Fundamentals of Technology

Study Guide

Assessment:
0901 Fundamentals of Technology

Aligned with Certiport's IC³ Global Standard 4
Overview

This study guide is designed to help students prepare for the Fundamentals of Technology assessment. It not only includes information about the assessment, but also the skills standards upon which the assessments are based and test taking strategies.

Each of the four sections in this guide provides useful information for students preparing the Fundamentals of Technology assessment.

- CareerTech and Competency-Based Education: A Winning Combination
- Fundamentals of Technology assessment
  - Assessment Information
  - Standards and Test Content
  - Sample Questions
  - Abbreviations, Symbols, and Acronyms
- Strategies for Test Taking Success
- Notes

This assessment is aligned with Certiport’s IC³ Global Standard 4 (GS4). The Internet and Computing Core (IC³) credential provides an in-depth and dynamic standard and testing program on which to develop educational programs for broad-based Internet and computing skills. The purpose of the certification is to provide students and job seekers with the educational/training foundation to succeed not only in technical careers, but also in any field or job position requiring the use of computers.

Certiport: www.certiport.com

Disclaimer
The Oklahoma Department of Career and Technology Education cannot vouch for the accuracy of the information contained in any linked site. Our intent is to simply provide a list of sites that we feel may be useful to you. Some of the links presented here are commercial sites. We do not endorse these sites or their products, and we do not request or accept any fee for inclusion on this list. The Department makes no representations or warranties, express or implied, with respect to the document, or any part thereof, including any warrantees of title, noninfringement of copyright or patent rights of others, merchantability, or fitness or suitability for any purpose.

Equal Opportunity/Non Discrimination Statement
The Oklahoma Department of Career and Technology Education does not discriminate on the basis of race, color, national origin, sex/gender, age, disability, or veteran status. Inquiries concerning application of this policy may be referred to the ODCTE Compliance Coordinator, 1500 W. 7th Ave. Stillwater, OK 74074-4364, or call 1-800 522-5810 or (405) 377-2000.
CareerTech and Competency-Based Education: A Winning Combination

Competency-based education uses learning outcomes that emphasize both the application and creation of knowledge and the mastery of skills critical for success. In a competency-based education system, students advance upon mastery of competencies, which are measurable, transferable outcomes that empower students.

Career and technology education uses industry professionals and certification standards to identify the knowledge and skills needed to master an occupation. This input provides the foundation for development of curriculum, assessments and other instructional materials needed to prepare students for wealth-generating occupations and produce comprehensively trained, highly skilled employees demanded by the work force.

Tools for Success

CareerTech education relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

Skills standards provide the foundation for competency-based instruction and outline the knowledge and skills that must be mastered in order to perform related jobs within an industry. Skills standards are aligned with national skills standards and/or industry certification requirements; therefore, a student trained to the skills standards is equally employable in local, state and national job markets.

Curriculum materials and textbooks contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources include supplemental activities that enhance learning by providing opportunities to apply knowledge and demonstrate skills.

Certification Assessments test the student over material outlined in the skills standards and taught using the curriculum materials and textbooks. When used with classroom performance evaluations, certification assessments provide a means of measuring occupational readiness.

Each of these components satisfies a unique purpose in competency-based education and reinforces the knowledge and skills students need to gain employment and succeed on the job.

Measuring Success

Evaluation is an important component of competency-based education. Pre-training assessments measure the student’s existing knowledge prior to receiving instruction and ensure the student’s training builds upon this knowledge base. Formative assessments administered throughout the training process provide a means of continuously monitoring the student’s progress towards mastery.

Certification assessments provide a means of evaluating the student’s mastery of knowledge and skills. Coaching reports communicate assessment scores to students and provide a breakdown of assessment results by standard area. The coaching report also shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.
Fundamentals of Technology
Assessment Information

What is the Fundamentals of Technology assessment?

The Fundamentals of Technology assessment is an end-of-course assessment for students in the Fundamentals of Technology course. The assessment provides an indication of student mastery of basic knowledge and concepts necessary for success in this area.

How was the assessment developed?

The assessment was developed by the CareerTech Testing Center. Items were developed and reviewed by a committee of subject matter experts.

What does the assessment cover?

Specifically, the tests include multiple-choice test items over the following areas:

Fundamentals of Technology (55 questions)

Computing Fundamentals
- Operating System Basics 9%
- Computer Hardware and Concepts 4%
- Computer Software and Concepts 11%
- Troubleshooting 2%

Key Applications
- Common Application Features 25%
- Word Processing Activities 5%
- Spreadsheet Activities 7%
- Presentation Activities 2%
- Basic Database Interactions 5%
- Collaboration 2%

Living Online
- Browsers 4%
- Networking Concepts 2%
- Digital Communication 11%
- Digital Citizenship 2%
- Safe Computing 5%
- Research Fluency 4%

What are the benefits of using this assessment?

