SkillsUSA ®

Career Essentials: Assessments

Teacher Preparation Guide
For Use with the
Career Essentials: Assessments

Discover, Develop and Validate Students'
Knowledge and Skill

COMPUTER MAINTENANCE TECHNOLOGY

ASSESSMENT

Introduction to the Career Essentials: Assessments

The Career Essentials: Assessments can help both students and teachers discover students' occupational strengths. By implementing the Career Essentials: Assessments, students and teachers can collaboratively develop a life-long learning plan to validate and enhance students' skills and knowledge. Assessment data results are beneficial for students, teachers and administrators in validating student learning, and improving programs and their accountability.

This teacher preparation guide is a tool developed for instructors to help students capitalize on their unique strengths, which can improve individual student performance and provide a clear way forward for student success.

The Career Essentials: Assessments Teacher Preparation Guide provides an easy-to-follow road map to implement the Career Essentials: Assessments. The guide is not meant to be curriculum nor should it replace that which already exists. It provides specific information regarding the Career Essentials: Assessments so teachers can identify existing curriculum areas that may need additional emphasis.

The guide ultimately helps teachers provide students with learning opportunities. Its goal is for students to become comfortable and successful with the Career Essentials: Assessments.

Inside the guide, teachers will find:
- Major content areas of the assessment
- A blueprint of the assessment competency areas
- A checklist of the various competency areas within the assessment
- Access to a trade- or technical-specific online 10-question demo assessment
- Resources used for the assessment development
- Access to an employability skills based, online 10-question practice assessment to help students navigate the assessment system

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What are Career Essentials: Assessments?
Career Essentials: Assessments are online assessments that evaluate technical and employability skills and knowledge. They are the way ahead for the next generation of our American workforce, and they help candidates validate their technical skills and knowledge to potential employers. They also help local instructors demonstrate the value of their programs, while supporting local industries with a pool of potential employees that has been tested by a system they can trust.

Each assessment was developed by a panel of industry, high school and college/postsecondary subject matter experts (SMEs) using national technical standards. Career Essentials: Assessments were created by industry to ensure relevance to entry-level skills, meet Perkins IV accountability requirements and provide certificates to students who achieve industry-defined scores. They ensure your students are workforce ready.

Career Essentials: Assessments incorporate photographs, videos, animations and illustrations to ensure clarity for each technical question. Drag-and-drop and multiple-choice questions appeal to visual and kinesthetic learners and test content knowledge rather than test-taking abilities. Even simple multiple-choice questions are brought to life through pictures and animations.

Assessments are available in more than 40 trade, industrial and technical areas. A rigorous and educationally sound process captures critical competencies, standards and criteria as defined by industry.

Academic core and critical skill areas also exist in each assessment. State-level academic curriculum specialists identified connections to national academic standards.

Each one-hour assessment includes 50 questions. Under the supervision of a proctor, the integrity of each test is ensured by offering multiple unique versions of the assessment, which

For complete information regarding the Career Essentials: Assessments and to see all assessment areas, please visit the website at:
www.careeressentials.org

measure the same core and critical competencies. Even within the same version, questions and answers are displayed in varying orders to prevent test takers from copying others. The Career Essentials: Assessments are designed to be user-friendly and intuitive for students.

Using the Career Essentials: Assessments
Every classroom is unique. You can use the Career Essentials: Assessments in a way that best suits your program and students. The following directions are SkillsUSA's suggested and preferred method to implement the assessments so that your students gain the most from the results.

The most important step in the Career Essentials: Assessments process is to select the correct assessment for your students. You are key to the selection process. Without your involvement, the wrong assessment may be selected. Assessment titles do not provide enough information for proper selection. Review the various assessment categories that best correspond to your program.

Next, look at each of the assessment titles within the category and the corresponding blueprint. The blueprint will tell you which competencies and subjects are addressed in the assessment.

Cross-walk the various blueprints with your classroom curriculum. The assessment blueprint will show what's emphasized and how competencies are weighed. Please remember the Career Essentials: Assessments are based on national industry standards, so the assessment may not perfectly align with the existing curriculum. Content may need to be added or emphasized to better prepare students for the Career Essentials: Assessments.   4

Once you have selected the assessment that best fits your program, administer that Career Essentials: Assessments at the beginning of your students' final program year. This could be considered a pre-test.

Assessment results are available as soon as your student completes the assessment. The report provides you with a gap analysis to identify your students' learning needs according to each competency area within the assessment. Dynamic reports compare your students' performance to the current state and national averages. Reports also enable you to track a student's progress on an individual basis. The assessment pre-testing results provide you with a benchmark for your students and identify student learning gaps. This data may help you adjust your own curriculum and identify areas that may need more or less emphasis. The data can be shared with students so everyone can focus on learning areas that need improvement during the school year.

Then, at the end of the school year or program semester, administer your specific Career Essentials: Assessments a second time as a post-test.

Use post-test data to improve or adjust curriculum once again for your next program year. This way, curriculum adjustments are made using the student testing data rather than arbitrarily making adjustments.

This pre- and post-test process is a "win-win" situation for the teacher and especially the student! To ensure a quality process, SkillsUSA is ready to help at any time.

Preparing Students for the Career Essentials: Assessments
Provide each student with a copy of their trade- or technical-specific Career Essentials: Assessments Blueprint. Do this at the beginning of your course. Review and discuss the blueprint with your class, providing insight on the assessment weighting and what is emphasized.

Have students discuss how they can assist each other to prepare for the assessment.

Place the Career Essentials: Assessments Blueprint on the classroom wall. The blueprint will help students focus on the appropriate course content areas that align with the assessment. It will also help everyone to be aware of the program's goals and expectations.

