STUDY GUIDE

Technology Specialist (178)

This test is now delivered as a computer-based test.

See www.il.nesinc.com for current program information.

Illinois State Board of Education

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Readers should be advised that this study guide, including many of the excerpts used herein, is protected by federal copyright law.
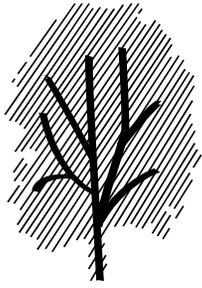
General Information About the Illinois Licensure Testing System

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General Information About the Illinois Licensure Testing System

Field-Specific Information

- **Test Subareas and Objectives**
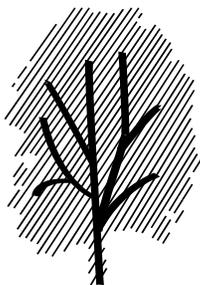- **Practice Test Questions**
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INTRODUCTION

The content tests are designed to assess a candidate's knowledge of content in the specific teaching, school service personnel, or administrative field in which licensure is sought. The tests are based on current and relevant expectations for teacher preparation students and for teachers in Illinois as defined by the Illinois Content Area Standards for Educators. This study guide is designed to focus your preparation by helping you become familiar with the format and content to be covered on the tests.

This section includes a list of the test subareas and objectives, practice test questions for the field covered by this study guide, an answer key, and an explanation of the test score report.

TEST SUBAREAS AND OBJECTIVES

The content covered by the test is organized into subareas. You will find a list of subareas at the beginning of the list of test objectives. Within each subarea, the content is further defined by a set of objectives. Each objective comprises two major parts:

1. the *objective statement*, which broadly defines the knowledge and skills that an entry-level educator needs to know; and

2. the *descriptive statements*, which describe in greater detail the types of knowledge and skills covered by the test objective.

The test objectives are broad, conceptual, and meaningful statements, written in language that reflects the skills, knowledge, and understanding that an entry-level teacher needs in order to teach effectively in an Illinois classroom. A test consists of test questions that measure an examinee's mastery of these test objectives.

Below is an example of a test objective statement and its accompanying descriptive statements for the Elementary/Middle Grades test.

Objective Statement

Understand word analysis strategies and vocabulary development and how to use effective, developmentally appropriate approaches to promote students' word analysis and vocabulary skills.

Descriptive Statements

- Demonstrate knowledge of phonics and its role in decoding; of ways to assess students' phonic skills; and of effective instructional strategies, activities, and materials for promoting students' phonetic analysis skills.

- Demonstrate knowledge of word analysis strategies, including syllabication, morphology (e.g., use of affixes and roots), and context clues; of ways to assess students' use of word analysis strategies; and of effective instructional strategies, activities, and materials for promoting students' word analysis and contextual analysis skills.

- Demonstrate knowledge of the role of vocabulary development in reading; of ways to assess students' vocabulary development; and of effective instructional strategies, activities, and materials for promoting students' vocabulary development.

PRACTICE TEST QUESTIONS

The practice test questions included in this section are designed to give the examinee an introduction to the nature of the test questions included on the ILTS test for each field. The practice test questions represent the various types of test questions you may expect to see on an actual test; however, they are **not** designed to provide diagnostic information to help you identify specific areas of individual strengths and weaknesses or predict your performance on the test as a whole. Use the answer key located after the practice test questions to check your answers.

To help you identify which test objective is being assessed, the objective statement to which the question corresponds is listed in the answer key. When you are finished with the practice test questions, you may wish to go back and review the entire list of test objectives and descriptive statements once again.

I. Foundations of Technology in Education
II. Infrastructure
III. Integration of Technology into Instruction
IV. Management, Planning, and Professional Development

SUBAREA I—FOUNDATIONS OF TECHNOLOGY IN EDUCATION

0001   Understand concepts and skills relevant to learning technologies, tools, and resources.

For example:

- Demonstrate knowledge of concepts and skills (e.g., ease of use, accessibility, age-appropriateness, Web-based interoperability) related to learning technologies, including keyboarding and information access and delivery in classroom, lab, and administrative settings.