Students receive a certificate for each assessment that he/she passes. This certificate may be included in his/her portfolio and used to communicate the student’s mastery of the subject matter to potential employers.
When should the assessment be taken?

The CareerTech Testing Center recommends that students take these assessments as soon as possible after receiving all standards-related instruction, rather than waiting until the end of the school year.

Is the assessment timed?

No. However, most students finish the assessment within one hour.

What resources can students use on these assessments?

Students are allowed to use calculators and scratch paper on CTTC assessments; however, these items must be provided by the testing proctor and returned to the proctor before the student’s exam is submitted for scoring. Calculator apps on cell phones and other devices may not be used on these assessments.

What accommodations can be made for students with Individualized Education Plans (IEPs)?

Accommodations are allowed for students with an Individualized Education Plan. Examples of allowable accommodations include:

- Extended time — This assessment is not timed; therefore, students may take as much time as needed to finish. The assessment must be completed in one testing session.
- Readers — A reader may be used to read the assessment to a student who has been identified as needing this accommodation.
- Enlarged text — Students needing this accommodation can activate this feature by clicking the **AA** icon in the upper right corner of the screen.

What can students expect on Test Day?

All CTTC assessments are web-based and delivered exclusively by a proctor in the school’s assessment center. The proctor **cannot** be an instructor or anyone who was involved with the students during instruction.

Assessments are delivered in a question-by-question format. When a question is presented, the student can select a response or leave the question unanswered and advance to the next question. Students may also flag questions to revisit before the test is scored. All questions must be answered before the test can be submitted for scoring.

After the assessment is scored, the student will receive a score report that not only shows the student’s score on the assessment, but also how the student performed in each standard area.

Can students retake the test?

Students may retake the test unless their school or state testing policies prohibit retesting. Students who can retest must wait at least three days between test attempts.
Standards and Test Content
Fundamentals of Technology

Computing Fundamentals

Operating System Basics (5 questions)

What is the OS and what does it do?
1. Explain the differences between software applications and operating systems and demonstrate their uses.
2. Common OS features, explain each of their uses:
   • Power On/Power Off
   • Differences between common OSs
   • Lock/Unlock
   • Log on/log off/switch user
3. Explain how hardware can influence the Operating System and software and vice versa.

Manage Computer Files and Folders
5. Directory and folder hierarchy and structure
   • Menu, Toolbar, and Window Navigation
   • Expand and Collapse
   • Folder views
6. File/Folder management
   • Keyboard shortcuts
   • Copy
   • Paste
   • Delete
   • Move
   • Rename
   • Create shortcuts
   • Search
7. Identify file extensions and their associations such as .docx, .xlsx, .pdf, .mp3, etc.

Manage computer configuration, Control Panel, OS drivers
8. Basic Desktop Customization
   • Visual options
   • Languages
   • Date and Time
   • Accessibility options
9. Describe the various states of operation available in a typical consumer-level OS. Include Shutdown, hibernation, standby, fully awake, etc.
10. User accounts and rights
    • Group policy (specifically mobile)
    • Rights
    • Administrative vs. standard user
    • Read/Write
11. File and Directory Permissions
Computer Hardware and Concepts (2 questions)

Common Computer Terminology

1. Define the terms and explain the differences between input/output devices.

   Hardware and Peripherals
   - Processing
     ▪ Gigahertz
     ▪ Hertz
   - Input / Output
     ▪ Monitor and Projector
     ▪ Microphone
     ▪ Mice
     ▪ Keyboards
     ▪ Stylus
   - Printers

2. Explain the different types of memory
   - Volatile
     ▪ RAM
   - Involatile
     ▪ SSD drive
     ▪ Magnetic hard drive
     ▪ Flash drives (USB, Jump, Thumb, etc.)
     ▪ ROM
   - Units of measurement
     ▪ Mega, giga, tera, peta

   Explain the difference between Bit vs. Byte

Types of Devices

3. Explain these different types of computers. Compare and contrast uses and capabilities.
   - Server
   - Desktop
   - Laptop
   - Tablet
   - Smart Phone

Computer Performance

4. Specify criteria that could be used to evaluate the pros and cons of various computing devices and peripherals. Focus on performance issues.

5. Processing vs. memory vs. storage: Describe the concepts of Processing capacity, processing speed, Memory capacity, Memory speed, Storage capacity, and Storage speed including how each interacts with the other to determine overall computing capacity, speed and power.
Computer Software and Concepts (6 questions)

Software Management
1. Describe how to install, uninstall and reinstall various kinds of software, including application software, drivers and system software, upgrades and patches, on various types of personal computers and configure the environment for use.

