

Praxis® Technology Education (5051) Study Plan

Test Content Categories	Description of content	How well do I know the content? (scale 1–5)	What resources do I have/need for this content?	Where can I find the resources I need?	Dates I will study this content	Date completed
I. Technology and Society (15%)						
A. Understands the nature of technology, technology education, and technological literacy						
B. Understands how invention and innovation occur, how they are influenced by cultural and economic factors, and how they are built on existing technologies						
C. Understands how technological development is influenced by knowledge from other fields of study, especially mathematics and the sciences						
D. Understands the influence that significant technological innovations have had on human history and on today's world						
E. Understands critical changes in technology through the different periods of human history (e.g., the Iron Age, the Industrial Revolution, the information age)						
F. Understands how various factors (e.g., marketing, economics, environment) affect technology development						
G. Understands the impact of technology on society and on social institutions such as the family and the political system						
H. Understands ways to decrease the negative environmental impact of technological systems and processes (e.g., by reducing resource inputs, reducing waste,						

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recycling) and knows how to evaluate trade-offs with respect to different approaches						
I. Understands the relationships between engineering, mathematics, science, and technology						
II. Engineering or Technological Design and Problem Solving (20%)						
A. Understands how to implement and document the steps of a design process						
B. Knows how to select and use tools—especially software—in a design process, including the creation, testing, evaluation, and communication of solutions						
C. Understands how to identify a problem and define design requirements (criteria and constraints)						
D. Knows how to generate possible solutions to design problems and how to select, develop, and refine design proposals using analysis and creativity						
E. Knows how to evaluate, test, and optimize designs using specifications, design principles, modeling, experimentation, and prototyping						
F. Understands how to organize and communicate the solution to a design problem—for example, by the use of verbal, graphic, quantitative, written, and three-dimensional representations						

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G. Understands systems thinking (i.e., input, process, output, feedback) and knows how to model it for students						
H. Understands there is no such thing as a perfect design and that making design decisions involves balancing trade-offs						
I. Knows how to operate, maintain, and troubleshoot technological systems						
J. Knows how to apply the design process to systems and problems in energy, power, and transportation						
K. Knows how to apply the design process to problems in information technology and communications technology						
L. Knows how to apply the design process to problems in manufacturing and construction						
III. Energy, Power, and Transportation (15%)						
A. Understands and knows how to utilize various types of control systems (e.g., electrical, chemical, mechanical)						
B. Knows how to apply mathematical and scientific principles to solve problems involving the harness, transfer, loss, transmission, and conversion of power and energy						
C. Understands energy utilization systems (e.g., internal combustion, external combustion, hybrid)						
D. Knows the inputs used in transportation systems (e.g., capital, materials, people)						

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E. Understands the components of vehicles and support systems, including infrastructures and subsystems for propulsion, suspension, control, and guidance						
F. Understands the different processes involved in transportation operations (e.g., receiving, storing, loading, moving, unloading), along with the part each process plays in the efficiency of the overall system						
G. Understands the different forms of energy— mechanical, thermal, chemical, nuclear, etc.—and the differences between them						
H. Understands and can model the relationship between energy, power, and work						
I. Knows how energy is measured and controlled						
J. Knows how to apply concepts of energy and power to solve problems related to them						
K. Knows the different ways power is generated and used, including the differences in efficiency and impact on the environment						
L. Knows and applies safety practices related to working with energy and power						
IV. Information and Communication Technologies (15%)						
A. Understands major concepts and terminology related to information systems						
B. Given a communications problem or task, can identify and knows how to use						

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appropriate tools and materials, especially software and hardware, to address it						
C. Knows how to use operating systems, software applications, communication devices, and networking components in the classroom/laboratory						
D. Recognizes the various types of network structures (e.g., LAN, MAN, WAN)						
E. Understands the concepts that make up a communications system: source, encoding, transmission, reception, decoding, storage, retrieval, and destination						
F. Understands concepts and terminology related to audio, video, electronic, data, technical, and graphic communications						
G. Knows how to arrange the elements of a communication message so that the message is effective and aesthetically pleasing						
H. Knows the impact of communication technology and media on society and culture						
I. Understands legal and ethical issues regarding the use of communications and information technologies (e.g., copyright, privacy, security)						
J. Knows issues and trends in information and communications technologies						
V. Manufacturing and Construction Technologies (15%)						
A. Knows the management functions used in construction and manufacturing (e.g., planning, organizing, directing)						

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B. Knows how to apply a systems model to manufacturing and construction processes (inputs, processes, outputs, feedback)						
C. Knows the key concepts associated with the efficiency of production (e.g., automation, interchangeable parts, just-in-time inventory)						
D. Understands the differences between manufacturing systems that involve flexible, continuous, batch, and custom production						
E. Knows the variety and properties of materials used in the manufacture of products and can evaluate the suitability of material to different manufacturing purposes						
F. Knows the primary processing methods of converting raw materials into industrial materials or standard stock (e.g., electrochemical, mechanical, thermal) and the secondary processing methods of converting industrial materials into finished products (e.g., casting and molding, forming, assembling)						
G. Understands the key concepts and terminology related to construction						
H. Knows the variety and properties of materials used in the construction of structures and can evaluate the suitability of material to different construction purposes						
I. Understands the numerous constraints on structural designs, such as building codes, cost, and function						

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J. Knows the systems and subsystems of buildings and structures and the functions they perform						
K. Understands static and dynamic loads and how they produce forces (e.g., compression, tension, torsion) that affect stability and failure in a structure						
L. Understands the variety of processes used in construction, including on-site and prefabricated techniques						
VI. Pedagogical and Professional Studies (20%)						
A. For a technology education program, knows how to create and implement a curriculum based on state and national standards (e.g., Standards for Technological Literacy)						
B. Knows how to select appropriate instructional content and develop learning activities						
C. Knows how to choose, adapt, and implement instructional strategies appropriate to both the content and the level at which the content is being taught						
D. Understands the importance of designing and implementing instructional activities that emphasize problem solving						
E. Knows how to apply appropriate instructional technology equipment, materials, processes, and tools to enhance teaching and to actively engage students in learning						

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F. Knows how to select and use a variety of assessment methods—formal and informal, formative and summative—to monitor and evaluate both student learning and instructional effectiveness						
G. Knows how to create and maintain a safe and healthy learning environment (e.g., in a laboratory), where appropriate practices and procedures are followed in the use of equipment, materials, and tools						
H. Is aware of the relationship between classroom learning and student organizations						
I. Understands the relationship between technology education programs and advisory committees						
J. Knows how to modify instructional activities and methods to address students' diverse needs						
K. Understands the importance of promoting technology education internally and externally (e.g., to the community, school staff, and students)						
L. Understands the importance of becoming involved in professional associations and organizations related to technology education						
M. Understands the importance of the professional growth of the technology education teacher via formal instruction, in-service activities, and professional association meetings						

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N. Is familiar with current educational policy, legislation, and funding opportunities						
O. Is familiar with opportunities for further education and careers						
P. Is aware of the history, issues, and trends related to technology education						
Q. Is familiar with the management of resources, records, and budgets						
R. Recognizes the importance of collaborating with other school faculty to design instruction that integrates knowledge and skills from other core academic subject areas into instruction in technology						