- Demonstrate knowledge of concepts and skills related to using classroom and administrative productivity tools.

- Demonstrate knowledge of problem-solving principles and skills (e.g., identifying the problem, using strategies) and how to use technology resources to solve problems.

0002   Understand social, ethical, legal, and security issues related to the use of technology in education.

For example:

- Analyze the social, ethical, and legal issues surrounding the responsible use of technology.

- Demonstrate familiarity with issues of equity regarding the use of computers and other learning technologies.

- Demonstrate knowledge of procedures for maintaining users' privacy, security, and safety when using computers and other learning technologies.

0003   Understand educational and technology-related research, the psychology of learning, and instructional design principles that guide use of computers and technology in education.

For example:

- Recognize principles and practices of educational research in educational technology.

- Recognize major research findings and trends that relate to the integration of technology in an elementary and/or secondary environment.

- Demonstrate knowledge of the relationships of theories of learning, teaching, and instructional design to the use of technology to support learning.

- Relate the use of technology in schools to social and historical foundations of education, including educational reform efforts.

- Demonstrate familiarity with research related to human and equity issues concerning the use of computers and related technologies in education.

- Demonstrate an understanding of how to evaluate the use of a specific technology in a K–12 environment.

0004 **Understand how to select, install, manage, and maintain the infrastructure of technology in the classroom setting.**

For example:

- Demonstrate an understanding of how to plan and configure computer/technology systems and related peripherals in laboratory, classroom cluster, and other appropriate instructional arrangements.

- Demonstrate knowledge of the development of school/laboratory policies, procedures, and practices related to the use of computers and other learning technologies.

- Demonstrate knowledge of how to research, evaluate, and develop recommendations for purchasing instructional software and learning technology systems to support and enhance the school curriculum.

- Analyze procedures for the organization, management, and security of hardware and software.

- Demonstrate an understanding of how to configure a computer system, configure software packages, and troubleshoot and maintain various hardware/software configurations.

0005 **Understand how to install, customize, and configure the operating systems of computers and computer networks in school settings.**

For example:

- Identify characteristics of the major operating systems associated with computing platforms found in schools and demonstrate an understanding of how to manipulate preferences, defaults, and other selectable features.

- Demonstrate knowledge of how to evaluate, install, troubleshoot, and maintain computer operating systems for classrooms and laboratories.

- Identify characteristics of network software packages used to operate a computer network.

- Demonstrate knowledge of the use of networking software to manage the operation of a local area network (LAN).

- Analyze issues related to selecting, installing, and maintaining wide area networks (WAN) for school districts.

0006   Understand types, uses, and selection of software in both classroom and administrative environments.

For example:

- Identify characteristics and uses of software used in classroom and administrative settings, including productivity tools, information access/telecommunication tools, multimedia/hypermedia tools, school management tools, evaluation/portfolio tools, and computer-based instruction.

- Demonstrate an understanding of purchasing strategies and procedures for acquiring administrative and instructional software for educational settings.

- Demonstrate knowledge of evaluation criteria for software and identify reliable sources of software evaluations.

- Recognize methods of installation, inventory, and management of software libraries and ethical and legal procedures for maintaining them.

- Identify types, characteristics, and uses of assistive technology for students and teachers with special needs and recognize resources to assist in their procurement and implementation.

0007   Understand the use of information access and delivery resources to support the curriculum.

For example:

- Recognize how to use information access and telecommunication tools to support research and instruction throughout the curriculum.

- Demonstrate an understanding of the characteristics and uses of distance learning delivery systems, including computer, audio, and video conferencing.

- Demonstrate knowledge of how to create multimedia presentations using advanced features of a presentation tool and how to deliver them using computer projection systems.

- Demonstrate knowledge of how to install, configure, and use local mass storage devices and media to store and retrieve information and resources.

SUBAREA III—INTEGRATION OF TECHNOLOGY INTO INSTRUCTION

0008   Understand how to plan, deliver, and assess instruction related to learning technologies.

For example:

- Demonstrate an understanding of strategies for heterogeneous grouping and collaboration using learning technologies.