Licensing
2. Understand the various licensing models used for computer software such as operating systems, application programs, system software, databases, browsers, etc. Freeware, shareware, open-source, premium applications
3. Demonstrate an understanding of the legal and ethical obligations associated with EULAs and the user’s responsibilities, commitments, and benefits that can be derived by entering into a typical computer industry EULA.
4. Demonstrate an understanding of the concept of a single seat and site License options, how each party benefits, restrictions, obligations, etc.

Software Usage
5. Describe the dependencies and constraints that exist between hardware and software operation
6. Demonstrate an understanding of the similarities and differences between a basic, consumer-level relational database management system and a typical spreadsheet program, including an understanding of which situations would be better suited to which product.
7. Describe what desktop publishing is, how and when desktop publishing software should be used, and the general feature set included in a representative desktop publishing program.
8. Describe what a Presentation program is, its purpose, how it is used, and the general feature set included in a typical consumer-level presentation program.
9. Demonstrate how to use templates, default settings, and quick start aids to rapidly generate usable application user data.
10. Describe the purpose and use of a personal computer-based entertainment program. List the features that could be expected to be found in such a program and explain how they work.
11. Demonstrate how to edit, modify, or adjust (as appropriate) graphics, pictures, slides, audio and video.

Software Tools
12. Explain what file compression is and how it works with various file types.
13. Explain how files are stored on a Hard Disk. Demonstrate how to organize, compress, defragment, and otherwise optimize a computer’s hard disk performance.
14. Explain the danger posed by viruses and malware and how virus and malware scanning software work. List several common/popular brands and types of virus and malware scanning software.
Troubleshooting (1 question)

Software
1. Explain the concepts associated with version control of Operating System (OS) software. Further explain how the OS version can affect the compatibility of other software on the PC.
2. Demonstrate how to identify and remove a virus or other malware from an infected PC.
3. Explain what ‘safe mode’ is in popular PC operating systems (OSs), and how and when it should be used when troubleshooting problems on a personal computer system.
4. Explain where and how to find information beyond that stored on the PC to help troubleshoot problems on a PC. List popular Knowledge base, forums, and self-help web sites and explain how to use them for troubleshooting.
5. Demonstrate how to invoke and interpret the information available in a PC’s Task, Process, or Application Manager. Further demonstrate how to use this tool when troubleshooting a problem on the affected PC.

Hardware
6. Explain how different versions of firmware affect performance of hardware subsystems on a PC and how that information may be used in troubleshooting a problem on a PC.
7. Explain the role of Cables and other connectors that connect the various parts of a computer together and what can happen when one or more cable or connector does not make the proper connection. Explain how this information may be used to troubleshoot problems on a personal computer.

Devices and Peripherals
8. Explain how different versions of firmware can affect performance of peripheral devices and hardware attached to a PC and how that information may be used in troubleshooting a problem on a PC.
9. Explain what a device driver is, how it fits into the operating system architecture, and how incompatibilities may lead to problems. Further explain how this information may be used in troubleshooting a problem on a PC.

Backup/Restore
10. Demonstrate how to backup and then restore software and data to:
   • Safe offsite location.
   • Cloud
   • External drive
11. Explain the implications of versioning and re-cycling of backups in an incremental backup system. Explain how to properly restore from an incremental backup system.
Key Applications

Common Application Features (14 questions)

Common Features and Commands

1. Demonstrate the use of keyboard shortcut keys or “hot keys” to invoke application features in an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

2. Demonstrate how to move, copy, and paste user data within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

3. Demonstrate how to reveal or hide user data from view within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

4. Demonstrate how to print user data from within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product and control the configuration in which the data is presented or printed as listed in the objective.

   • Basic print options
     - Sizing
     - Pages per sheet
     - Collation
     - Layout
   • Print Preview

5. Demonstrate how to check spelling within user data, find and replace portions of user data, and use the Undo and Redo features to alter user data within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

6. Demonstrate how to move user data using the Drag and Drop features within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

7. Preferences, resets, customization.

   Demonstrate how to control presentation and configuration of user data within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application.

8. Identify the various sources of help, built-in, online, context-sensitive, help lines, chat services, coworkers, help desks, etc. available to get assistance in learning how to use an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

   Describe how each source of help is accessed, what kind of help can be found at each source, and which resources are available when.
9. Selecting
   • Select All
   • Select non-adjacent

   Demonstrate how to select user data using the features listed in the objective within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

   Demonstrate how to sort user data using the features built into an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

**Formatting**

10. Demonstrate how to control the font face display features listed in the objective from within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product in such a way as to control the look, feel, and other display characteristics with which the user data is presented on-screen or printed.

