ITEEA Standards for Technological Literacy

Code	Chapter	Standard	Benchmarks
1.F	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.
1.G	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	The development of technology is a human activity and is the result of individual or collective needs and the ability to be creative.
1.H	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	Technology is closely linked to creativity, which has resulted in innovation.
1.I	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	Corporations can often create demand for a product by bringing it onto the market and advertising it.
1.J	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	The nature and development of technological knowledge and processes are functions of the setting.
1.K	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	The rate of technological development and diffusion is increasing rapidly.
1.L	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	Inventions and innovations are the results of specific, goal-directed research.
1.M	The Nature of Technology	Students will develop an understanding of the characteristics and scope of technology.	Most development of technologies these days is driven by profit motive and the market.
2.M	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Technological systems include input, processes, output, and, at times, feedback.
2.N	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Systems thinking involves considering how every part relates to others.
2.O	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	An open-loop system has no feedback path and requires human intervention, while a closed-loop system uses feedback.
2.P	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Technological systems can be connected to one another.
2.Q	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Malfunctions of any part of a system may affect the function and quality of the system.
2.R	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Requirements are the parameters placed on the development of a product or system.
2.S	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Trade-off is a decision process recognizing the need for careful compromises among competing factors.
2.T	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Different technologies involve different sets of processes.
2.U	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Maintenance is the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability.
2.V	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Controls are mechanisms or particular steps that people perform using information about the system that causes systems to change.
2.W	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Systems thinking applies logic and creativity with appropriate compromises in complex real-life problems.

2.X	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.
2.Y	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	The stability of a technological system is influenced by all of the components in the system, especially those in the feedback loop.
2.Z	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Selecting resources involves tradeoffs between competing values, such as availability, cost, desirability, and waste.
2.AA	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	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.
2.BB	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.
2.CC	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	New technologies create new processes.
2.DD	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Quality control is a planned process to ensure that a product, service, or system meets established criteria.
2.EE	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Management is the process of planning, organizing, and controlling work.
2.FF	The Nature of Technology	Students will develop an understanding of the core concepts of technology.	Complex systems have many layers of controls and feedback loops to provide information.
3.D	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Technological systems often interact with one another.
3.E	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	A product, system, or environment developed for one setting may be applied to another setting.
3.F	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Knowledge gained from other fields of study has a direct effect on the development of technological products and systems.
3.G	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.
3.H	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Technological innovation often results when ideas, knowledge or skills are shared within a technology, among technologies or across other fields.
3.I	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Technology ideas are sometimes protected through the process of patenting.
3.J	The Nature of Technology	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	Technological progress promotes the advancement of science and mathematics.

4.D	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use.
4.E	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	Technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences.
4.F	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	The development and use of technology poses ethical issues.
4.H	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	Changes caused by the use of technology can range from gradual to rapid and from subtle to obvious.
4.I	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects.
5.H	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	When new technologies are developed to reduce the use of resources, considerations of tradeoffs are important.
5.K	Technology and Society	Students will develop an understanding of the cultural, social, economic, and political effects of technology	Humans devise technologies to reduce the negative consequences of other technologies.
6.D	Technology and Society	Students will develop an understanding of the role of society in the development and use of technology.	Throughout history, new technologies have resulted from the demands, values and interests of individuals, businesses, industries and societies.
6.E	Technology and Society	Students will develop an understanding of the role of society in the development and use of technology.	The use of inventions and innovations has led to changes in society and the creation of new needs and wants.
7.C	Technology and Society	Students will develop an understanding of the influence of technology on history.	Many inventions and innovations have evolved by using slow and methodical processes of tests and refinements.
7.D	Technology and Society	Students will develop an understanding of the influence of technology on history.	The specialization of function has been at the heart of many technological improvements.
7.E	Technology and Society	Students will develop an understanding of the influence of technology on history.	The design and construction of structures for service or convenience have evolved from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships.
7.F	Technology and Society	Students will develop an understanding of the influence of technology on history.	In the past, an invention or innovation was not usually developed with the knowledge of science.
7.G	Technology and Society	Students will develop an understanding of the influence of technology on history.	Most technological development has been evolutionary, the result of a series of refinements to a basic invention.
7.O	Technology and Society	Students will develop an understanding of the influence of technology on history.	The Information Age places emphasis on the processing and exchange of information.
8.E	Design	Students will develop an understanding of the attributes of design.	Design is a creative planning process that leads to useful products and systems.
8.F	Design	Students will develop an understanding of the attributes of design.	There is no perfect design.
8.G	Design	Students will develop an understanding of the attributes of design.	Requirements for a design are made up of criteria and constraints.

8.H	Design	Students will develop an understanding of the attributes of design.	The design process includes defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying 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 processes and results.
8.I	Design	Students will develop an understanding of the attributes of design.	Design problems are seldom presented in a clearly defined form.
8.J	Design	Students will develop an understanding of the attributes of design.	The design needs to be continually checked and critiqued, and the ideas of the design must be redefined and improved.
8.K	Design	Students will develop an understanding of the attributes of design.	Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.
9.F	Design	Students will develop an understanding of engineering design.	Design involves a set of steps, which can be performed in different sequences and repeated as needed.
9.G	Design	Students will develop an understanding of engineering design.	Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.
9.H	Design	Students will develop an understanding of engineering design.	Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.
9.I	Design	Students will develop an understanding of engineering design.	Established design principles are used to evaluate existing designs, to collect data, and to guide the design process.
9.J	Design	Students will develop an understanding of engineering design.	Engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.
9.K	Design	Students will develop an understanding of engineering design.	A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.
9.L	Design	Students will develop an understanding of engineering design.	The process of engineering design takes into account a number of factors.
10.F	Design	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.	Troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system.
10.G	Design	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.	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.
10.H	Design	Students will develop an understanding of the role of troubleshooting, research and development,	Some technological problems are best solved through experimentation.
10.I	Design	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.	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.
10.J	Design	Students will develop an understanding of the role of troubleshooting, research and development,	Technological problems must be researched before they can be solved.
10.K	Design	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.	Not all problems are technological, and not every problem can be solved using technology.