The Career Essentials: Assessments at a Glance

- **Select the correct assessment title. *Do not* have someone select the assessment for you, as there may be several titles that may relate to your program**

- **Review the assessment blueprint that best aligns with your existing curriculum**

- **Identify gaps in your curriculum, and use additional resources to enhance or align the curriculum**

- **Share the assessment blueprint with the students so everyone is aware of the expectation**

- **Have your students take the assessment at the beginning of their final program year as a pre-test**

- **Use pre-test data to identify learning gaps or strengths of individual students or the class**

- **Remediate the students using the data analysis from pre-test to enhance, emphasize and adjust learning objectives**

- **Have your students take the assessment a second time (as a post-test) at the end of the program year to determine learning gains/gaps**

- **Use post-test data to improve or adjust curriculum for your next program year**

Administer the Career Essentials: Assessments as a pre-test to identify student gaps. If possible, pre-test your students at the beginning of their final program year to identify learning gaps both individually and as a class. The data will provide an excellent "road map" to prepare students to take the assessment again (post-test) at the end of the program. Using the data, tailor the instruction to better prepare your students.

Use the Career Essentials: Assessments competency areas checksheets included in this guide to encourage class discussion and help students identify strengths and weaknesses.

Use the pre-test data to ascertain problematic learning areas. Have students identify discussion topics based on the various competency areas and their pre-test data results. Exercises, demonstrations and even questions can be developed by the students using their textbooks or other resources listed in this guide.

Assign homework that aligns to the assessment blueprint. Focus on a competency area within the assessment. Using the checksheets in this guide, have students develop questions and potential answers using the resources identified when developing the assessment. Use the questions for class discussion or "quiz bowl" activities.

Have students take the Career Essentials: Assessments trade- or technical-specific online 10-question demo assessment. This could be a homework assignment or done in class 30 days prior to taking the assessment the second time (as a post-test). This not only will provide students with specific sample questions and potential answers, but it will also allow students to experience the online system again and become more familiar with the types of questions they may encounter when taking the actual assessment.

Following the demo assessment, discuss the experience students had. What question(s) did they not understand? Did they have difficulty navigating the online system? This experience will help students be more comfortable and confident when taking the final assessment.

Discuss as a class or individually with students which question(s) were difficult. Facilitate a discussion to glean more information regarding why certain answers were wrong. Offer techniques students can use to better determine correct answers.

Workplace-Ready Skills
Through the Career Essentials: Assessments, you have the option for your students take an Employability Assessment. This assessments tests a student's workplace-ready skills such as communication, teamwork, time management and more. It can be used for any student in any occupational area as a practice test or a separate assessment.

If you use the Employability Assessment as a practice test have students take it in class. Not only can the Employability Assessment help students become familiar with the navigational tools of the assessment system, but it can also measure and make your students aware of another important skill set. It may also help them become comfortable in the testing environment.

See the Career Essentials: Assessments website for more information: *www.careeressentials.org*

The Employability Assessment is *not* intended to familiarize students with the computer maintenance technology assessment content.

Please note: For all Career Essentials: Assessments to be valid, instructors cannot be present in the room where their students will be taking the test. A proctor is required. Proctors can be other instructors, a school administrator or school counselor.

Assessment Competency Areas

Career Essentials: Assessments Computer Maintenance Technology Assessment covers seven major technical competency areas (unit areas). In the online assessment, these seven competencies are tested with 50 interactive, multiple-choice items. Each competency area has a different number of items. The chart lists the major technical competency areas and the percentage of the assessment in each one.

Technical Competency Areas for Computer Maintenance Technology

Competency	Percentage of Area Assessment
Perform maintenance on personal computers and computer components	24%
Perform XP maintenance procedures on laptops and portable devices	8%
Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center	24%
Install and configure printers and scanners successfully	8%
Apply knowledge of networking principles to install, configure, optimize and upgrade networks	16%
Provide security measures for computer systems	12%
Apply awareness of safety and environmental concerns surrounding computer maintenance technology	8%

Committee Identified Academic Skills

The SkillsUSA national technical committee has identified that the following academic skills are embedded in the computer maintenance technology training program and assessment:

Math Skills
- Use scientific notation

Science Skills
- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of work, force, mechanical advantage, efficiency and power
- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of signal frequencies and baud rate
- Use knowledge of communication modes (full/half duplex)

Language Arts Skills
- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards
- Algebra
- Data analysis and probability
- Problem solving
- Reasoning and proof
- Communication
- Connections
- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: *www.nctm.org/standards/content.aspx?id=16909.*

Science Standards

- Understands relationships among organisms and their physical environment
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: *www2.mcrel.org/compendium/*

Language Arts Standards

- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: *www.readwritethink.org/standards/index.html.*

Student Tools:

Access Directions for the Trade- or Technical-Specific Online 10-Item Demo Assessment
Have your students copy and paste this link *http://www.careeressentials.org/assessments/ demo-our-assessments/* into their browser. The sample programmatic questions will give you and your students an idea of the types of questions on the assessment and how the questions are generally written.

Test-Taking Reminders

Encourage your students to have good study habits. Below are basic reminders to better prepare students for life-long learning and workplace success. You may want to have this discussion at the beginning of the year to encourage students to incorporate these strategies.

- Develop a regular study schedule
- Identify a specific location to study
- Always take notes while studying in class or on your own
- Take short breaks during your study session
- Perform "mini-testing" to make sure you understand and comprehend the program concepts
- Join small study groups to help focus on the program content
- If you need special assistance in testing, tell your teacher or counselor so they can make accommodations.

