

Concept	Indicator	Indicator Statement	FIRST TECH CHALLENGE	FIRST ROBOTICS COMPETITION	FIRST TECH CHALLENGE
STEL 1 Nature and Characteristics of Technology and Engineering	6-8.1J	Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.	X	X	X
	6-8.1K	Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems.	X	X	X
	6-8.1L	Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations.	x	X	X
	6-8.1M	Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	X	X	x
STEL 2 Core Concepts of Technology and Engineering	6-8.2M	Differentiate between inputs, processes, outputs, and feedback in technological systems.	-	-	X
	6-8.2N	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.	x	x	X
	6-8.2O	Create an open-loop system that has no feedback path and requires human intervention.	-	x	X
	6-8.2P	Create a closed-loop system that has a feedback path and requires no human intervention	-	x	X
	6-8.2Q	Predict outcomes of a future product or system at the beginning of the design process.	x	x	X
	6-8.2R	Compare how different technologies involve different sets of processes.	x	x	X
	6-8.2S	Defend decisions related to a design problem.	x	x	X
STEL 3 Integration of Knowledge, Technologies, and Practices	6-8.3E	Analyze how different technological systems often interact with economic, environmental, and social systems.	-	-	X
	6-8.3F	Apply a product, system or process developed for one setting to another setting.	-	-	X
	6-8.3G	Explain how knowledge gained from other content areas affects the development of technological products and systems.	x	x	X
STEL 4 Impacts of Technology	6-8.4K	Examine the ways that technology can have both positive and negative effects at the same time.	-	-	x
	6-8.4L	Analyze how the creation and use of technologies consumes renewable and non-renewable resources and creates waste.	-	-	-
	6-8.4M	Devise strategies for reducing, reusing, and recycling waste caused from the creation and use of technology.	-	-	-
	6-8.4N	Analyze examples of technologies that have changed the way people think, interact, and communicate.	-	-	X
	6-8.4O	Hypothesize what alternative outcomes (individual, cultural, and/or environmental) might have resulted had a different technological solution been selected.	x	x	X
STEL 5 Influence of Society on Technological Development	6-8.5F	Analyze how an invention or innovation was influenced by its historical context.	-	-	X
	6-8.5G	Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.	x	x	X
STEL 6 History of Technology	6-8.6C	Compare various technologies and how they have contributed to human progress.	X	x	X
	6-8.6D	Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.	x	x	X
	6-8.6E	Verify how specialization of function has been at the heart of many technological improvements.	x	x	x

STEL 7 Design in Technology and Engineering Education	6-8.7P	Illustrate the benefits and opportunities associated with different approaches to design.	X	X	X
	6-8.7Q	Apply the technology and engineering design process.	X	X	X
	6-8.7R	Refine design solutions to address criteria and constraints.	X	X	X
	6-8.7S	Create solutions to problems by identifying and applying human factors in design.	X	X	X
	6-8.7T	Assess design quality based upon established principles and elements of design.	X	X	X
	6-8.7U	Evaluate the strengths and weaknesses of different design solutions.	X	X	X
	6-8.7V	Improve essential skills necessary to successfully design.	X	X	X
STEL 8 Applying, and Maintaining, and Assessing Technological Products and Systems	6-8.8H	Research information from various sources to use and maintain technological products or systems.	X	X	X
	6-8.8I	Use tools, materials, and machines to safely diagnose, adjust, and repair systems.	X	X	X
	6-8.8J	Use devices to control technological systems.	X	X	X
	6-8.8K	Design methods to gather data about technological systems.	X	X	X
	6-8.8L	Interpret the accuracy of information collected.	X	X	X
	6-8.8M	Use instruments to gather data on the performance of everyday products.	X	X	X

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STEL 1 Nature and Characteristics of Technology and Engineering	9-12.1N	Explain how the world around them guides technological development and engineering design.	X	x	X
	9-12.1O	Assess how similarities and differences among scientific, mathematics, engineering, and technological knowledge and skills contributed to the design of a product or system	X	x	X
	9-12.1P	Analyze the rate of technological development and predict future diffusion and adoption of new technologies.	X	x	X
	9-12.1Q	Conduct research to inform intentional inventions and innovations that address specific needs and wants.	X	x	X
	9-12.1R	Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system.	x	x	X
STEL 2 Core Concepts of Technology and Engineering	9-12.2T	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.	X	X	-
	9-12.2U	Diagnose a flawed system embedded within a larger technological, social, or environmental system.	X	X	X
	9-12.2V	Analyze the stability of a technological system and how it is influenced by all of the components in the system, especially those in the feedback loop.	X	X	X
	9-12.2W	Select resources that involve tradeoffs between competing values, such as availability, cost, desirability, and waste while solving problems.	X	X	X
	9-12.2X	Cite examples of the criteria and constraints of a product or system and how they affect final design.	X	X	X
	9-12.2Y	Implement quality control as a planned process to ensure that a product, service, or system meets established criteria	X	X	X
	9-12.2Z	Use management processes in planning, organizing, and controlling work.	X	X	X
STEL 3 Integration of Knowledge, Technologies, and Practices	9-12.3H	Analyze how technology transfer occurs when a user applies an existing innovation developed for one function for a different purpose.	X	X	X
	9-12.3I	Evaluate how technology enhances opportunities for new products and services through globalization.	X	X	X
	9-12.3J	Connect technological progress to the advancement of other areas of knowledge and vice versa.	X	X	X
STEL 4 Impacts of Technology	9-12.4P	Evaluate ways that technology can impact individuals, society, and the environment.	-	-	-
	9-12.4Q	Critique whether existing or proposed technologies use resources sustainably.	-	-	-
	9-12.4R	Assess a technology that minimizes resource use and resulting waste to achieve a goal.	-	-	-
	9-12.4S	Develop a solution to a technological problem that has the least negative environmental and social impact.	-	-	-
	9-12.4T	Evaluate how technologies alter human health and capabilities.	-	-	-
STEL 5 Influence of Society on Technological Development	9-12.5H	Evaluate a technological innovation that arose from a specific society's unique need or want	-	-	X
	9-12.5I	Evaluate a technological innovation that was met with societal resistance impacting its development.	-	-	X
	9-12.5J	Design an appropriate technology for use in a different culture.	-	-	-
	9-12.6F	Relate how technological development has been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge.	X	X	X

STEL 6 History of Technology	9-12.6G	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.	-	-	-
	9-12.6H	Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history.	-	-	-
	9-12.6I	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.	-	-	-
	9-12.6J	Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information.	-	-	-
STEL 7 Design and Technology Engineering	9-12.7W	Determine the best approach by evaluating the purpose of the design.	X	X	X
	9-12.7X	Document trade-offs in the technology and engineering design process to produce the optimal design.	X	X	X
	9-12.7Z	Optimize a design by addressing desired qualities within criteria and constraints.	X	X	X
	9-12.7AA	Illustrate principles, elements, and factors of design.	X	X	X
	9-12.7BB	Implement the best possible solution to a design.	X	X	X
	9-12.7CC	Apply a broad range of design skills to their design process.	X	X	X
	9-12.7DD	Apply a broad range of making skills to their design process.	X	X	X
STEL Applying, Maintaining, and Assessing Technological Products and Systems	9-12.8N	Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems.	X	X	X
	9-12.8O	Develop a device or system for the marketplace.	X	X	X
	9-12.8P	Apply appropriate methods to diagnose, adjust and repair systems to ensure precise, safe and proper functionality			
	9-12.8Q	Synthesize data and analyze trends to make decisions about technological products, systems, or processes.			
	9-12.8R	Interpret the results of technology assessment to guide policy development.			