- Recognize considerations and practices related to using learning technologies with diverse populations, including at-risk students and students with disabilities.

- Demonstrate knowledge of integrated technology classroom activities that involve teamwork or small-group collaboration, including their design and implementation.

- Demonstrate knowledge of evaluation strategies and methods for assessing the effectiveness of instructional units that integrate computers and other learning technologies.

0009 **Understand concepts and skills related to implementing, promoting, and supporting technology literacy across the curriculum.**

For example:

- Demonstrate knowledge of issues and strategies related to the implementation and revision of the computer/technology literacy curriculum to reflect ongoing changes in technology.

- Demonstrate knowledge of the uses of media and online tools, such as those related to the World Wide Web (Internet), television, audio technology, print media, and graphics.

- Demonstrate knowledge of methods for promoting the ethical and legal use of technology.

- Demonstrate knowledge of student guidance resources, career awareness resources, and student support activities related to computing and technology as a career option for students.

0010 **Understand concepts and skills related to instructional design and product development.**

For example:

- Identify the characteristics and uses of current authoring environments* and evaluate their appropriateness for classroom applications.

- Demonstrate an understanding of concepts and skills related to the use of modern authoring tools.*

- Apply instructional design principles to the design of screens, text, graphics, audio, and video when developing instructional products.

- Demonstrate an understanding of how to test and evaluate instructional products once they have been created.

- Identify and apply instructional design principles to develop substantive, interactive, multimedia, and computer-based instructional products.

0011 **Understand the development of curricular plans and instructional programs that are based on standards and guidelines and that integrate computers and other learning technologies.**

For example:

- Identify and demonstrate an understanding of standards and guidelines for developing curricular plans and instructional programs that integrate technology into the curriculum.

- Demonstrate knowledge of accepted principles of strategic planning that facilitate the design of instructional programs for teaching with computers and related technologies.

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*authoring environments/tools
software that allows the user to easily create computer-enhanced products of all types, including multimedia, interactive, and Web-based teaching aids

SUBAREA IV—MANAGEMENT, PLANNING, AND PROFESSIONAL DEVELOPMENT

0012   Understand issues related to facilities and resource management.

For example:

- Demonstrate an understanding of budget planning and management procedures related to educational computing and technology facilities and resources (e.g., Illinois infrastructure to support educational technology).

- Identify resources, including funding and infrastructure, available at the local, state, and/or national level.

- Demonstrate knowledge of effective methods for developing grant proposals.

- Demonstrate knowledge of how to plan, implement, and evaluate strategies and procedures for resource acquisition and for managing technology-based systems, including hardware and software.

- Identify and analyze procedures for basic troubleshooting, preventive maintenance, and procurement of system-wide technological maintenance services.

- Demonstrate knowledge of methods for developing policies and procedures concerning staffing, scheduling, and security for managing computers and technology in a variety of instructional and administrative settings.

0013   Understand strategies for and issues related to managing the change process within educational reform efforts.

For example:

- Recognize how to evaluate school and district technology plans and recommend improvements.

- Demonstrate an understanding of effective group-process skills and issues related to building collaborations, alliances, and partnerships involving educational technology initiatives.

- Analyze educational reform efforts and recommend building-level changes and professional development strategies (e.g., block scheduling, cross-subject units of instruction) that facilitate the integration of technology into all content areas.

- Analyze evaluation findings to recommend modifications in technology implementations.

0014   Understand staff development activities to support professional growth in learning technologies.

For example:

- Demonstrate an understanding of how to design and customize staff development programs that support professional growth in learning technologies for different audiences.

- Identify professional organizations, groups, and resources that support the field of educational computing and technology.

- Identify resources for staff development in learning technologies.

