



TEST DESIGN AND FRAMEWORK

TEST DESIGN

Technology Education

The **Technology Education** assessment consists of **two tests**. Each test contains a section with selected-response questions and a section with constructed-response assignments. Each section counts for a percentage of your total test score. The areas of content assessed by each test, the approximate number of selected-response questions and constructed-response assignments in each content area, and the percentage of your total test score derived from each test section are shown in the tables below. Further information regarding the content included in each subarea can be found in the test framework.

■ Test I (Test Code 048)

Subareas:	Objectives	Approximate Number of Selected-Response Questions	Constructed-Response Assignments
➤ Fundamentals of Technology	0001–0004	22	1
➤ Manufacturing Technology and Biotechnology	0005–0008	22	1
➤ Construction Technology	0009–0011	16	
TOTAL		60	2
Percentage of Test Score		80%	20%

■ Test II (Test Code 049)

Subareas:	Objectives	Approximate Number of Selected-Response Questions	Constructed-Response Assignments
➤ Communication Technology	0012–0016	28	1
➤ Energy and Power Technology	0017–0019	16	1
➤ Transportation Technology	0020–0022	16	
TOTAL		60	2
Percentage of Test Score		80%	20%



Georgia Assessments for the
Certification of Educators®

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TEST FRAMEWORK

Technology Education

FUNDAMENTALS OF TECHNOLOGY

0001 Understand the role of technology in global society.

For example:

- demonstrating knowledge of the social, political, economic, and environmental effects of technology
- demonstrating knowledge of the effects of society, politics, and the economy on the regulation and development of technology
- identifying important events and trends in the history of technology

0002 Understand connections between technology, engineering, and other disciplines.

For example:

- applying mathematical skills to solve technology-related problems (e.g., cost estimation, storage capacity requirements, circuit analysis, use of algebraic concepts and geometry in problem solving)
- applying knowledge of physics to solve technology-related problems (e.g., moment of inertia, momentum, torque, gravitational force)
- applying knowledge of chemistry and biology to solve technology-related problems (e.g., environmental protection, stack scrubbers, fuel cells, biotechnology)

0003 Understand the design process and its role in engineering and technology.

For example:

- identifying steps in the design process and their characteristics
- analyzing the role of the design process in technology and the roles of modeling, prototyping, and the universal systems model in the design process
- applying procedures for setting, interpreting, and meeting design criteria and constraints (e.g., ergonomic considerations, design for manufacturability, customer feedback)
- applying critical-thinking skills to evaluate designs and solve technological problems

0004 Understand basic business concepts and skills required in the modern workplace.

For example:

- applying knowledge of basic economic concepts (e.g., supply and demand, opportunity cost, pricing, competition) in a given situation
- recognizing types of businesses (e.g., sole proprietorship, limited liability corporation, not-for-profit)
- recognizing the role of research and development in business and the roles of invention, innovation, and experimentation in solving problems
- locating and interpreting information in a variety of formats (e.g., manuals, graphs, reports, schedules, flowcharts) and determining appropriate formats for organizing, communicating, and presenting information
- recognizing personal qualities and interpersonal skills that facilitate success in the workplace (e.g., ethics, reliability, punctuality, creativity, integrity)
- identifying effective strategies and techniques for career development, including the use of technology in job seeking and career enhancement

MANUFACTURING TECHNOLOGY AND BIOTECHNOLOGY

0005 Understand the principles and characteristics of manufacturing technology.

For example:

- identifying types of manufacturing businesses, global markets, and major material and service providers
- identifying types of manufacturing techniques (e.g., just-in-time, continuous, custom, automated) and their characteristics
- demonstrating knowledge of legal and regulatory issues related to manufacturing (e.g., environmental regulations, patents, trademarks, copyrights, trade secrets, labeling, warranties, OSHA and EPA regulations, product recalls)
- demonstrating knowledge of procedures for ensuring quality assurance in a manufacturing facility (e.g., sampling, monitoring, product testing, setting benchmarks and tolerances)
- identifying appropriate plans of action to take in given management situations in manufacturing (e.g., resource management, supply chain management)