Student Testing Tips

The most important tip for your students is to be prepared mentally and physically for the testing session. Make sure to tell them to get plenty of rest and eat healthy. Suggest they wear comfortable and appropriate clothing to the testing session. If they are able to bring items to the testing session, such as a non-programmable calculator, make sure they have the items ready the night before. Have students check our website at *http://www.careeressentials.org/ wp-content/uploads/2017/07/Permitted-Testing-Tools-Aids.pdf* for permitted tools or job aids that can be used during testing. The more organized they are before the testing period, the more relaxed they will be during the actual testing session.

Encourage your students to be relaxed and positive. If they begin to panic during the testing, suggest they take some deep breaths to relax and think positive thoughts.

Do not rush through the questions. Instruct your students to read the question and poten-

tial answers thoroughly. Tell them to make sure they know exactly what the question is asking before answering. Let them know that if they are unsure, they can mark the question and re-turn to it. Other questions may have clues to the correct answer.

Use process of elimination. If your students are not sure of the correct answer, tell them to study the potential answers and eliminate the ones that they know are not correct.

If all else fails, tell students to *guess.* After they have exhausted all options, tell them to take their best guess at the correct answer. If they have studied the content area, they may intui-tively know the correct answer. The Career Es-sentials: Assessments system does not penalize students for guessing and they may guess cor-rectly!

Student Tools:
Computer Maintenance Technology Blueprint and Competency Area Knowledge Check-sheets
The next section provides the assessment blue-print and detailed topics within each compe-tency area covered within the computer main-tenance technology assessment. Photocopy and share the following blueprints and checksheets with your students so they can better prepare for each of the competency areas within the computer maintenance technology assessment.

Summary and Quick Glance Testing Reminders
The Career Essentials: Assessments process is designed for program and curriculum improve-ment. This is a continuous improvement process to better meet the educational needs of your students by strategically using data results.

Advanced planning and preparation is a key component in implementing this process. Be-low we have attempted to summarize the steps in the suggested Career Essentials: Assessments implementation pre- and post-test process.

- Identify the correct assessment for your pro-gram
- Share the selected assessment blueprint with your students, parents, advisory board mem-bers and others. Place the blueprint on the classroom wall
- Pre-test your students at the beginning of their final programmatic year
- Use the data results to identify "learning gaps"
- Share the pre-test data with the student(s)
- Tailor learning experiences to meet student needs and supplement current curriculum
- Develop homework assignments around the competency knowledge checksheets located in this guide
- Have students take the demo 10-question practice test 30 days prior to the post-test
- For students that need more time in the actual testing environment, use the Employ-ability Assessment to review navigational tools and to make students more comfort-able in the testing lab
- Finally, review the blueprint and knowledge checksheets in totality before taking the post-test to ensure students are aware of the expectation

Using the above steps, you and your students should see improvement in the post-test assess-ment score report and a percentage of knowl-edge gained.

Computer Maintenance Technology Blueprint

This Blueprint contains the subject matter content of this Career Essentials Assessment.

Note: To fully prepare for **Computer Maintenance Technology** SkillsUSA Championships contest, refer to the current year's SkillsUSA Championships Technical Standard, now included with your SkillsUSA Professional Membership. If you need help in accessing this benefit, contact the SkillsUSA Membership Office at 1-800-355-8422.

Standards and Competencies

Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Perform maintenance on personal computers and computer components

24%

- ∞ Identify the fundamental principles of using personal computers
- ∞ Identify the names, purposes and characteristics of storage devices
- ∞ Identify the names, purposes and characteristics of motherboards
- ∞ Identify the names, purposes and characteristics of power supplies
- ∞ Identify the names purposes and characteristics of processor/CPUs
- ∞ Identify the names, purposes and characteristics of memory
- ∞ Identify the names, purposes and characteristics of display devices
- ∞ Identify the names, purposes and characteristics of input devices
- ∞ Identify the names, purposes and characteristics of adapter cards
- ∞ Identify the names, purposes and characteristics of ports and cables
- ∞ Identify the names, purposes and characteristics of cooling systems
- ∞ Install, configure, optimize and upgrade personal computer components
- ∞ Add, remove and configure internal and external storage devices
- ∞ Install display devices
- ∞ Add, remove and configure basic input and multimedia devices
- ∞ Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components
- ∞ Recognize the basic aspects of troubleshooting
- ∞ Identify and apply basic diagnostic procedures and troubleshooting techniques
- ∞ Recognize and isolate issues with display, power, basic input devices, storage, memory, thermal, POST errors, peripherals, multimedia, specialty input devices, internal and external storage and CPUs
- ∞ Apply basic troubleshooting techniques to check for problems (e.g. thermal issues, error codes, power and connections including cables and/or pins, compatibility, functionality, software/drivers) with components
- ∞ Recognize the names, purposes, characteristics and appropriate application of tools for example: BIOS, self-test, hard drive self-test and software diagnostics test
- ∞ Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate components, settings and current driver)
- ∞ Recognize names, purposes, characteristics and appropriate application of tools
- ∞ Perform preventative maintenance on personal computer components
- ∞ Identify and apply basic aspects of preventative maintenance theory
- ∞ Identify and apply common preventative maintenance techniques for devices such as input devices and batteries