1. A sixth grade classroom teacher has asked the school technology specialist for assistance in integrating some of the school's multimedia resources into an upcoming unit on South America. It would be most appropriate for the technology specialist to explain to the teacher that the use of technology should be determined primarily by:

   A. the teacher's level of comfort with classroom technology.

   B. the educational objectives of the unit being presented.

   C. the ability of the resources and presentation to entertain students.

   D. the amount of in-class time that will be devoted to the unit.

2. A teacher is configuring a computer so that when using the keyboard, combinations of keys can be entered one key at a time instead of having to press two or more keys simultaneously. This feature is most likely to benefit a student who:

   A. lacks confidence using the keyboard.

   B. is only able to use one hand when entering data using the keyboard.

   C. uses the mouse rather than the keyboard for all tasks.

   D. uses an oversized keyboard because of a visual impairment.

3. Mr. Turner is observing Ms. Rialto's classroom and is interested in the educational software being used by the students. Mr. Turner borrows Ms. Rialto's CD and installs it on the computer in his own classroom. Ms. Rialto has a single-user license for the software. Which of the following best describes this situation?

   A. Installing the software is not a violation of copyright law if both Mr. Turner's and Ms. Rialto's classrooms are in the same school.

   B. Installing the software is a violation of copyright law because it is contrary to the terms of the licensing agreement.

   C. Installing the software is not a violation of copyright law provided that the two teachers do not use the software at the same time.

   D. Installing the software is a violation of copyright law only if Ms. Rialto has already made her allowed backup copy of the software.

4. A teacher is planning a writing class in which students will either be writing and editing at a computer or meeting with the teacher for consultation about their work. Which of the following is an important question relating to the affective domain of learning for the teacher to consider prior to implementing this course?

A. Is the type or version of the word processor likely to influence the quality of work produced by the students?

B. Should the students be allowed to post their unedited drafts on the school's Web site prior to the teacher's review?

C. Will the students in the class be allowed to use the range of software tools and applications necessary to gain technological literacy?

D. How is the extended amount of time spent on the computer likely to influence the social interactions that typically occur in the classroom?

5. A school uses a central server to provide Internet connections for classroom computers throughout the school. Which of the following activities is most likely to defeat the purpose of the server's firewall?

A. A teacher allows students to download and save files accessed on the Web.

B. A teacher uses the classroom telephone outlet to connect an external modem to a computer.

C. A teacher leaves a computer connected to the Internet all day although it is not being used.

D. A teacher downloads a new copy of a free Web browser and installs it on a classroom computer.

6. When scanning a disk for viruses, it is most important to check files having which of the following extensions?

   A. .jpg

   B. .pdf

   C. .wav

   D. .exe

7. A teacher installs a network card in a new computer and connects the computer to the local area network (LAN) through a hub. The computer functions properly on the network, but the next day when the computer boots it is unable to access the network. All connectors are still connected properly, and other computers connected to the same hub are functioning properly. Which of the following is most likely causing this problem?

   A. The computer has been assigned a static IP, and the server assigns IPs dynamically.

   B. The number of computers assigned to the hub is greater than the number of available ports on the hub.

   C. The server uses TCP/IP, while the computer is configured for a different protocol.

   D. The other computers on the LAN are transferring data at a combined rate that is close to the server's data transfer rate.

8. In a Windows®-based operating system, which of the following tasks is best performed using the Device Manager window?

   A. uninstalling word-processing software

   B. configuring a printer to use draft settings

   C. changing the interrupt used by a modem

   D. changing the settings used by a screen saver

9. A committee of middle school teachers is meeting to begin the process of finding a software program to improve students' keyboarding skills. Which of the following steps should the committee take first in this process?

   A. Download a trial version of the most popular software for evaluation.

   B. Conduct a survey to determine the importance of keyboarding skills in the classroom.

   C. Define the objectives they would like the software to meet.

   D. Decide what type of user interface would be most appropriate.

10. A high school with limited resources wants to take advantage of distance learning courses offered at a local community college to provide its students with advanced placement classes, but the video being displayed at the high school is halting and the video and audio are out of synch. Which of the following factors is most likely to be causing the problem?

A. resolution of the display

B. quality of the video camera used at the college

C. amount of available bandwidth

D. computer platform incompatibility between the two locations

11. Which of the following strategies would be most effective in ensuring that a school Web page is accessible to visually impaired users?

A. Use alt tags to describe images.

B. Use href tags for hyperlinks.

C. Use image maps for navigation.

D. Use automatic page refresh for all pages.

12. Students in a music class are using audio recording software with a microphone to record live music performances as .wav files. When the students play back their first recording they find that the sound quality is very poor. Which of the following is most likely to solve this problem?