   Basic text formatting
   • Bold
   • Italic
   • Underline
   • Font Size

**Navigating**

11. Demonstrate how to launch and terminate an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

   Further demonstrate how to open an application data file and make it available for editing within an application program and how to close an application data file so that it is no longer immediately available to an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

12. Save vs. Save As

   Demonstrate how to save user data in an application data file using the same and/or different file names and path information from within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

13. Demonstrate how to create a new empty application data file, either blank, or using an available templates provided with the application from within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

14. Demonstrate how to manipulate OS and application windows to automatically resize while using an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

15. Describe how to search for specific subsets of user data within a larger set of user data in an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.
16. Demonstrate how to display user data from within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product and control the size, orientation, portion of data displayed and other display configuration settings in which the data is presented as listed in the objective, including ways to save, change, and delete those settings.

Views:
- Zoom
- Switching

**Working with Multimedia Files**

17. Demonstrate how to adjust the display of pictures, videos, audio, or other multimedia content within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product according to the action listed in the objective.

- Resize
- Crop
- Rotate

18. Demonstrate how to incorporate and display pictures, videos, audio, or other multimedia content within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product according to the action listed in the objective.

- Insert
- Attach
- Working in the application

**Word Processing Activities (3 questions)**

**Organizing Data**

1. Demonstrate how to organize text and data into tables within a word processor. Further demonstrate the ability to add columns, rows, merge and split cells within those tables.

2. Demonstrate how to organize text and data into lists within a word processor. Further demonstrate the ability to order and re-order those lists according to various criteria (alphabetize, lowest-to-highest, by date, etc.).

**Layout**

3. Page Layout

Demonstrate how to arrange user data and set options within a word processor so as to cause those text and data to display and print in a particular format or layout. Within that context control the attributes and structures listed in the objective to display and print as specified, including ways to save, change, and delete those saved configurations.

- Page Numbering
- Columns
- Alignment, text in paragraphs and tables
- Tabs and Rulers
- Orientation
- Margin

4. Demonstrate how to set line and paragraph spacing within a word processor.

5. Demonstrate how to indent text within a word processing program.
Spreadsheet Activities (4 questions)

Spreadsheet Layout

1. Insert/delete
   Demonstrate how to add, insert, remove, and delete rows and columns in a spreadsheet environment.

2. Demonstrate how to adjust the size of cells and the amount of data displayed in a cell within a spreadsheet.

3. Demonstrate how to adjust the alignment and positioning of cells and the positioning and orientation of data as displayed in cells within a spreadsheet.

4. Navigation
   Demonstrate how to locate, move focus to, or otherwise activate cells within a worksheet. Demonstrate knowledge of the ramifications of using relative and/or absolute cell referencing. Further demonstrate the difference between a worksheet and a workbook and how to move between and among them.

5. Demonstrate how and when to merge or un-merge cells within a spreadsheet, including how to preserve, manage, and arrange data within the merged or un-merged cells.

Data Management

6. Filter and sort
   Demonstrate how and when to filter data columns, including how to select what to display or hide in cells within the filtered range. Demonstrate how to sort ranges of data in various orders, custom and predetermined, vertically and horizontally.

7. Formulas and Functions
   Demonstrate how to construct formulas using standard mathematical operators (=, +, -, *, /). Demonstrate how to use formulas as arguments to functions and other functions as arguments to functions. Specifically demonstrate how to use the most common functions, such as SUM(), AVERAGE(), COUNT(), and so forth.

8. Number format
   Demonstrate how to set formatting options associated with a cell or a range of cells so that cells display their data in specific formats, such as currency, dates, decimals, number of significant places, regional formats, and so forth.

9. Cell format
   Demonstrate how to set the formatting options associated with a cell or range of cells so that cells display their data in specific text formats, such as different font faces, font sizes, bolding, italicizing, stroke color, background colors, regional character settings, and so forth.
10. Charts, graphs

Demonstrate how to create the types of charts and graphs commonly included in spreadsheet applications, including Pie charts, Line graphs, and bar graphs (histograms). Demonstrate how to insert graphs and charts into a spreadsheet, how to associate datasets with the graphs or charts, affecting how they display and how to move the component parts of the graph around within the graph or chart, and move the graph or chart around within a spreadsheet and within workbooks.

Presentation Activities (1 question)

Inserting Content

1. Demonstrate how to insert text into a presentation application so as to display properly and effectively in the desired font face, size and style in a slide show.

2. Demonstrate how to insert a table into or create a table and insert text into it in a presentation application so as to display properly and effectively in the desired font face, size and style in a slide show.

3. Demonstrate how to insert an audio, video, animations, and other media clips into a presentation application so as to display properly and effectively with the desired timing and control in a slide show presentation.

4. Demonstrate how to insert a chart into or create a chart and insert text, numbers, and shapes into it in a presentation application so as to display properly and effectively in the desired colors, layout, and format in a slide show presentation.

5. Demonstrate how to insert shapes, graphics, and pictures of various formats, file formats, sizes, palettes, etc. into or create shapes and graphics and insert content into them in a presentation application so as to display properly and effectively in the desired colors, layout, and format in a slide show presentation.

