

**PROGRAM FOR LICENSING ASSESSMENTS  
FOR COLORADO EDUCATORS® (PLACE®)  
OBJECTIVES  
FIELD 037: TECHNOLOGY EDUCATION**

**Subareas**

Fundamentals of Technology  
Communication and Information Systems  
Energy, Power, and Transportation Systems  
Production and Construction Systems  
Technology Education Programs

**FUNDAMENTALS OF TECHNOLOGY**

**Understand the history of technology and historical trends in technology and technology education.**

Includes important figures and developments in the history of technology, their effects on society, and historical trends in the fields of technology and technology education.

**Understand core concepts and terms related to technology and technological systems.**

Includes defining basic technology terms and concepts and applying terms and concepts to the selection and analysis of technological systems.

**Understand applications of mathematics and natural and physical sciences in technological systems and processes.**

Includes basic calculations and unit conversions; units of measure; fundamental concepts of algebra and geometry; basic principles of chemistry, physics, biology, and environmental sciences; and applications of mathematics and science in technology.

**Understand the applications and effects of technology in other disciplines.**

Includes advances and innovations in biological, medical, and agricultural sciences (e.g., diagnostic tools, food preservation methods, food production methods).

**Understand principles of high quality and productivity management in business and industry.**

Includes basic principles of effective business management, principles of resource allocation, fundamentals of quality control and quality assurance systems, and principles and techniques of managing for both high quality and high productivity.

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**OBJECTIVES**  
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**Analyze the impact of technological systems on economic, political, and legal aspects of society and on the environment.**

Includes the effects of a particular technology on society, the interrelationships between technology and specific areas of society, and the relationships between technology and the environment.

**Understand the principles, methodologies, and roles of problem solving, research, and development in technological systems.**

Includes basic principles of technological research; the role of research and development; the functions and methodologies of problem solving, research, and development; and applications of problem solving, research, and development in existing and emerging technologies.

**COMMUNICATION AND INFORMATION SYSTEMS**

**Understand principles, processes, and tools used in technical and graphic communications.**

Includes principles of speaking, reading, and writing in a technical environment; basic elements of graphic design; tools and processes used in measuring and marking; fundamentals of sketching and technical drawing; principles of computer-aided design and drawing; and basic principles of desktop publishing.

**Understand principles, processes, and tools used in imaging, photography, and printing.**

Includes fundamentals of still and motion imagery; film development and printing; principles and procedures used in photography and video; and materials, equipment, and processes used in printing, imaging, and editing.

**Understand principles, processes, and components used in electronic communication.**

Includes types and principles of electronic communication, processes used in electronic communication (e.g., encoding, transmitting, receiving, decoding, storing), and components and functions of electronic communication systems.

**Understand the basic functions, components, and operations of computers.**

Includes knowledge of basic computer components (e.g., input and output devices, storage media), computer functions (e.g., information management, communication, product creation), types and applications of software, principles of computer operations and operating systems, and computer upkeep and trouble-shooting.

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**Understand components, functions, and operating principles of computer systems and networks.**

Includes the various components and functions of computer systems and networks (e.g., servers, LANs, Internet) and operating principles and processes of computer networks, including security issues.

**ENERGY, POWER, AND TRANSPORTATION SYSTEMS**

**Understand types, characteristics, and applications of energy resources.**

Includes types of energy and units used to measure energy and work; sources of energy; characteristics of different types of energy; applications of energy resources; principles for generating, storing, controlling, and transmitting energy; and the environmental effects of energy generation and use.

**Understand basic principles and processes related to electrical energy.**

Includes basic principles of electronics, and components and properties of AC and DC circuits.

**Understand basic principles and processes related to renewable and nonrenewable energy sources.**

Includes types and properties of renewable and nonrenewable energy sources (e.g., fossil fuels, nuclear power, wind power), and principles and processes of power generation and storage.

**Understand basic components and operating principles of motors, engines, and mechanical systems.**

Includes components of motors and engines, operating principles of electric motors and internal combustion engines, principles for controlling motors and engines, basic trouble-shooting and maintenance procedures, and principles of mechanical systems (e.g., hydraulic, pneumatic).

**Understand components, processes, and systems used in land transportation.**

Includes types of transportation vehicles; power sources; and technological and scientific principles related to control, guidance, propulsion, and energy storage.

**Understand components, processes, and systems used in water transportation.**

Includes types of transportation vehicles; power sources; and technological and scientific principles related to control, guidance, propulsion, and energy storage.

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**Understand components, processes, and systems used in aerospace transportation.**

Includes types of transportation vehicles; power sources; and technological and scientific principles related to control, guidance, propulsion, and energy storage.

**PRODUCTION AND CONSTRUCTION SYSTEMS**

**Understand types, characteristics, and uses of materials used in production technologies.**

Includes identifying types and characteristics of raw materials used in manufacturing and construction (e.g., wood, concrete, plastics, ceramics, composites), selecting appropriate materials for a given application, and comparing characteristics and advantages of various materials.

**Understand tools and equipment used in production technologies.**

Includes safe and appropriate use of hand tools and power tools, tools for specific purposes, maintenance procedures, and tools and equipment used in various types of manufacturing (e.g., presses, lathes, kilns, computer numerical controlled machining centers).

**Understand principles and processes used in manufacturing.**

Includes principles and processes for casting and molding, forming, separating, conditioning, assembling, and finishing materials and products; project management; the role of automation in manufacturing (e.g., robotics, CAD/CAM); and quality control procedures.

**Understand principles and processes used in residential and commercial construction.**

Includes site selection, project management, and usage planning; blueprints; building codes; procedures for constructing foundations, floors, walls, roofs, and other systems; scheduling; structural analysis; and procedures for rough and finish assembly.

**Understand principles and processes related to design and prototyping.**

Includes problem-solving procedures related to the design process, prototype testing, and patent searching.

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**TECHNOLOGY EDUCATION PROGRAMS**

**Understand work force preparation documents, employability skills and standards, and careers and sources of career information related to technology.**

Includes procedures and standards for creating resumes, portfolios, and letters of application; knowledge of skills and attributes desired by employers; appropriate workplace behaviors; characteristics of various technology careers; and sources of career information.

**Understand how to manage student work areas safely and the safe use of tools, systems, and processes in school-based and work-based learning sites.**

Includes basic principles of safety and risk management, safety procedures for specific tools and equipment, the use of safety equipment, safety laws and regulations, and work- and job-site safety procedures.

**Understand how to acquire, evaluate, organize, interpret, and communicate information related to technology and technology education.**

Includes research procedures and sources; personal record keeping; evaluation and problem-solving strategies; and procedures for organizing, interpreting, and communicating technology information.

**Understand how to organize and manage student organizations and cooperative learning experiences.**

Includes principles for organizing a technology students' organization; recruitment; roles and responsibilities of the advisor; procedures for running meetings, managing finances, and scheduling activities; goals and management of cooperative learning experiences; and ways to promote positive relationships with community businesses and industrial partners.