A. increasing the digital sampling rate

B. playing the recording through the computer's internal speaker

C. rerecording using MIDI devices

D. saving the file in the MP3 file format

13. The primary advantage of using a vector program rather than a paint program for creating a graphic image is that:

A. the quality of an image created with a vector program will be maintained no matter how much it is enlarged.

B. the number of options for selecting the color mode when creating an image with a vector program is greater.

C. a vector program allows files to be saved in GIF and JPEG formats for use on the Web.

D. a vector program provides greater flexibility when creating and working with layers in an image.

14. A high school junior is interested in a summer job with a local electronics company, but the job requires A+ certification. The student has built and serviced computers and has helped install and configure the school's computer network. The student also is able to troubleshoot most operating system problems. The student has asked the technology specialist for advice on how to acquire the needed certification. In this situation, the technology specialist would most likely suggest that the student:

A. find a number of other students who also would like A+ certification so that the school could offer a course.

B. enroll in an A+ certification course offered by a local community college.

C. buy an A+ certification study guide and use it to study for the next A+ certification test.

D. accept a less demanding job at the electronics company and use it to move up to the desired job.

15. A teacher creates a Web page using Web authoring software and finds that the page is available locally but not on the Internet. Which of the following concepts is most important to explain to this teacher?

A. Web server

B. FTP protocol

C. bandwidth

D. firewall

16. Administrators in a middle school want to foster an environment conducive to the comprehensive integration of technology into the educational setting. To achieve this goal, it is most important for the administrators to:

A. cultivate a culture of responsible risk taking and to support innovation in the use of technology.

B. establish strict guidelines and requirements for technology use within the curriculum.

C. showcase teachers who are actively incorporating technology into the curriculum.

D. cultivate a culture of acceptance where teachers infuse technology into the curriculum at their own pace.

17. When planning for the successful management of technology systems at the school level, it is most important to:

A. create a plan that takes into consideration the total cost of ownership.

B. create guidelines for access to technology by teachers, students, and staff.

C. develop a schedule for the replacement of obsolete or malfunctioning equipment.

D. create a plan that utilizes the expertise of teachers and students to minimize maintenance costs.

18. The E-Rate is the discount schools receive for telecommunication services and Internet access. Under this federal program, schools may also be eligible for discounts on:

    A. the internal network wiring and connections.

    B. computers for teachers and students.

    C. professional development for technology staff.

    D. educational software packages.

19. A technology specialist has been asked to help increase teachers' integration of technology into all curriculum areas. In order to achieve this goal, which of the following would be most beneficial?

    A. showcasing teachers who are successfully integrating technology into their curriculum

    B. offering intensive training on the school's content-area-based applications

    C. providing staff development workshops that model appropriate technology integration

    D. offering skills-based workshops followed by on-site support for application software

20. A teacher interested in obtaining the National Education Technology Standards could most likely obtain the information from which of the following sources?

    A. U.S. Department of Education's Office of Educational Technology (OET)

    B. International Society for Technology in Education (ISTE)

    C. *Journal of Information Technology Education*

    D. Educational Research Service (ERS)

This section contains the answers to the practice test questions in the previous section.

After you have worked through the practice test questions, check the answers given in this section to see which questions you answered correctly.

Question Number	Correct Response	Test Objective
1.	B	Understand concepts and skills relevant to learning technologies, tools, and resources.
2.	B	Understand concepts and skills relevant to learning technologies, tools, and resources.
3.	B	Understand social, ethical, legal, and security issues related to the use of technology in education.
4.	D	Understand educational and technology-related research, the psychology of learning, and instructional design principles that guide use of computers and technology in education.
5.	B	Understand how to select, install, manage, and maintain the infrastructure of technology in the classroom setting.
6.	D	Understand how to select, install, manage, and maintain the infrastructure of technology in the classroom setting.
7.	A	Understand how to install, customize, and configure the operating systems of computers and computer networks in school settings.
8.	C	Understand how to install, customize, and configure the operating systems of computers and computer networks in school settings.
9.	C	Understand types, uses, and selection of software in both classroom and administrative environments.
10.	C	Understand the use of information access and delivery resources to support the curriculum.
11.	A	Understand how to plan, deliver, and assess instruction related to learning technologies.
12.	A	Understand concepts and skills related to implementing, promoting, and supporting technology literacy across the curriculum.
13.	A	Understand concepts and skills related to implementing, promoting, and supporting technology literacy across the curriculum.
14.	C	Understand concepts and skills related to implementing, promoting, and supporting technology literacy across the curriculum.
15.	A	Understand concepts and skills related to instructional design and product development.