Slide Management

6. Demonstrate how to add slides into or create slides within a presentation application.

7. Demonstrate how to delete slides from or remove slides from within a presentation application.

8. Describe how to alter the presentation order of slides or move them around within a presentation application.

Slide Design

9. Layout

Demonstrate how to position and re-position presentation elements on the slide background or palette within a presentation application.

10. Animations

Demonstrate how to animate presentation elements and control their movement over, under, and among other slide elements and slide background within a presentation application.

11. Transitions

Demonstrate how to invoke, remove, and control special effects associated with and defining how slides transition from one to another during the execution of a presentation application slide show.
Basic Database Interactions (3 questions)

Record Managements
1. Run Reports
   Demonstrate how to run pre-defined (or “canned”) reports from within a consumer-oriented, personal computer-based database management system.
   Demonstrate how to create and successfully execute a simple report from within a consumer-oriented, personal computer-based database management system.

2. Search and use stored queries
   Demonstrate how to search a database by using pre-scripted queries stored within a consumer-oriented personal computer-based database management system.
   Demonstrate how to use the features built into a consumer-oriented personal computer-based database management system to successfully search for and retrieve specific user data.

3. Input data (records)
   Demonstrate how to successfully create, modify, and delete new data records from within a consumer-oriented personal computer-based database management system.

Collaboration (1 question)

Comments
1. Review comments
   Demonstrate the ability to review comments created by another regarding the user data and settings within an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

2. Accept or Reject
   Demonstrate the ability to accept or reject changes, edits, additions, deletions, and so forth created by another and intended for you within the user data associated with an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.

3. Add comments
   Demonstrate the ability to add comments and edits intended for review or action by another to the user data associated with an application such as a word processor, spreadsheet, presentation package, database manager, or other software application product.
**Sharing files**

4. Share using e-mail
   Demonstrate how to attach files of various sorts to email messages and send them successfully to another email recipient. Demonstrate an understanding of the implications of this sharing process on further edits to files shared in this particular way.

5. Network storage
   Demonstrate how to find, navigate to, access, and edit files of various sorts in a network storage environment. Demonstrate an understanding of the implications of multiple users sharing and editing user data files in this particular way.

6. Cloud
   Demonstrate how to find, navigate to, access, and edit files of various sorts in a cloud storage environment. Demonstrate an understanding of the implications of multiple users sharing and editing user data files in this particular way.

**Living Online**

**Browsers (2 questions)**

**Internet vs. Browsers vs. WWW**

1. Explain the concepts of: Internet, Browsers, WWW.
2. Explain the differences between: Internet, Browsers, WWW
3. Demonstrate how to use each: Internet, Browsers, WWW

**Navigation**

4. Domains
   - .org, .net, .com, .gov, .edu, etc.
   - Country codes
   Explain the use/need and importance for each of the domains listed in the objectives. Briefly explain and demonstrate country codes

5. Explain how hyperlinks function in a web browser environment
6. Demonstrate how and why you would want to set a homepage.
7. Demonstrate how to move back, forward and refresh in a variety of browsers. Identify universal symbols used for each term
8. Explain why favorites/bookmarks are helpful. Describe how to establish, save, invoke, and delete a bookmark.
9. Explain what a plugin is and its function. Describe how to find, install, configure, use, disable, enable, and delete a plugin.
10. Explain how the History function of a browser works and how to use it. Describe how to clear history.
11. Demonstrate how to search using an internet browser, including the use of advanced features such as using basic Boolean logic including, Or, And, plus sign +, quotation marks “”, etc.
12. Tabs
   Explain how to use multiple tabs and the benefits associated with using them. Describe how to activate/deactivate the feature and close tabs.

13. Downloading/Uploading
   Explain the differences between downloading and uploading, including speed on an asynchronous link and how internet speed can vary between them.

**Networking Concepts (1 question)**

**Internet Connection**

1. Speed
   Explain the units of measurement associated with an internet connection and what they mean – mbps, kbps.
   Explain the things that can limit or increase speed: multiple browsers open, wireless connection, etc.

2. Explain the differences between dial-up and broadband connections and the process each uses to establish a connection.

3. Wireless
   • Security
   Explain how wireless signals can be “stolen” and the importance of maintaining security with wireless access. Explain types of security including WEP, WPA and others.

4. Security
   • Firewalls
   • Gateways
   Explain the difference between the Firewalls and Gateways. Explain that the risks of networks are managed through careful procedures for allowing access to the network by network administrators and other security. Explain the concept of a port and how it may be opened (unblocked) or closed (blocked) and how those settings affect WAN and LAN network connections.