0006 Understand the selection and use of tools, equipment, and materials in manufacturing technology.

For example:

- selecting appropriate tools, equipment, and materials for a given application (e.g., computers and automation equipment)
- identifying characteristics and principles of operation of tools, equipment, and materials
- identifying procedures for ensuring safety in the use of tools, equipment, and materials

0007 Understand processes and procedures related to manufacturing technology.

For example:

- identifying technical processes used in manufacturing (e.g., casting, forming, conditioning, separating, fastening, finishing, packaging) and their characteristics and uses
- identifying appropriate manufacturing processes and procedures in a given situation
- demonstrating knowledge of safe procedures for operating, troubleshooting, and maintaining manufacturing equipment and systems

0008 Understand the principles and applications of biotechnology.

For example:

- demonstrating knowledge of the scientific bases of biotechnology (e.g., principles of genetics and biomechanics)
- identifying techniques used in biotechnology (e.g., gene-splicing, gene therapy, cloning, hydroponic techniques, aquaculture)
- identifying applications of biotechnology (e.g., improved crop yields, increased shelf life of produce, prosthetics, disease control)

CONSTRUCTION TECHNOLOGY

0009 Understand the principles and characteristics of construction technology.

For example:

- identifying types of construction businesses, global markets, and major material and service providers (e.g., architects, civil engineers, designers, contractors)
- demonstrating knowledge of legal and regulatory issues related to construction (e.g., environmental regulations, building codes, zoning, Americans with Disabilities Act, OSHA regulations)
- demonstrating knowledge of procedures for ensuring quality assurance in a construction project (e.g., monitoring, setting benchmarks and tolerances, interpreting and checking specifications, inspecting completed and in-process work)



0010 Understand the selection and use of tools, equipment, and materials in construction technology.

For example:

- selecting appropriate tools, equipment, and materials (e.g., carpentry, masonry, plumbing, electrical) for a given application
- identifying characteristics and principles of operation of tools, equipment, and materials
- identifying procedures for ensuring safety in the use of tools, equipment, and materials

0011 Understand processes and procedures related to construction technology.

For example:

- identifying processes and procedures (e.g., excavating, loading, hauling, compacting, framing, finishing) used in various types of construction projects (e.g., residential and commercial buildings, roadways, bridges, tunnels) and their characteristics
- identifying appropriate construction processes and procedures in a given situation
- demonstrating knowledge of safe procedures for operating, troubleshooting, and maintaining construction tools, equipment, and systems

COMMUNICATION TECHNOLOGY

0012 Understand the principles and characteristics of communication technology.

For example:

- identifying types of communication businesses, global markets, and major material and service providers
- recognizing the role of communication in society (e.g., disseminating information, reinforcing culture, shaping personal values)
- identifying procedures for locating and retrieving information (e.g., Internet search techniques and strategies, database queries and searches, downloading and storing data)
- demonstrating knowledge of procedures for ensuring quality assurance in communications industries (e.g., sampling; monitoring; setting and checking specifications, benchmarks, and tolerances)

0013 Understand the selection and use of tools, equipment, and materials in communication technology.

For example:

- identifying characteristics and principles of operation of tools, equipment, and materials (e.g., computer hardware and software, photographic and video equipment and materials, printing equipment, wireless devices, radio frequency identification [RFID])
- selecting appropriate tools, equipment, and materials for a given application
- demonstrating knowledge of procedures for ensuring safety in the use of tools, equipment, and materials

0014 Understand processes and procedures related to drafting and design.

For example:

- identifying types and characteristics of sketches and drawings used in the design process
- identifying and interpreting symbols and lines used in drafting and computer-aided design (CAD)
- interpreting technical drawings and their notations (e.g., architectural drawings, isometric drawings, dimensioning, measurements and specifications, tolerances, multiview drawing, section drawing)
- demonstrating knowledge of computer technology used to produce technical drawings (e.g., CAD/CAM, plotters, rapid prototyping, modeling software)

0015 Understand processes and procedures related to graphic communications and electronic publishing.

For example:

