verify that the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools, materials, and processes.
<b>9-12</b>	<b>6H.</b> Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history.
<b>9-12</b>	<b>6I.</b> 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.
<b>9-12</b>	<b>6J.</b> Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information.
<b>STEL 7 Design in Technology and Engineering Education</b>	
<b>PreK-2</b>	<b>7A.</b> Apply design concepts, principles, and processes through play and exploration.
<b>PreK-2</b>	<b>7B.</b> Demonstrate that designs have requirements.
<b>PreK-2</b>	<b>7C.</b> Explain that design is a response to wants and needs.
<b>PreK-2</b>	<b>7D.</b> Discuss that all designs have different characteristics that can be described.
<b>PreK-2</b>	<b>7E.</b> Illustrate that there are different solutions to a design and that none are perfect.
<b>PreK-2</b>	<b>7F.</b> Differentiate essential skills of the technology and engineering design process.
<b>PreK-2</b>	<b>7G.</b> Apply skills necessary for making in design.



<b>3-5</b>	<b>7H.</b> Illustrate that there are multiple approaches to design.
<b>3-5</b>	<b>7I.</b> Apply the technology and engineering design process.
<b>3-5</b>	<b>7J.</b> Evaluate designs based on criteria, constraints, and standards.
<b>3-5</b>	<b>7K.</b> Interpret how good design improves the human condition.
<b>3-5</b>	<b>7L.</b> Apply universal principles and elements of design.
<b>3-5</b>	<b>7M.</b> Evaluate the strengths and weaknesses of existing design solutions, including their own solutions.
<b>3-5</b>	<b>7N.</b> Practice successful design skills.
<b>3-5</b>	<b>7O.</b> Apply tools, techniques, and materials in a safe manner as part of the design process.
<b>6-8</b>	<b>7P.</b> Illustrate the benefits and opportunities associated with different approaches to design.
<b>6-8</b>	<b>7Q.</b> Apply the technology and engineering design process.
<b>6-8</b>	<b>7R.</b> Refine design solutions to address criteria and constraints.
<b>6-8</b>	<b>7S.</b> Create solutions to problems by identifying and applying human factors in design.
<b>6-8</b>	<b>7T.</b> Assess design quality based upon established principles and elements of design.
<b>6-8</b>	<b>7U.</b> Evaluate the strengths and weaknesses of different design solutions.
<b>6-8</b>	<b>7V.</b> Improve essential skills necessary to successfully design.
<b>9-12</b>	<b>7W.</b> Determine the best approach by evaluating the purpose of the design.
<b>9-12</b>	<b>7X.</b> Document trade-offs in the technology and engineering design process to produce the optimal design.
<b>9-12</b>	<b>7Y.</b> Optimize a design by addressing desired qualities within criteria and constraints.
<b>9-12</b>	<b>7Z.</b> Apply principles of human-centered design.

9-12	<b>7AA.</b> Illustrate principles, elements, and factors of design.
9-12	<b>7BB.</b> Implement the best possible solution to a design.
9-12	<b>7CC.</b> Apply a broad range of design skills to their design process.
9-12	<b>7DD.</b> Apply a broad range of making skills to their design process.
<b>STEL 8 Applying, Maintaining, and Assessing Technological Products and Systems</b>	
PreK-2	<b>8A.</b> Analyze how things work.
PreK-2	<b>8B.</b> Identify and use everyday symbols.
PreK-2	<b>8C.</b> Describe qualities of everyday products.
3-5	<b>8D.</b> Follow directions to complete a technological task.
3-5	<b>8E.</b> Use appropriate symbols, numbers, and words to communicate key ideas about technological products and systems.
3-5	<b>8F.</b> Identify why a product or system is not working properly.
3-5	<b>8G.</b> Examine information to assess the trade-offs of using a product or system.
6-8	<b>8H.</b> Research information from various sources to use and maintain technological products or systems.
6-8	<b>8I.</b> Use tools, materials, and machines to safely diagnose, adjust, and repair systems.
6-8	<b>8J.</b> Use devices to control technological systems.
6-8	<b>8K.</b> Design methods to gather data about technological systems.
6-8	<b>8L.</b> Interpret the accuracy of information collected.
6-8	<b>8M.</b> Use instruments to gather data on the performance of everyday products.
9-12	<b>8N.</b> Use various approaches to communicate processes and procedures for using, maintaining, and assessing

	technological products and systems.
9-12	<b>8O.</b> Develop a device or system for the marketplace.
9-12	<b>8P.</b> Apply appropriate methods to diagnose, adjust and repair systems to ensure precise, safe, and proper functionality.
9-12	<b>8Q.</b> Synthesize data and analyze trends to make decisions about technological products, systems, or processes.
9-12	<b>8R.</b> Interpret the results of technology assessment to guide policy development.