**Network types and features, capabilities**

5. Explain the concepts associated with the Publicly switched networks
6. Explain the concepts associated with DNS (Domain Name Server)
7. Explain the concepts associated with Addressing.
8. Explain the concepts associated with and the difference between LAN vs. WAN
9. Explain the concepts associated with VPN

**Network Troubleshooting**

10. Demonstrate the ability to solve simple networking connectivity problems in various settings.
11. Explain methods of identifying common network problems.
12. Explain the concepts associated with Define IP Addressing
Digital Communication (6 questions)

Email Communication

1. E-mail Account Settings
   - Username
   - Password
   - Credentials
   Explain the objective terms. Explain the need for and demonstrate “secure” examples of usernames, passwords and credentials.

2. Appropriate use of e-mail
   - Subject Line
   - Body
   - Address Book (contact lists, group lists)
   - Attachments
   - CC and BCC
   - Reply, Reply all, Forward
   Explain what each of the objective terms are and how to properly use each of them. Reply vs. Reply all, CC and BC, etc.

3. Managing e-mail communications
   - Automated features
     - Auto-respond
     - Out of office
     - Auto-forwarding
     - Signatures
   - Personal Folders
     - Archive
   - Junk mail
   - Spam
   Explain the concepts associated with each of the terms listed in the objective.
   Demonstrate how what goes into a proper Out of Office auto reply.
   Demonstrate what a signature should look like and why.
   Explain the why archiving email is useful.
   Explain how to limit exposure to spamming and how to dispose of junk mail.

Real-Time-Communication

4. Text Communication
   - IM
     - Gmail Chat
     - Skype
     - ICQ, AIM, Windows Live Messenger, etc.
   - SMS
   Explain the differences between each of the objective terms.
   Demonstrate the proper use of each of the listed modes of real-time digital communication.
5. Audio Visual communication
   • MMS
   • Real-time video
   • Chatting
   • Skype
   • VoIP
   • Video conferencing

Demonstrate how to use each of the listed modes of real-time Audio-Visual communication

Explain how each of the listed modes of communication work and when they should be used.

6. Telepresence (Social Media)
   • Change online status
   • Visible vs. invisible
   • Blogging

Demonstrate how to configure and use features in various popular social media sites such as Facebook, LinkedIn, Twitter, and the like to show one’s current status, grant or limit accessibility to others, post information, or otherwise publish desired information to the public at large with immediacy.

**Digital Citizenship (1 question)**

**Communication Standards**

1. Explain the difference between personal and professional communication and the importance of spelling and use of abbreviations in each type of communication
2. All capitals vs. standard capitalization
   Explain that all caps indicates “yelling” or an over importance
3. Verbal vs. Written, Professional vs. Personal communication
   • Suitable behavior in online interactions, Facebook
   • Differences and benefits
   Explain the differences between phone calls, texting, email, social media postings and appropriate uses for each in both personal and professional communication.
4. Explain the terms: spamming, flaming, bullying and the harm that each can cause. Explain how they are not faceless, harmless electronic actions.
5. Explain the terms Libel and Slander and the real life legal consequences of each.

**Legal and Responsible Use of Computers**

6. Explain what censorship is. Contrast its benefits and drawbacks
7. Explain what filtering is. Contrast its benefits and drawbacks
9. Explain Piracy, how to protect yourself from it and the ethical issues surrounding it.
10. Explain what a copyright is, how it is obtained, the legal ramifications surrounding a copyright and its value to its holder.
11. Licensing

Explain that software must be legitimately licensed before it can be used and that there are different ways software can be distributed and licensed.

Explain traditional licensing and installation of software on a standalone computer (single-user license) or network (network licensing).

Explain the benefits of network licensing (cost, shared resources, etc.)

Explain that software is increasingly being sold as a service (Software as a Service or SaaS, or Application Service Provider or ASP licensing).

Explain that this involves licensing a product that is accessed via a network, Intranet or the Internet, normally via a user logon.

Explain alternative methods of distributing and licensing software beyond traditional purchasing, including Open Source software, Freeware and Shareware, and software bundled free with hardware purchases.

Explain the user (or system administrator’s) responsibilities to only use legitimately licensed software and how users and administrators can stay informed about product licensing and other issues.

12. Explain what Creative Commons is, the licensing availability and legal issues surrounding it, as well as the benefits to the community.

Safe Computing (3 questions)

Secure Online Communication or Activity

1. Identity Protection

2. Explain Data Protection including the following:

   Residual files left on hard drives, flash drives, and portable drives
   - Keeping Your Computer Secure and Updated
   - Protection programs / utilities / practices
     - Downloads
     - Virus protection
   - Personal Firewall
   - Cookies
   - Spyware protection

   Explain how to completely remove data from hard drives, portable memory, and digital devices.