Perform maintenance procedures on laptops and portable devices

8%
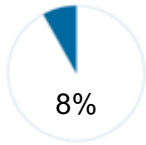
∞ Identify the fundamental principles of using laptops and portable devices
∞ Identify names, purposes and characteristics of laptop-specific devices
∞ Identify and distinguish between mobile and desktop motherboards and processors including throttling, power management and WiFi
∞ Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cellular WAN and Ethernet
∞ Identify appropriate laptop-specific power and electrical input devices and determine how amperage and voltage can affect performance
∞ Identify the major components of the LCD including inverter, screen and video card
∞ Install, configure, optimize and upgrade laptops and portable devices
∞ Configure power management
∞ Demonstrate safe removal of laptop-specific hardware such as peripherals, hot-swappable devices and non-hot-swappable devices
∞ Remove laptop-specific hardware such as peripherals, hot-swappable and non-hot-swappable devices
∞ Describe how video sharing affects memory upgrades
∞ Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices
∞ Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues
∞ Use tools, diagnostic procedures and troubleshooting techniques for laptops and portable devices
∞ Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues
∞ Perform preventative maintenance on laptops and portable devices
∞ Identify and apply common preventative maintenance techniques for laptops and portable devices, for example: cooling devices, hardware and video cleaning materials, operating environments including temperature and air quality, storage, transportation and shipping

Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center

24%

∞ Identify the fundamentals of using operating systems
∞ Identify differences between operating systems (e.g. Mac, Windows and Linux) and describe operating system revision levels including GUI, system requirements, application and hardware compatibility
∞ Identify names, purposes and characteristics of the primary operating system components including registry, virtual memory and file system
∞ Describe features of operating system interfaces
∞ Identify the names, locations, purposes and characteristics of operating system files
∞ Identify concepts and procedures for creating, viewing and managing disks, directories and files in operating systems
∞ Use command-line functions and utilities to manage operating systems, including proper syntax and switches
∞ Locate and use operating system utilities and available switches
∞ Install, configure, optimize and upgrade operating systems — references to upgrading from Windows 95 and NT may be made
∞ Identify procedures for installing and optimizing operating systems
∞ Identify procedures for upgrading operating systems
∞ Install/add a device including loading, adding device drivers and required software
∞ Identify procedures and utilities used to optimize operating systems for example, virtual memory, hard drives, temporary files, service, startup and applications
∞ Identify tools, diagnostic procedures and troubleshooting techniques for operating

11

systems

- ∞ Identify basic boot sequences, methods and utilities for recovering operating systems
- ∞ Identify and apply diagnostic procedures and troubleshooting techniques
- ∞ Recognize and resolve common operational issues such as blue screen, system lock-up, input/output device, application install, start or load and Windows-specific printing problems (e.g. print spool stalled, incorrect/incompatible driver for print)
- ∞ Explain common error messages and codes
- ∞ Identify the names, locations, purposes and characteristics of operating system utilities
- ∞ Demonstrate the ability to recover operating systems (e.g. boot methods, recovery console, ASR, ERD)
- ∞ Use diagnostic utilities and tools to resolve operational problems
- ∞ Perform preventative maintenance on operating systems
- ∞ Describe common utilities for performing preventative maintenance on operating systems; for example, software and Windows updates (e.g. service packs), scheduled backups/restore and restore points
- ∞ Demonstrate the ability to perform preventative maintenance on operating systems including software and Windows updates (e.g. service packs), scheduled backups/restore and restore points

Install and configure printers and scanners successfully

8%
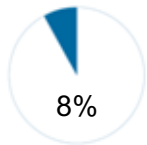
- ∞ Identify the fundamental principles of using printers and scanners
- ∞ Identify differences between types of printer and scanner technologies
- ∞ Identify names, purposes and characteristics of printer and scanner components and consumables
- ∞ Identify the names, purposes and characteristics of interfaces used by printers and scanners including port and cable types
- ∞ Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink and impact printers and scanners
- ∞ Identify basic concepts of installing, configuring, optimizing and upgrading printers and scanners
- ∞ Install and configure printers/scanners
- ∞ Optimize printer performance; for example, printer settings such as tray switching, print spool settings, device calibration, media types and paper orientation, resolution, file format and default settings
- ∞ Identify tools, basic diagnostic procedures and troubleshooting techniques for printers and scanners
- ∞ Gather information about printer/scanner problems
- ∞ Review and analyze collected data
- ∞ Identify solutions to identified printer/scanner problems
- ∞ Isolate and resolve an identified printer/scanner problem including defining the cause, applying the fix and verifying functionality
- ∞ Identify appropriate tools used for troubleshooting and repairing printer/scanner problems

Apply knowledge of networking principles to install, configure, optimize and upgrade networks

16%
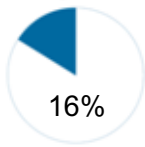
- ∞ Identify the fundamental principles of networks
- ∞ Describe basic networking concepts
- ∞ Identify names, purposes and characteristics of the common network cables
- ∞ Identify names, purposes and characteristics of network connectors
- ∞ Identify names, purposes and characteristics of technologies for establishing connectivity
- ∞ Install, configure, optimize and upgrade networks
- ∞ Install and configure network cards (physical address)
- ∞ Install, identify and obtain wired and wireless connections
- ∞ Install and configure browsers
- ∞ Establish network connectivity
- ∞ Demonstrate the ability to share network resources
- ∞ Identify tools, diagnostic procedures and troubleshooting techniques for networks
- ∞ Explain status indicators, for example: speed, connection and activity lights and wireless signal strength
- ∞ Identify names, purposes and characteristics of tools
- ∞ Diagnose and troubleshoot basic network issue

