Concept	Indicator	Indicator Statement	Activity
The Nature of Technology *1. The scope of technology.* *2. The core concepts of technology.* *3. The relationship among technologies and the connections between technology and other fields.* *.*	1-J	The nature and development of technological knowledge and processes are functions of the setting.	Why FTC, Team Plan and Robot Plan
	1-K	The rate of technological development and diffusion is increasing rapidly.	Computational Thinking
	1-L	Inventions and innovations are the results of specific, goal-directed research.	Team Plan and Robot Plan
	1-M	Most development of technologies these days is driven by the profit motive and market.	Team Plan and Robot Plan
	2-W	Systems thinking applies logic and creativity with appropriate compromises in complex real-life problems.	Robot Systems, Iteration and Redesign
	2-X	Systems, which are building blocks of technology, are embedded within larger technological, social, and environmental systems.	Robot Systems, Computational Thinking
	2-Y	The stability of a technological system is influenced by all of the components in the system, especially those in the feedback loop.	Advanced Computational Thinking
	2-Z	Selecting resources involves tradeoffs between competing values, such as availability, cost, desirability, and waste.	Robot Plan, Iteration and Redesign
	2-AA	Requirements involve the identification of the criteria and constraints of a product or system and the determination of how they affect the final design and development.	Robot Plan, Sprint to Compete, Iteration and Redesign
	2-BB	Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.	Robot Plan, Sprint to Compete, Iteration and Redesign
	2-CC	New technologies create new processes.	Computational Thinking, Iteration and Redesign
	2-DD	Quality control is planned process to ensure that a product, service, or system meets established criteria.	Iteration and Redesign
	2-EE	Management is the process of planning, organizing, and controlling work.	Team Plan and Robot Plan
	2-FF	Complex systems have many layers of controls and feedback loops to provide information.	Advanced automation
	3-G	Technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.	Iteration and Improvements.
	3-H	Technological innovation often results when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields.	Iteration and Redesign
	3-I	Technological ideas are sometimes protected through the process of patenting.	Community Project
	3-J	Technological progress promotes the advancement of science and mathematics.	Community Project
Technology and Society *4.The cultural, social, economic, and political effects of technology.*	4-H	Changes caused by the use of technology can range from gradual to rapid and from subtle to obvious.	Community Project
	4-I	Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects.	Robot Plan, Robot Systems, Iteration and Redesign
	4-J	Ethical considerations are important in the development, selection, and use of technologies.	Community Project

5.The effects of technology on the environment. *6.The role of society in the development and use of technology.* *7.The influence of technology on history.* *.6-*	4-K	The transfer of a technology from one society to another can cause cultural, social, economic, and political changes affecting both societies to varying degrees.	Community Project
	5-G	Humans can devise technologies to conserve water, soil, and energy through such techniques as reusing, reducing, and recycling.	Community Project
	5-H	When new technologies are developed to reduce the use of resources, considerations of tradeoffs are important.	Community Project
	5-I	With the aid of technology, various aspects of the environment can be monitored to provide information for decision making.	Community Project
	5-J	The alignment of technological processes with natural processes maximizes performance and reduces negative impacts on the environment.	Community Project
	5-K	Humans devise technologies to reduce the negative consequences of other technologies.	Community Project
	5-I	Decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment.	Community Project
	6-H	Different cultures develop their own technologies to satisfy their individual and shared needs, wants, and values.	Community Project
	6-I	The decision whether to develop a technology is influenced by societal opinions and demands, in addition to corporate cultures.	Community Project
	6-J	A number of different factors, such as advertising, the strength of the economy, the goals of the company, and the latest fads contribute to shaping the design of and demand for various technologies.	Community Project
	7-G	Most technological development has been evolutionary, the result of a series of refinements to a basic invention.	Community Project
	7-H	The evolution of civilization has been directly affected by and has in turn affected, the development and use of tools and materials.	Community Project
	7-I	Throughout history, technology has been a powerful force in reshaping the social, cultural, political, and economic landscape.	Community Project
	7-J	Early in history of technology, the development of many tools and machines was based not on scientific knowledge but on technological knowledge.	Computational Thinking
	7-K	The Iron Age was defined by the use of iron and steel as the primary materials for tools.	-
	7-L	The Middle Age saw the development of many technological devices that produced long-lasting effects on technology and society.	-
	7-M	The Renaissance, a time of rebirth of the arts and humanities, was also an important development in the history of technology.	-
	7-N	The Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advance construction practices, an improve education and leisure time.	-
	7-O	The Information Age places emphasis on the processing and exchange of information.	-
Design *8. The attributes of design* *9. Engineering Design* *10. The role of troubleshooting,*	8- H	The design process includes defining a problem, brainstorming, researching and generating ideas, identifying and specifying design constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating process and results.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign

research and development, invention and innovation, and experimentation in problem solving.9-	8-I	Design problems are seldom presented in a clearly defined form.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	8-J	The design needs to be continually checked and critiqued, and the ideas of the design must be refined and improved.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	8-K	Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	9-I	Established design principles are used to evaluate existing designs, to collect data, and guide the design process.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	9-J	Engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	9-K	A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	9-L	The process of engineering design takes into account a number of factors, safety, reliability, economic, quality control, manufacturing, maintenance, and ergonomics.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	10-I	Research and development is a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	10-J	Technological problems must be researched before they can be solved.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	10-K	Not all problems are technological, and not every problem can be solved using technology.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	10-L	Many technological problems require a multidisciplinary approach.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
Abilities for Technological World *11.Apply the design process. 12.Use and maintain technological products and systems. 13.Assess the impact of product and systems.*	11-M	Identify the design problem to solve and decide whether or not to address it.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	11-N	Identify criteria and constraints and determine how these will affect the design process.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	11-O	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	11-P	Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign

	11-Q	Develop and produce a product or system using a design process.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	11-R	Evaluate final solutions and communicate observation, process, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three dimensional models.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	12-L	Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	12-M	Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	12-N	Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	12-O	Operate systems so that they function in the way they were designed.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	12-P	Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	13-J	Collect information and evaluate its quality.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	13-K	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	13-L	Use assessment techniques, such as trend analysis and experimentation, to make decisions about the future development of technology.	Team Plan and Robot Plan, Sprint to Compete, Iteration and Redesign
	13-M	Design forecasting techniques to evaluate the results of altering natural systems.	-
The Designed World *14.Medical Technologies* *15.Agricultural and related biotechnologies.* *16. Energy and power technologies.* *17. Information and communication technologies.* *18. Transportation technologies.* *19. Manufacturing technologies.* *20. Construction technologies*	14	Medical technologies.	-
	15	Agricultural and related biotechnologies.	-
	15-N	The engineering design and management of agricultural systems require knowledge of artificial ecosystems and the effects of technological development on flora and fauna.	-
	16-J	Energy cannot be created nor destroyed; however, it can be converted from one form to another.	Iteration and Redesign, Advanced Automation
	16-K	Energy can be grouped into major forms; thermal, radiant, electrical, mechanical, chemical, nuclear and others.	Robot Systems. Iteration and Redesign, Advanced Automation
	16-L	It is impossible to build an engine to perform work that does not exhaust thermal energy to the surroundings.	Iteration and Redesign, Advanced Automation
	16-N	Power systems must have a source of energy, a process, and loads.	Iteration and Redesign, Advanced Automation

	17- L	Information and communication technologies include the inputs, processes, and outputs associated with sending and receiving information.	Computational Thinking
	17-M	Information and communication systems allow information to be transferred from human to human, human to machine, machine to human, and machine to machine.	Computational Thinking
	17-N	Information and communication systems can be used to inform, persuade, entertain, control, manage and educate.	Team Plan Robot Plan, Sprint to Compete, Community Project
	17-O	Communication systems are made up source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.	Computational Thinking
	17-P	There are many ways to communicate information, such as graphic and electronic means.	Computational Thinking
	17-Q	Technological knowledge and processes are communicated using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.	Computational Thinking
	18-F	Transporting people and goods involves a combination of individuals and vehicles	-
	18-G	Transportation vehicles are made up of subsystems, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively.	Robot Systems
	19-L	Servicing keeps products in good operating condition.	Iteration and Redesign
	19-P	Interchangeability of parts increases the effectiveness of manufacturing processes.	Iteration and Redesign
	19-R	Marketing involves establishing a product's identity, conducting research on its potential, advertising it, distributing it and selling it.	Community Project
	20	Construction technologies.	Community Project