   Explain how to secure the data on your computer and keep it updated by backing up data to other sources – cloud, backup hard drives

   Describe how to use protection programs and the value of these services. Also describe the harm that can come from not using these products and services.

Ergonomics

3. Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to monitor height and angle.

4. Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to mouse and keyboard shapes and use.
5. Explain the ergonomics around proper chair height and settings, arms, lumbar support, etc.
6. Explain the issues around poor lighting, short term and long term eye problems.
7. Explain the physical issues surrounding poor body posture, especially with prolonged time in the same position(s).

**Research Fluency (2 questions)**

**Using Search Engines**

1. Explain how to use search engines to acquire information. The value of the resources available on the internet.
2. Demonstrate how to use search engines to answer questions and solve problems by using good search terms to get specific information from reputable sources.

**Evaluate Search Results**

3. Forums
   Explain the value and problems with internet forums.
   Forum users are just individuals with an interest in the forum topic, this does not make them experts, but information can be very useful
   Explain how to be a good forum participant, only post good info, no “flaming” other users, etc.
4. Explain that ads are paid messages from companies that want to interest you in their products. Messages are not necessarily factual.
5. Explain that sponsored links are a form of advertising and not to be relied on as an informational resource.
6. Explain that a knowledge base is a collection of data around a particular subject. Include examples like Help menus available from software and hard goods manufacturers.
7. Explain how to determine the validity of various sources, including but not limited to domain names/domain, published journals, government sites and documents vs. forums, blogs, and personal websites.
8. Explain that articles can be both factual and made up. Articles are created for a number of reasons including, reviews of products that may or may not have been given to the reviewer, personal opinion, or well researched documenting of fact.

**Using Advanced Features of Search Engines**

9. Search types
   - File
   - Category
   - Media
   - Size
   - Size

   Explain how to search for different types of media by using file types and searching applicable databases. Examples include: YouTube, Flickr, iTunes, etc.
Sample Questions

1. What method of internet searching uses "OR", "AND" and "NOT"?
   a. advanced search
   b. Boolean search
   c. spider search
   d. wildcard search

2. The science of adapting the working environment, conditions, and equipment to suit workers is known as:
   a. computer science.
   b. ergonomics.
   c. life science.
   d. workplace protocol.

3. The process of transferring data in a continuous and even flow, allowing users to access and use a file while transmitting is:
   a. channel coding.
   b. flowing.
   c. streaming.
   d. surfing.

4. Printer resolution is measured in:
   a. bits per inch (bpi).
   b. characters per inch (cpi).
   c. dots per inch (dpi).
   d. pixels per inch (ppi).

5. Which disk utility provides the best way to improve disk performance?
   a. CHKDSK
   b. DEFRAG
   c. FDISK
   d. SCANDISK

6. What is the default file extension for a Microsoft Excel file?
   a. DOC
   b. MDB
   c. PPT
   d. XLS
7. What is a benefit of being on a networked computer?
   a. files can be shared from a central location
   b. increased vulnerability to viruses
   c. loss of autonomy
   d. restricted access

8. Programs that perform housekeeping chores, such as file management and recovery, disk defragmentation, compression and backup, and virus detection are known as:
   a. application software.
   b. boot loaders.
   c. firmware.
   d. utility software.

9. In a word processing program, what menu allows the user to enter a date and time stamp that will automatically update each time the document is opened?
   a. Home
   b. Insert
   c. Page Layout
   d. Review

10. To undue a deletion in Excel, press:
    a. Esc.
    b. F5.
    c. Ctrl + g.
    d. Ctrl + z.
Sample Questions — Key

1. What method of internet searching uses "OR", "AND" and "NOT"?
   a. advanced search Wrong, but plausible
   b. Boolean search Correct
   c. spider search Wrong, but plausible
   d. wildcard search Wrong, but plausible

2. The science of adapting the working environment, conditions, and equipment to suit workers is known as:
   a. computer science. Wrong, but plausible
   b. ergonomics. Correct
   c. life science. Wrong, but plausible
   d. workplace protocol. Wrong, but plausible

3. The process of transferring data in a continuous and even flow, allowing users to access and use a file while transmitting is:
   a. channel coding Wrong, but plausible
   b. flowing Wrong, but plausible
   c. streaming Correct
   d. surfing Wrong, but plausible

4. Printer resolution is measured in:
   a. bits per inch (bpi). Wrong, but plausible
   b. characters per inch (cpi). Wrong, but plausible
   c. dots per inch (dpi). Correct
   d. pixels per inch (ppi). Wrong, but plausible

5. Which disk utility provides the best way to improve disk performance?
   a. CHKDSK Wrong, but plausible
   b. DEFFRAG Correct
   c. FDISK Wrong, but plausible
   d. SCANDISK Wrong, but plausible