Provide security measures for computer systems

12%

- ∞ Identify the fundamental principles of security
- ∞ Identify names, purposes and characteristics of hardware and software security
- ∞ Identify names, purposes and characteristics of wireless security
- ∞ Identify names, purposes and characteristics of data and physical security
- ∞ Describe importance and process of incidence reporting
- ∞ Recognize and respond appropriately to social engineering situations
- ∞ Identify the purposes and characteristics of access control
- ∞ Identify the purposes and characteristics of auditing and event logging
- ∞ Install, configure, upgrade and optimize security
- ∞ Install, configure, upgrade and optimize hardware, software and data security
- ∞ Install and configure software, wireless and data security
- ∞ Identify tool, diagnostic procedures and troubleshooting techniques for security
- ∞ Diagnose and troubleshoot hardware, software and data security issues
- ∞ Diagnose and troubleshoot software and data security issues
- ∞ Perform preventative maintenance for computer security
- ∞ Implement software security preventative maintenance techniques such as installing service packs and patches and training users about malicious software prevention technologies
- ∞ Recognize social engineering situations
- ∞ Address social engineering situations

Apply awareness of safety and environmental concerns surrounding computer maintenance technology

8%

- ∞ Describe the aspects and importance of safety and environmental issues
- ∞ Identify potential safety hazards and take preventative action
- ∞ Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation
- ∞ Use appropriate repair tools
- ∞ Describe methods to handle environmental and human (e.g. electrical, chemical, physical) accidents including incident reporting
- ∞ Identify potential hazards and implement proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling
- ∞ Identify proper disposal procedures for batteries, display devices and chemical solvents and cans

Display communication and professionalism while working in computer maintenance technology
- ∞ Use good communication skills, including listening and tact/discretion, when communicating with customers and colleagues
- ∞ Use clear, concise and direct statements
- ∞ Allow the customer to complete statements — avoid interrupting
- ∞ Clarify customer statements — ask pertinent questions
- ∞ Avoid using jargon, abbreviations and acronyms
- ∞ Listen to customers
- ∞ Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customer's property

Demonstrate professional development skills in a simulated customer‑service or employment situation. Examples may include:
- ∞ Job interview
- ∞ Customer service scenario
- ∞ Communications
- ∞ Decision making, problem solving and/or critical thinking

Committee Identified Academic Skills

The SkillsUSA national technical committee has identified that the following academic skills are embedded in the computer maintenance technology training program and assessment:

Math Skills
- ∞ Use scientific notation

Science Skills
- ∞ Use knowledge of mechanical, chemical and electrical energy
- ∞ Use knowledge of temperature scales, heat and heat transfer
- ∞ Use knowledge of work, force, mechanical advantage, efficiency and power
- ∞ Use knowledge of principles of electricity and magnetism
- ∞ Use knowledge of static electricity, current electricity and circuits
- ∞ Use knowledge of signal frequencies and baud rate
- ∞ Use knowledge of communication modes (full/half duplex)

Language Arts Skills
- ∞ Organize and synthesize information for use in written and oral presentations
- ∞ Demonstrate knowledge of appropriate reference materials

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards
- ∞ Algebra
- ∞ Data analysis and probability
- ∞ Problem solving
- ∞ Reasoning and proof
- ∞ Communication
- ∞ Connections
- ∞ Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: http://www.nctm.org/standards/content.aspx?id=16909.

Science Standards
- ∞ Understands relationships among organisms and their physical environment
- ∞ Understands the sources and properties of energy
- ∞ Understands forces and motion
- ∞ Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks/.

Language Arts Standards
- ∞ Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- ∞ Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- ∞ Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.

24%
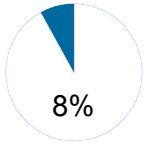
Competency Area 1: Perform maintenance on personal computers and computer components

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental principles of using personal computers?	❐	❐	❐
2. Identify the names, purposes and characteristics of storage devices?	❐	❐	❐
3. Identify the names, purposes and characteristics of motherboards?	❐	❐	❐
4. Identify the names, purposes and characteristics of power supplies?	❐	❐	❐
5. Identify the names purposes and characteristics of processor/CPUs?	❐	❐	❐
6. Identify the names, purposes and characteristics of memory?	❐	❐	❐
7. Identify the names, purposes and characteristics of display devices?	❐	❐	❐
8. Identify the names, purposes and characteristics of inpur deices?	❐	❐	❐
9. Identify the names, purposes and characteristics of adapter cards?	❐	❐	❐
10. Identify the names, purposes and characteristics of ports and cables?	❐	❐	❐
11. Install, configure, optimize and upgrade personal computer components?	❐	❐	❐

Areas I Need To Review:

Competency Area 1: Perform maintenance on personal computers and computer components *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
12. Add, remove and configure internal and external storage devices?	❐	❐	❐
13. Install display devices?	❐	❐	❐
14. Add, remove and configure basic input and multimedia devices?	❐	❐	❐
15. Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components?	❐	❐	❐
16. Recognize the basic aspects of troubleshooting?	❐	❐	❐
17. Identify and apply basic diagnostic procedures and troubleshooting techniques?	❐	❐	❐
18. Recognize and isolate issues with display, power, basic input devices, storage, memory, thermal, POST errors, peripherals, multimedia, specialty input devices, internal and external storage and CPUs?	❐	❐	❐
19. Apply basic troubleshooting techniques to check for problems (e.g. thermal issues, error codes, power and connections including cables, and/or pins, compatibility, functionality, software/drivers) with components?	❐	❐	❐
20. Recognize the names, purposes, characteristics and appropriate application of tools for example: BIOS, self-test, hard drive self-test and software diagnostics test?	❐	❐	❐

