

Massachusetts Tests for Educator Licensure™
Test Objectives
Field 33: Technology/Engineering

SUBAREAS:

COMMUNICATION
PRODUCTION
POWER, ENERGY, AND TRANSPORTATION
TECHNOLOGY

COMMUNICATION

0001 Understand the composition and function of communication technology industries.

For example: types of businesses; recent industry trends; career opportunities, their characteristics, and their requirements; major markets; and major material and service providers.

0002 Understand the appropriate selection and use of resources in communication technology.

For example: appropriate tools, materials, and equipment for a given task; the safe use of selected tools and equipment in a given situation (e.g., computer-based page layout and design, audio, video, and multimedia productions, data storage and retrieval); properties of materials and supplies used in communication technology; and the selection of appropriate materials and supplies for a given application.

0003 Understand the principles, processes, and procedures in graphic arts and electronic publishing.

For example: graphic design (e.g., layout, color, typography); image generation (e.g., scaling, photo imaging, image assembly); production (e.g., image carrier, image transfer); binding and finishing; and the use of computers in graphic arts.

0004 Understand the principles, processes, and procedures in design/drafting.

For example: types of sketches and drawings and their uses; techniques and procedures for designing, producing, and interpreting technical drawings (e.g., mechanical, architectural); the production and interpretation of specifications and three-dimensional models; and the use of computers and computer software.

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0005 Understand the principles, processes, and procedures in electronic communication.

For example: basic electronics (e.g., characteristics and uses of electronic components, DC and AC circuits, analog and digital circuits, integrated circuits); processes and procedures related to electronic and telecommunication systems (e.g., television, telephone, on-line communication, fiber optics satellite communication); the analysis of broadcast systems (e.g., operating parameters of broadcast systems, applying test procedures, determining appropriate systems and components for a given application); and the analysis of the capabilities of various technologies.

PRODUCTION

0006 Understand the composition and function of production technology industries.

For example: types of businesses; recent industry trends; career opportunities, their characteristics, and their requirements; major markets; and major material and service providers.

0007 Understand the appropriate selection and use of resources in production technology.

For example: the selection and safe use of appropriate tools and equipment in a given manufacturing or construction situation; the properties of materials used in production technology; and the selection of appropriate materials for a given application.

0008 Understand the principles, processes, and procedures in construction.

For example: processes and procedures used to construct various types of structures; the importance of legal requirements associated with construction projects (e.g., regulatory agencies, zoning laws, building inspection services); purposes of construction documents such as permits and licenses; problems related to construction systems; and appropriate applications and modifications of processes and procedures.

0009 Understand the principles, processes, and procedures in manufacturing.

For example: characteristics and types of manufacturing systems (e.g., automated, robotics, continuous, custom, intermittent, just-in-time); types and characteristics of manufacturing processes (e.g., casting, forming, separating, conditioning) and their capabilities; procedures for ensuring and maintaining quality control; procedures for managing manufacturing operations; and the management and financial impact of operational and line decisions.

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POWER, ENERGY, AND TRANSPORTATION

0010 Understand the composition and function of power, energy, and transportation technology industries.

For example: types of businesses; recent industry trends; career opportunities, their characteristics, and their requirements; major markets; and major material and service providers.

0011 Understand resources used in power, energy, and transportation technologies.

For example: the selection and safe use of appropriate tools and equipment in a given situation (e.g., conversion, control, storage, and transmission of energy); properties of materials and supplies used in power, energy, and transportation technologies; and the selection of appropriate materials for a given application.

0012 Understand generation, transformation, transmission, and control of energy.

For example: scientific principles, processes, and equipment involved in generating power (e.g., nuclear, fossil fuel, solar, hydro, wind); conversions among electrical, mechanical, chemical, and nuclear forms; the transmission, control, and storage of energy; and concepts of efficiency and energy loss.

0013 Understand transportation technology.

For example: principles, processes, and equipment related to propulsion, suspension, guidance, control, support, and structural components of land, air, and sea transportation systems; technological problems related to transportation systems; and analysis of situations to determine appropriate applications and modifications of processes and procedures.

TECHNOLOGY

0014 Understand career opportunities in technology career paths.

For example: characteristics of these careers (e.g., educational requirements, working conditions, responsibilities); the relationship between the characteristics of careers and the goals of individuals; preparation requirements for careers; skills for seeking employment; functions and resources of professional organizations; and the importance and development of social skills, leadership skills, and pride in the quality of one's work.

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0015 Understand environmental and safety issues related to resources used in technology education.

For example: procedures for the safe operation of tools and equipment; recognition of safety hazards and potentially dangerous situations; the importance of a safe and clean work environment in the laboratory and workplace; procedures and equipment for maintaining a safe and clean environment; procedures and issues related to environmentally sound disposal of materials; and the importance of personal safety and instruction of safety practices.

0016 Understand independent and integrated systems.

For example: the systems approach (e.g., input, process, output, feedback); how technological systems operate individually and interdependently; interrelationships that commonly exist among technological systems (e.g., communication, energy, production); the critical role of evaluation and quality control in technological systems; and procedures for setting and meeting specifications.

0017 Understand the principles, processes, and procedures in multimedia communication.

For example: capabilities of multimedia systems; procedures for interfacing various communication media; and the planning and designing of a multimedia communication product intended to teach, inform, or sell.

0018 Understand new and emerging technologies.

For example: capabilities of new and emerging technologies (e.g., biotechnology, laser technology); scientific principles related to these technologies; sources of information concerning emerging technologies; and likely uses for these technologies.

0019 Understand the interrelationships among technology, science, and mathematics.

For example: the flow of information among technology, science, and mathematics; the analysis of technological systems in terms of mathematical and scientific principles; and the influence of technology on science and mathematics.

0020 Understand technology and society.

For example: current political, economic, and social trends and how they relate to industrial technology; ethical considerations; the role of business, government, society, and the individual in shaping the field of technology; and the history of technology and its significance in global, political, and social contexts.

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0021 Understand the interdisciplinary nature of technology education.

For example: the value of an integrated approach that uses knowledge of other academic subjects to help understand and solve technological problems (e.g., the use of effective language skills for the communication of ideas, the application of the principles of social systems to analyze the impact of technology and society on one another).

0022 Understand the principles, processes, and procedures in engineering technology.

For example: the basic principles of design, technology, physics, chemistry, and electronics (e.g., dimensional analysis, force, Ohm's law) related to the solution of engineering problems; and basic mathematical procedures and processes (e.g., quadratic equations, graphing, trigonometric functions) related to the solution of engineering problems.

0023 Understand the design process for solving problems in technology.

For example: identifying a problem; proposing designs and choosing between alternative solutions; evaluating a solution; communicating the problem, process, and solution; and redesigning the solution.