Question Number	Correct Response	Test Objective
16.	A	Understand the development of curricular plans and instructional programs that are based on standards and guidelines and that integrate computers and other learning technologies.
17.	A	Understand issues related to facilities and resource management.
18.	A	Understand issues related to facilities and resource management.
19.	C	Understand strategies for and issues related to managing the change process within educational reform efforts.
20.	B	Understand staff development activities to support professional growth in learning technologies.

OVERVIEW

The score report indicates whether or not you passed the test and how you performed on each test subarea. The passing scores for the Illinois Licensure Testing System were established by the Illinois State Board of Education based on recommendations from panels of Illinois educators. The passing score for each content-area test is designed to reflect the level of content knowledge and skills required to perform the job of an educator receiving an initial license in Illinois.

Passing Score

To pass a content-area test you must obtain a scaled total test score of 240 or above.

Total Test Score

The total test score is based on your performance on the entire test, specifically the number of multiple-choice questions you answered correctly.
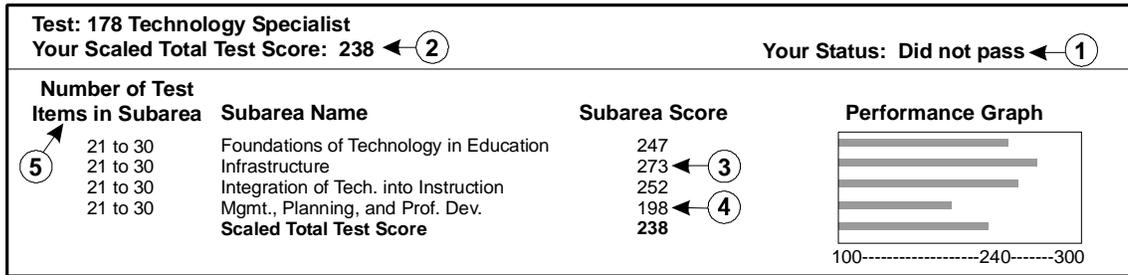
Subarea Scores

- Subarea scores are presented on the same scale as the total test score.

- Subarea scores contain different numbers of questions and are weighted differently in the computation of the total test score; therefore, the average of the subarea scaled scores generally will not equal the scaled total test score.

- Subarea scores will help you assess your areas of relative strength and weakness.

Reporting of Scores

Your results will be forwarded to the Illinois State Board of Education and to the Illinois institution(s) you indicate during the registration process. You should keep the score report you receive for your own records.

READING YOUR REPORT: A SAMPLE

A sample of a Technology Specialist test score report is provided below.

Test: 178 Technology Specialist			
Your Scaled Total Test Score: 238 ◄—②			**Your Status: Did not pass** ◄—①

Number of Test Items in Subarea	Subarea Name	Subarea Score	Performance Graph
21 to 30	Foundations of Technology in Education	247	
⑤ 21 to 30	Infrastructure	273 ◄—③	
21 to 30	Integration of Tech. into Instruction	252	
21 to 30	Mgmt., Planning, and Prof. Dev.	198 ◄—④	
	Scaled Total Test Score	**238**	100-----------------240-------300

According to the above sample, the examinee did not pass the Technology Specialist test ①, because the examinee's total test score of 238 ② is below the passing score of 240.

The examinee did better on the Infrastructure section ③ of the test than on the Management, Planning, and Professional Development section ④. The examinee will need to retake the test and achieve a total test score of 240 or higher to pass the test. The score report indicates the number of items for each subarea on the test ⑤.