Competency Area 1: Perform maintenance on personal computers and computer components *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
21. Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate components, settings and current driver)?	❒	❒	❒
22. Recognize names, purposes, characteristics and appropriate application of tools?	❒	❒	❒
23. Perform preventative maintenance on personal computer components?	❒	❒	❒
24. Identify and apply basic aspects of preventative maintenance theory?	❒	❒	❒
25. Identify and apply common preventative maintenance techniques for devices such as input devices?	❒	❒	❒

Areas I Need To Review:

8%

Competency Area 2: Perform maintenance procedures on laptops and portable devices

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental principles of using laptops and portable devices?	❐	❐	❐
2. Identify names, purposes and characteristics of laptop-specific devices?	❐	❐	❐
3. Identify and distinguish between mobile and desktop motherboards and processors including throttling, power management and WiFi?	❐	❐	❐
4. Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cleeular WAN and Ethernet?	❐	❐	❐
5. Identify appropriate laptop-specific power and electrical input devices and determine how amperage and voltage can affect performance?	❐	❐	❐
6. Identify the major components of the LCD including inverter, screen and video card?	❐	❐	❐

Areas I Need To Review:

Competency Area 2: Perform maintenance procedures
on laptops and portable devices *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
7. Install, configure, optimize and upgrade laptops and portable devices?	❐	❐	❐
8. Configure power management?	❐	❐	❐
9. Demonstrate safe removal of laptop-specific hardware such as peripherals, hot-swappable devices and non-hot-swappable devices?	❐	❐	❐
10. Remove laptop-specific hardware such as peripherals, hot-swappable and non-hot-swappable devices?	❐	❐	❐
11. Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices?	❐	❐	❐
12. Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues?	❐	❐	❐
13. Perform preventative maintenance on laptops and portable devices?	❐	❐	❐
14. Identify and apply common preventative maintenance techniques for laptops and portable devices, for example: cooling devices, hardware and video cleaning materials, operating environments including temperature and air quality, storage, transportation and shipping?	❐	❐	❐

Areas I Need To Review:
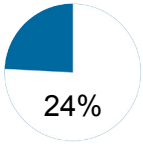
Competency Area 3: Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental s of using operating systems?	❐	❐	❐
2. Identify differences between operating systems (e.g. Mac, Windows and Linux) and describe operating system revision levels including GUIO, system requirements, application and hardware compatibility?	❐	❐	❐
3. Identify names, purposes and characteristics of the primary operating system components including registry, virtual memory and file system?	❐	❐	❐
4. Describe features of operating system interfaces?	❐	❐	❐
5. Identify the names, locations, purposes and characteristics of operating system files?	❐	❐	❐
6. Identify concepts and procedures for creating, viewing and managing disks, directories and files in operating systems?	❐	❐	❐
7. Use command-line functions and utilities to manage operating systems, including proper syntax and switches?	❐	❐	❐
8. Locate and use operating system utilities and available switches?	❐	❐	❐
9. Install, configure, optimize and upgrade operating systems – references to upgrading from Windows 95 and NT may be made?	❐	❐	❐
10. Identify procedures fro installing and optimizing operating systems?	❐	❐	❐

## Competency Area 3: Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
11. Identify procedures for upgrading operating systems?	❒	❒	❒
12. Install/add a device including loading, adding device drivers and required software?	❒	❒	❒
13. Identify procedures and utilities used to optimize operating systems for example, virtual memory, hard drives, temporary files, service, startup and applications?	❒	❒	❒
14. Identify tools, diagnostic procedures and troubleshooting techniques for operating systems?	❒	❒	❒
15. Identify basic boot sequences, methods and utilities for recovering operating systems?	❒	❒	❒
16. Identify and apply diagnostic procedures and troubleshooting techniques?	❒	❒	❒
17. Recognize and resolve common operational issues such as blue screen, system lock-up, input/output device, application install, start or load and Windows-specific printing problems (e.g. print spool stalled, incorrect/incompatible driver for print)?	❒	❒	❒
18. Explain common error messages and codes?	❒	❒	❒
19. Identify the names, locations, purposes and characteristics of operating system utilities?	❒	❒	❒

Competency Area 3: Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
20. Demonstrate the ability to recover operating systems (e.g. boot methods, recovery console, ASR, ERD)?	❏	❏	❏
21. Use diagnostic utilities and tools to resolve operational problems?	❏	❏	❏
22. Perform preventative maintenance on operating systems?	❏	❏	❏
23. Describe common utilities for performing preventative maintenance on operating systems; for example, software and Windows updates (e.g. service packs), scheduled backups/restore and restore points?	❏	❏	❏
24. Demonstrate the ability to perform preventative maintenance on operating systems including software and Windows updates (e.g. service packs), scheduled backups/restore and restore points?	❏	❏	❏

Areas I Need To Review:
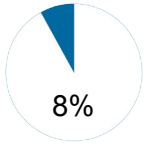
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Competency Area 4: Install and configure printers and scanners successfully

Knowledge Check

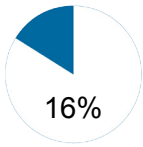| How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental principles of using printers and scanners?	❒	❒	❒
2. Identify differences between types of printer and scanner technologies?	❒	❒	❒
3. Identify names, purposes and characteristics of printer and scanner components and consumables?	❒	❒	❒
4. Identify the names, purposes and characteristics of interfaces used by printers and scanners including port and cable types?	❒	❒	❒
5. Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink, and impact printers and scanners?	❒	❒	❒
6. Identify basic concepts of installing, configuring, optimizing and upgrading printers and scanners?	❒	❒	❒
7. Install and configure printers/scanners?	❒	❒	❒
8. Optimize printer performance; for example, printer settings such as tray switching, print spool settings, device calibration, media types and paper orientation, resolution, file format and default settings?	❒	❒	❒
9. Identify tools, basic diagnostic procedures and troubleshooting techniques for printers and scanners?	❒	❒	❒