10.L	Design	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.	Many technological problems require a multidisciplinary approach.
11.H	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Apply a design process to solve problems in and beyond the laboratory-classroom.
11.I	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Specify criteria and constraints for the design.
11.J	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Make two-dimensional and three-dimensional representations of the designed solution.
11.K	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.
11.L	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Make a product or system and document the solution.
11.M	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Identify the design problem to solve and decide whether or not to address it.
11.N	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Identify criteria and constraints and determine how these will affect the design process.
11.O	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.
11.P	Abilities for a Technological World	Students will develop the abilities to apply the design process.	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.
11.Q	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Develop and produce a product or system using a design process.
11.R	Abilities for a Technological World	Students will develop the abilities to apply the design process.	Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models.
12.H	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Use information provided in manuals, protocols, or by experienced people to see and understand how things work.
12.I	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Use tools, materials, and machines safely to diagnose, adjust, and repair systems.
12.J	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Use computers and calculators in various applications.
12.K	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Operate and maintain systems in order to achieve a given purpose.
12.L	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.
12.M	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.
12.N	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.
12.O	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Operate systems so that they function in the way they were designed.
12.P	Abilities for a Technological World	Students will develop the abilities to use and maintain technological products and systems.	Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.

13.F	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Design and use instruments to gather data.
13.G	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology.
13.H	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Identify trends and monitor potential consequences of technological development.
13.I	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Interpret and evaluate the accuracy of the information obtained and determine if it is useful.
13.J	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Collect information and evaluate its quality.
13.K	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
13.L	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology.
13.M	Abilities for a Technological World	Students will develop the abilities to assess the impact of products and systems.	Design forecasting techniques to evaluate the results of altering natural systems.
16.E	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Energy is the capacity to do work.
16.F	The Designed World	Students will develop an understanding of and be able to select and use energy and power	Energy can be used to do work, using many processes.
16.G	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Power is the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done.
16.H	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Power systems are used to drive and provide propulsion to other technological products and systems.
16.I	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Much of the energy used in our environment is not used efficiently.
16.J	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Energy cannot be created nor destroyed; however, it can be converted from one form to another.
16.K	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Energy can be grouped into major forms: thermal, radiant, electrical, mechanical, chemical, nuclear, and others.
16.L	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	It is impossible to build an engine to perform work that does not exhaust thermal energy to the surroundings.
16.M	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Energy resources can be renewable or nonrenewable.
16.N	The Designed World	Students will develop an understanding of and be able to select and use energy and power technologies.	Power systems must have a source of energy, a process, and loads.
17.H	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Information and communication systems allow information to be transferred from human to human, human to machine, and machine to human.

17.I	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination.
17.J	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	The design of a message is influenced by such factors as the intended audience, medium, purpose, and nature of the message.
17.K	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	The use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas.
17.L	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Information and communication technologies include the inputs, processes, and outputs associated with sending and receiving information.
17.M	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Information and communication systems allow information to be transferred from human to human, human to machine, machine to human, and machine to machine.
17.N	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Information and communication systems can be used to inform, persuade, entertain, control, manage, and educate.
17.O	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	Communication systems are made up of source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
17.P	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	There are many ways to communicate information, such as graphic and electronic means.
17.Q	The Designed World	Students will develop an understanding of and be able to select and use information and communication technologies.	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.
19.F	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Manufacturing systems use mechanical processes that change the form of materials through the processes of separating, forming, combining and conditioning them.
19.G	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Manufactured goods may be classified as durable and nondurable.
19.H	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	The manufacturing process includes the designing, development, making, and servicing of products and systems.
19.K	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Marketing a product involves informing the public about it as well as assisting in selling and distributing it.
19.L	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Servicing keeps products in good operating condition.
19.M	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Materials have different qualities and may be classified as natural, synthetic, or mixed.
19.N	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Durable goods are designed to operate for a long period of time, while non-durable goods are designed to operate for a short period of time.

19.O	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Manufacturing systems may be classified into types, such as customized production, batch production, and continuous production.
19.P	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	The interchangeability of parts increases the effectiveness of manufacturing processes.
19.R	The Designed World	Students will develop an understanding of and be able to select and use manufacturing technologies.	Marketing involves establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it.
20.G	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Structures rest on a foundation.
20.H	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Some structures are temporary, while others are permanent.
20.I	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Buildings generally contain a variety of subsystems.
20.J	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Infrastructure is the underlying base or basic framework of a system.
20.K	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Structures are constructed using a variety of processes and procedures.
20.L	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	The design of structures includes a number of requirements.
20.M	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Structures require maintenance, alteration, or renovation periodically to improve them or to alter their intended use.
20.N	The Designed World	Students will develop an understanding of and be able to select and use construction technologies.	Structures can include prefabricated materials.