6. What is the default file extension for a Microsoft Excel file?
   a. DOC Wrong, but plausible
   b. MDB Wrong, but plausible
   c. PPT Wrong, but plausible
   d. XLS Correct
7. What is a benefit of being on a networked computer?
   
a. files can be shared from a central location  \textbf{Correct}

   b. increased vulnerability to viruses  \textbf{Wrong, but plausible}

   c. loss of autonomy  \textbf{Wrong, but plausible}

   d. restricted access  \textbf{Wrong, but plausible}

8. Programs that perform housekeeping chores, such as file management and recovery, disk defragmentation, compression and backup, and virus detection are known as:

   a. application software.  \textbf{Wrong, but plausible}

   b. boot loaders.  \textbf{Wrong, but plausible}

   c. firmware.  \textbf{Wrong, but plausible}

   d. utility software.  \textbf{Correct}

9. In a word processing program, what menu allows the user to enter a date and time stamp that will automatically update each time the document is opened?

   a. Home  \textbf{Wrong, but plausible}

   b. Insert  \textbf{Correct}

   c. Page Layout  \textbf{Wrong, but plausible}

   d. Review  \textbf{Wrong, but plausible}

10. To undue a deletion in Excel, press:

    a. Esc.  \textbf{Wrong, but plausible}

    b. F5.  \textbf{Wrong, but plausible}

    c. Ctrl + g.  \textbf{Wrong, but plausible}

    d. Ctrl + z.  \textbf{Correct}
Abbreviations, Symbols and Acronyms

When abbreviations, symbols or acronyms are more commonly used in written and verbal communications within fundamentals of technology than the words they represent, they will also be used on the written examination required for competency. The following is a list of abbreviations, symbols and acronyms used on the fundamentals of technology examination.

\[
\begin{align*}
/ & \quad \text{Division} \\
= & \quad \text{Equal} \\
+ & \quad \text{Plus} \\
3D & \quad \text{three dimensional} \\
AIM & \quad \text{AOL Instant Messenger} \\
ASP & \quad \text{Application Service Provider} \\
BCC & \quad \text{blind carbon copy} \\
CC & \quad \text{carbon copy} \\
CMOS & \quad \text{Complementary Metal-Oxide Semiconductor} \\
CPU & \quad \text{Central Processing Unit} \\
DIP & \quad \text{Dual In-line Package} \\
DNS & \quad \text{Domain Name Server} \\
EULA & \quad \text{End User License Agreement} \\
etc. & \quad \text{et cetera} \\
HTTPS & \quad \text{Hypertext Transfer Protocol Secure} \\
ICQ & \quad \text{Instant messaging computer program} \\
IM & \quad \text{instant messaging} \\
IP & \quad \text{Internet Protocol} \\
ISP & \quad \text{Internet Service Provider} \\
kbps. & \quad \text{kilobits per second} \\
LAN & \quad \text{local area network} \\
mbps. & \quad \text{megabit per second} \\
MMS & \quad \text{Multimedia Messaging Service} \\
OS & \quad \text{Operating System} \\
PC & \quad \text{personal computer} \\
RAM & \quad \text{Random-Access Memory} \\
ROM & \quad \text{Read-Only Memory} \\
SaaS & \quad \text{Software as a Service} \\
SMS & \quad \text{Short Message Service} \\
SSD & \quad \text{Solid-State Drive} \\
URL & \quad \text{Uniform Resource Locator} \\
USB & \quad \text{Universal Serial Bus} \\
VoIP & \quad \text{Voice over internet protocol} \\
VPN & \quad \text{Virtual Private Network} \\
WAN & \quad \text{Wide Area Network} \\
WEP & \quad \text{Wired Equivalent Privacy} \\
Wi-Fi & \quad \text{local area wireless technology} \\
WPA & \quad \text{Wi-Fi Protected Access} \\
WWW & \quad \text{World Wide Web}
\end{align*}
\]
Test Taking Strategies

This section of the study guide contains valuable information for testing success and provides a common-sense approach for preparing for and performing well on any test.

General Testing Advice

1. Get a good night’s rest the night before the test — eight hours of sleep is recommended.
2. Avoid junk food and “eat right” several days before the test.
3. Do not drink a lot or eat a large meal prior to testing.
4. Be confident in your knowledge and skills!
5. Relax and try to ignore distractions during the test.
6. Focus on the task at hand — taking the test and doing your best!
7. Listen carefully to the instructions provided by the exam proctor. If the instructions are not clear, ask for clarification.

Testing Tips

1. Read the entire question before attempting to answer it.
2. Try to answer the question before reading the choices. Then, read the choices to determine if one matches, or is similar, to your answer.
3. Do not change your answer unless you misread the question or are certain that your first answer is incorrect.
4. Answer questions you know first, so you can spend additional time on the more difficult questions.
5. Check to make sure you have answered every question before you submit the assessment for scoring — unanswered questions are marked incorrect.