Competency Area 4: Install and configure printers and scanners successfully *(continued)*

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
10. Gather information about printer/scanner problems?	❐	❐	❐
11. Review and analyze collected data?	❐	❐	❐
12. Identify solutions to identified printer/scanner problems?	❐	❐	❐
13. Isolate and resolve an identified printer/scanner problem including defining the cause, applying the fix, and verifying functionality?	❐	❐	❐
14. Identify appropriate tools used for troubleshooting and repairing printer/scanner problems?	❐	❐	❐

Areas I Need To Review:

Competency Area 5: Apply knowledge of networking principles to install, configure, optimize and upgrade networks

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental principles of networks?	❐	❐	❐
2. Describe basic networking concepts?	❐	❐	❐
3. Identify names, purposes and characteristics of the common network cables?	❐	❐	❐
4. Identify names, purposes and characteristics of network connectors?	❐	❐	❐
5. Identify names, purposes and characteristics of technologies for establishing connectivity?	❐	❐	❐
6. Install, configure, optimize and upgrade networks?	❐	❐	❐
7. Install and configure network cards (physical address)?	❐	❐	❐
8. Install, identify and obtain wired and wireless connections?	❐	❐	❐
9. Install and configure browsers?	❐	❐	❐
10. Establish network connectivity?	❐	❐	❐
11. Demonstrate the ability to share network resources?	❐	❐	❐
12. Identify tools, diagnostic procedures and troubleshooting techniques for networks?	❐	❐	❐
13. Explain status indicators, for example: speed, connection and activity lights and wireless signal strength?	❐	❐	❐
14. Identify names, purposes and characteristics of tools?	❐	❐	❐
15. Diagnose and troubleshoot basic network issues?	❐	❐	❐

Areas I Need To Review:

12%
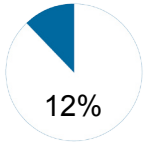
Competency Area 6: Provide security measures for computer systems

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify the fundamental principles of security?	❑	❑	❑
2. Identify names, purposes and characteristics of hardware and software security?	❑	❑	❑
3. Identify names, purposes and characteristics of wireless security?	❑	❑	❑
4. Identify names, purposes and characteristics of data and physical security?	❑	❑	❑
5. Describe importance and process of incidence reporting?	❑	❑	❑
6. Recognize and respond appropriately to social engineering situations?	❑	❑	❑
7. Identify the purposes and characteristics of access control?	❑	❑	❑
8. Identify the purposes and characteristics of auditing and event logging?	❑	❑	❑
9. Install, configure, upgrade and optimize security?	❑	❑	❑
10. Install, configure, upgrade and optimize hardware, software and data security?	❑	❑	❑
11. Install and configure software, wireless and data security?	❑	❑	❑
12. Identify tool, diagnostic procedures and troubleshooting	❑	❑	❑

Areas I Need To Review:

Competency Area 6: Provide security measures for computer systems *(continued)*

Knowledge Check

techniques for security?

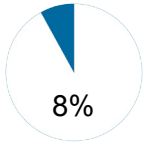| How well do you know how to:	Very Well	Somewhat Well	Not Well
13. Diagnose and troubleshoot hardware, software and data security issues?	❐	❐	❐
14. Diagnose and troubleshoot software and data security issues?	❐	❐	❐
15. Perform preventative maintenance for computer security?	❐	❐	❐
16. Implement software security preventative maintenance techniques such as installing service packs and patches and training users about malicious software prevention technologies?	❐	❐	❐
17. Recognize social engineering situations?	❐	❐	❐
18. Address social engineering situations?	❐	❐	❐

Areas I Need To Review:

8%

Competency Area 7: Apply awareness of safety and environmental concerns surrounding computer maintenance technology

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Describe the aspects and importance of safety and environmental issues?	❐	❐	❐
2. Identify potential safety hazards and take preventative action?	❐	❐	❐
3. Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation?	❐	❐	❐
4. Use appropriate repair tools?	❐	❐	❐
5. Describe methods to handle environmental and human (e.g. electrical, chemical, physical) accidents including incident reporting?	❐	❐	❐
6. Identify potential hazards and implement proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling?	❐	❐	❐
7. Identify proper disposal procedures for batteries, display devices and chemical solvents and cans?	❐	❐	❐

Areas I Need To Review:

Helpful Tips and Reminders for Students

Access Directions to the Trade- or Technical-Specific Online 10-question Demo Assessment

Access the Web link *http://www.careeressentials.org/assessments/demo-our-assessments/* with your browser. The sample programmatic questions will help give you an idea of the types of questions on the assessment and how they are generally written.

Test-Taking Reminders

Implementing good study habits is essential for any test or class. Below are basic reminders to better prepare you for life-long learning and workplace success. Incorporate these strategies into your everyday habits.

- Develop a regular study schedule
- Identify a specific location to study
- Always take notes while studying in class or on your own
- Take short breaks during your study session
- Perform "mini-testing" to make sure you understand and comprehend the program concepts
- Join small study groups to help focus on the program content
- If you need special assistance in testing, tell your teacher or counselor so he or she can make accommodations

Student Testing Tips

The most important tip for you is to be prepared mentally and physically for the testing session. Make sure to get plenty of rest and eat healthy. Wear comfortable and appropriate clothing to the testing session. Find out if you can bring items to the testing session, such as a non-programmable calculator, and make sure you have the items ready the night before. Check the website at *http://www.careeressentials.org/wp-content/uploads/2017/07/Permitted-Testing-Tools-Aids.pdf* for permitted tools or job aids that can be used during testing. The more organized you are before the testing period, the more relaxed you will be during the actual testing session.

