

Technology Education 6–12

Section 55

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1 Knowledge of the nature and impacts of technology

1. Identify the characteristics of technology.
2. Analyze a technological system in terms of inputs, processes, outputs, and feedback.
3. Assess the role of technology in developing products and systems that solve problems.
4. Evaluate the historical, social, ethical, cultural, economic, political, and environmental causes and effects of technological development and change.
5. Identify and assess new, emerging, and developing technologies and their impacts on society.
6. Identify biotechnology applications and advances in the areas of agriculture, pharmaceuticals, food and beverages, medicine, energy, environment, and genetic engineering.

2 Knowledge of principles of drafting

1. Select appropriate drafting instruments, equipment, and materials for a given purpose.
2. Differentiate between various disciplines of drafting (e.g., architectural, electrical, mechanical).
3. Apply fundamental principles of drafting (e.g., line conventions, lettering, dimensioning, scale, measurement, graphing).
4. Analyze the types of drawings used in drafting (e.g., orthographic, pictorial, auxiliary view).
5. Select appropriate 3D modeling processes for a given purpose.
6. Identify components of hardware and software for CAD.

3 Knowledge of principles of engineering

1. Identify appropriate design and problem-solving principles and procedures in engineering design.
2. Analyze factors involved in engineering design (e.g., economic, safety, ergonomic, reliability).
3. Analyze data acquisition methods in engineering (e.g., the use of test equipment, measurement instruments, research techniques).

4. Analyze legal and ethical issues in engineering.

4 Knowledge of energy and power technologies

1. Analyze the characteristics of power (e.g., steam, fluid power, electrical, solid and liquid fuels, nuclear, solar) and methods of generation and distribution.
2. Analyze the economic, social, and environmental impacts of traditional and alternative energy sources.
3. Select appropriate tools and materials used in various energy and power technologies.
4. Identify characteristics of AC and DC circuits and their components (e.g., source, load, path).
5. Apply Ohm's law and Kirchhoff's law to series and parallel circuits.
6. Distinguish between the characteristics of analog and digital circuits.

5 Knowledge of information and communication technologies

1. Analyze communication systems in terms of their components (i.e., source, encoder, transmitter, receiver, decoder, storage, retrieval, destination).
2. Analyze the tools, machines, equipment, and sources used in multiple forms of communications (e.g., human to human, machine to machine, human to machine, machine to human).
3. Apply the design process (e.g., storyboarding, wireframes, compositions) for various media.
4. Apply appropriate hardware and software application components for Web-based, audiovisual, and print media.
5. Select the most appropriate form of communication for a given task (e.g., traditional versus emerging technologies).
6. Classify the elements (e.g., color, shape, lines) and principles of design (e.g., balance, rhythm, emphasis).
7. Distinguish between the types, characteristics, components, and processes of prepress operations (e.g., generating and manipulating images, desktop publishing, typography).
8. Identify the characteristics and components of major printing processes (e.g., screen, offset, digital, sublimation).

6 Knowledge of transportation technologies

1. Analyze transportation systems, their subsystems (i.e., structural, propulsion, suspension, guidance, control, support), and their components.
2. Analyze transportation processes (e.g., receiving, holding, shipping) and systems (e.g., railways, pipelines).
3. Select appropriate transportation systems or components for land, sea, air, and space.
4. Analyze legal and ethical issues related to transportation (e.g., environmental regulations, governmental regulations, safety).

7 Knowledge of manufacturing technologies

1. Select appropriate tools, machinery, and equipment used for manufacturing.
2. Analyze types of manufacturing (e.g., job-lot, custom, mass production) and their characteristics.
3. Analyze legal and ethical issues related to manufacturing (e.g., environmental regulations, safety procedures, labeling requirements).
4. Select appropriate manufacturing management systems (e.g., just-in-time, continuous, lean, FMS).
5. Analyze factors affecting choices in manufacturing processes (e.g., rapid prototyping, CAM, CNC, CIM), including emerging technologies.
6. Select appropriate materials according to their properties and characteristics (e.g., strength, weight, costs, environmental impact).

8 Knowledge of construction technologies

1. Differentiate between characteristics of residential, commercial, civil, and industrial construction.
2. Analyze structural systems, their subsystems, and their components.
3. Select appropriate tools, equipment, materials, and processes in construction.
4. Identify the constraints (e.g., building codes, environmental sustainability, structural forces) that affect residential, commercial, civil, and industrial construction and renovation.
5. Evaluate factors involved in estimating, bidding, and scheduling.

9 Knowledge of laboratory management and safety

1. Evaluate the requirements for safety precautions and practices in technology education laboratories for staff and all students.
2. Identify student guidelines and processes for safe, functional use, storage, and maintenance of tools, machines, and equipment.
3. Identify student guidelines and processes for safe, functional use, storage, and disposal of materials and supplies.
4. Select precautions and practices in preventing and extinguishing different classes of fires.
5. Identify components of a comprehensive safety program for work and learning spaces (e.g., emergency procedures, OSHA regulations).
6. Select appropriate tools, machines, equipment, materials, and supplies for program objectives.
7. Determine the procedures for developing and maintaining an inventory of tools, machines, equipment, materials, supplies, and records.

10 Knowledge of technology education, professional development, and standards-based instruction and assessment

1. Identify the social, historical, and philosophical foundations of technology education and STEM programs.
2. Apply appropriate instructional and assessment strategies for developing learning activities, including project-based learning, that are aligned with standards (e.g., the Standards for Technological Literacy, Florida Curriculum Frameworks, Common Core State Standards).
3. Determine how technology education supports and fosters STEM learning through cross-curricular integration.
4. Apply instructional strategies and measurement instruments for developing and assessing the cognitive learning, psychomotor processes, and problem-solving skills (e.g., critical thinking, lateral problem solving) of diverse student populations.
5. Evaluate the relationships between technology education, career readiness, and career and technical student organizations.
6. Identify components of a lifelong plan for professional and technical development, including learning theories, pedagogical practices, assessment techniques, research findings, and changing technologies.