- demonstrating knowledge of elements of graphic design (e.g., color, line, proportion, symmetry)
- identifying types and characteristics of digital images (e.g., RGB and CMYK colors, resolution, scaling, color correcting)
- demonstrating knowledge of processes and procedures related to image preparation and production (e.g., image capture, image editing, image transfer, image assembly, image carriers, relief, screen, lithography, non-impact)
- demonstrating knowledge of procedures for using computer hardware and software in electronic publishing (e.g., scanners, printers, photo-imaging software, drawing software, computer-aided publishing software)

0016 Understand processes and procedures related to electronic communication and information technology.

For example:

- demonstrating knowledge of processes and procedures related to telecommunication systems (e.g., signal processing, fiber optics, modulation and demodulation, interlacing, tuning, use of satellites)
- demonstrating knowledge of procedures for producing multimedia productions (e.g., video production, computer animation, 3-D modeling, titling, digital graphics, audio mixing, Web development)
- demonstrating knowledge of processes and procedures related to information and computer technology (e.g., software installation, computer upgrades, network configuration)
- demonstrating knowledge of procedures for selecting, operating, troubleshooting, and maintaining computers and computer networks

ENERGY AND POWER TECHNOLOGY

0017 Understand the principles and characteristics of energy and power technology.

For example:

- identifying types of energy and power businesses, global markets, and major material and service providers
- identifying types of energy (e.g., kinetic, potential) and energy sources (e.g., renewable, nonrenewable) and their characteristics
- demonstrating knowledge of legal and regulatory issues related to energy and power technology (e.g., liability, power industry regulation, OSHA regulations)
- demonstrating knowledge of procedures for ensuring quality assurance in energy and power technology (e.g., sampling, monitoring, setting benchmarks and tolerances, energy industry regulations, OSHA regulations)

0018 Understand the selection and use of tools, equipment, and materials in energy and power technology.

For example:

- selecting appropriate tools, equipment, and materials for a given application (e.g., multimeters, diodes, transistors, transformers, dynamometers, insulators, capacitors, conductors)
- identifying characteristics and principles of operation of tools, equipment, and materials
- demonstrating knowledge of procedures for ensuring safety in the use of tools, equipment, and materials



0019 Understand processes and procedures related to energy and power technology.

For example:

- demonstrating knowledge of processes, procedures, and operating principles related to power generation (e.g., wind, hydro, nuclear, solar, fossil fuel, fuel cells)
- identifying basic principles of electricity and electronics (e.g., flow of electrons, conductors, insulators, semiconductors)
- solving mathematical problems related to work, power, and energy (e.g., efficiency, Ohm's law, Pascal's law, time, distance, velocity)
- demonstrating knowledge of safe procedures for operating, troubleshooting, and maintaining energy and power equipment and systems

TRANSPORTATION TECHNOLOGY

0020 Understand the principles and characteristics of transportation technology.

For example:

- identifying types of transportation businesses, global markets, and major material and service providers
- recognizing how transportation technology is affected by legal and regulatory issues (e.g., liabilities, FAA and DOT regulations, operator licenses, vehicle registrations, automotive recalls)
- demonstrating knowledge of procedures for ensuring quality assurance in transportation technology (e.g., preventive maintenance, tracking, setting benchmarks)

0021 Understand the selection and use of tools, equipment, and materials in transportation technology.

For example:

- selecting appropriate tools, equipment, and materials for a given application
- identifying characteristics and principles of operation of tools, equipment, and materials
- demonstrating knowledge of procedures for ensuring safety in the use of tools, equipment, and materials



0022 Understand processes and procedures related to transportation technology.

For example:

- identifying technical processes and procedures (e.g., energy storage, propulsion, guidance, control) used in various types of transportation systems (e.g., land, air, marine, space) and their characteristics
- demonstrating knowledge of processes for transmitting power in transportation systems (e.g., pneumatics, hydraulics, gears, pulleys, transmissions)
- identifying appropriate technical processes and procedures in a given transportation technology situation
- demonstrating knowledge of safe procedures for operating, troubleshooting, and maintaining transportation equipment and systems