Be relaxed and positive. If you begin to panic during the testing, take some deep breaths to relax, and think positive thoughts.

Do not rush through the questions. Read the question and potential answers thoroughly. Make sure you know exactly what the question is asking before answering. If you are unsure, note the question and return to it. Other questions may have clues to the correct answer. Use process of elimination. If you are not sure of the correct answer, study the potential answers and eliminate the ones that you know are not correct.

If all else fails – *guess*. After you have exhausted all options, take your best guess at the correct answer. If you have studied the content area, you may intuitively know the correct answer. The Career Essentials: Assessments does not penalize you for guessing, and you may guess correctly!

Sample Assessment Questions

Sample Questions

The following questions are examples of the types of questions you may see within the assessment test. The questions could be in the form of a video clip, drop and drag, sequential or a typical multiple choice.

Computer Maintenance Sample Questions

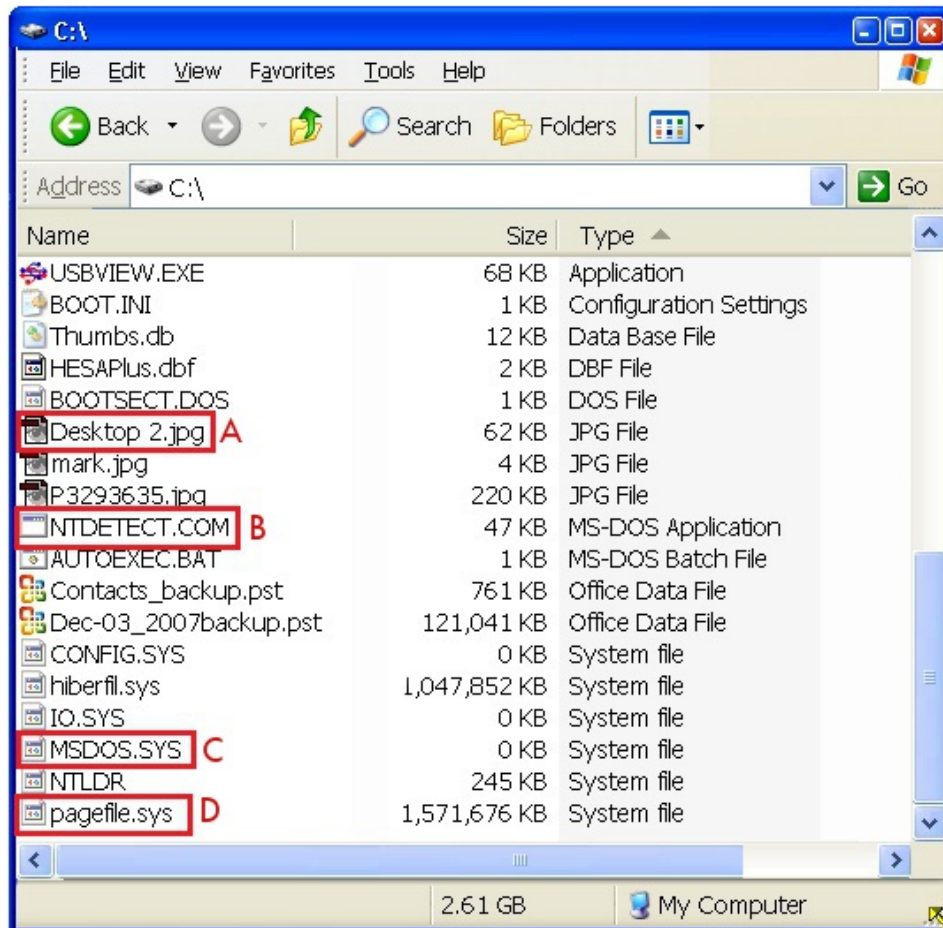1) **Identify the tab in where you would change display effects?**

A.

B.

C.

D.

Answer: D

2) **Which of the following is files is critical to start up of Windows XP?**

A. NTLDR

B. PAGEFILE.SYS

C. XPDETECT

D. XPLDR

Answer: A

3) Identify the swap file in the image shown below.

A.

B

C.

D.

Answer: D

4) Which of the following images depicts SCSI port?

A.

B.

C.

D.

Answer : A

5) A customer says the computer sounds like it is starting up properly, but there is nothing on the monitor. What is one of the first things to check?

A. Monitor configuration
B. Power to the monitor and the monitor is connected to the computer
C. Screen saver settings
D. Safe Mode

Answer: B

6) While servicing a customer's system you replace the CPU. After a thorough test process you are confident that the CPU is working well. An hour later the system is showing CPU overheating warnings. Why would this happen?

A. You forgot to apply thermal compound or a thermal pad.
B. The heat sink has fallen off.
C. The CPU is overclocked too much.
D. The temperature sensor on the motherboard is defective.

Answer: A

12/12/13

Resources

Additional Resources
Below are resources that will be helpful in pre-paring for the Assessments which were created based on industry standards nationwide. Use the Career Essentials: Assessments Blueprint as a guideline for competencies tested. Use the resources below to find curriculum or additional study guides for industry standards.

This assessment is defined by industry stan-dards as determined by the CompTIA A+ Certi-fication Examination. A+ Certification objectives may be found at the following website: *www.comptia.org.*

This information is also free by request. Write to:
CompTIA
450 E. 22nd St., Suite 230
Lombard, IL 60148-6158

Computer Maintenance Technology Resources:
http://www.careeressentials.org/assessments/assessment-resources/