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| **COMPUTER MAINTENANCE, 15.1200.20** |
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| These technical knowledge and skill standards were validated by a Skill Standards Validation Committee on March 24, 2015. First testing date using the new standards will be Fall 2015. |
| **STANDARD 1.0 APPLY PROBLEM-SOLVING AND CRITICAL THINKING SKILLS TO COMPUTER/ ELECTRONIC DEVICE MAINTENANCE** |
| 1.1 | Describe methods to determine priorities in establishing and maintaining computers/electronic devices |
| 1.2 | Apply problem-solving processes to troubleshoot computers and electronic devices (i.e. define problem, identify cause, research problem, select and test solution, prevent the problem) |
| 1.3 | Identify common project management concepts (e.g. project management triangle, goals, Gantt charts) and their limitations |
| 1.4 | Document the results of the problem-solving process |
| **STANDARD 2.0 MAINTAIN A SAFE AND ENVIRONMENTALLY CONCIOUS TECHNOLOGY WORK ENVIRONMENT** |
| 2.1 | Demonstrate personal responsibility for developing and maintaining a safe and healthy technology work environment |
| 2.2 | Use the tools, materials, and equipment commonly used in the field of technology maintenance |
| 2.3 | Identify ergonomics and repetitive strain injuries commonly experienced in technology maintenance occupations |
| 2.4 | Determine safe working practices to avoid or eliminate electrical hazards |
| 2.5 | Explain environmental considerations when disposing of computer/electronic device components |
| 2.6 | Explain various safety measures and procedures including electrostatic discharge and how inadequate measures can damage equipment |
| 2.7 | Identify proper safety procedures relating to high voltage and other electrical equipment |
| 2.8 | Identify environmental protection measures, procedures, and guidelines |
| **STANDARD 3.0 RECOGNIZE SECURITY ISSUES RELATED TO COMPUTERS/ELECTRONIC DEVICES** |
| 3.1 | Explain policies to maintain data integrity and security |
| 3.2 | Identify security issues related to computer hardware, software, data, and mobile devices |
| 3.3 | Explain the importance of physical security of computer hardware and electronic devices |
| 3.4 | Define concepts such as phishing, viruses, email attachments, social engineering, spoofing, identify theft, and spamming |
| 3.5 | Identify methods to protect computers/electronic devices from malware |
| 3.6 | Identify methods to safely remove malware |
| 3.7 | Explain concepts such as denial of service, hacking/cracking, intrusion, and intellectual property |
| **STANDARD 4.0 EXPLORE LEGAL AND ETHICAL ISSUES RELATED TO INFORMATION TECHNOLOGY** |
| 4.1 | Explore issues regarding intellectual property rights including copyright, software licensing, patents, and software duplication |
| 4.2 | Identify issues and trends affecting computers and information privacy |
| 4.3 | Differentiate between ethical and unethical uses of information technology |
| 4.4 | Examine the relationship between ethics and the law in relation to information technology |
| 4.5 | Identify workers' rights regarding workplace issues including safety, harassment, discrimination, monitoring, and privacy |

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| **STANDARD 5.0 DEMONSTRATE THE USE OF BINARY AND OTHER NUMERIC SYSTEMS IN COMPUTER APPLICATIONS** |
| 5.1 | Explain the function of base number systems in mathematics as they relate to computer/electronic device technology |
| 5.2 | Perform decimal to binary and binary to decimal conversions |
| 5.3 | Perform decimal to hexadecimal and hexadecimal to decimal conversions |
| 5.4 | Perform hexadecimal to binary and binary to hexadecimal conversions |
| 5.5 | Determine appropriate method to perform conversions (e.g. paper/pencil, electronic resources) |
| 5.6 | Explain the relationship of bits to common hard drive capacities |
| 5.7 | Explain the relationship of hertz to process and bus speed |
| 5.8 | Apply basic electronics theories (i.e. Ohm’s Law, calculation of wattage, voltage, amperage, resistance, capacitance) |
| 5.9 | Distinguish differences between direct current and alternating current and how they apply to electronic devices |
| 5.10 | Explain basic transformer theory |
| **STANDARD 6.0 DESCRIBE THE DEVELOPMENT/EVOLUTION OF COMPUTERS/ELECTRONIC DEVICES** |
| 6.1 | Explain the historical evolution of the computer and computer networks |
| 6.2 | Explain how the development of computers has impacted modern life |
| 6.3 | Discuss future trends in computer/portable device technology |
| **STANDARD 7.0 INSTALL, CONFIGURE, UPGRADE, AND MAINTAIN COMPUTERS/ELECTRONIC DEVICES** |
| 7.1 | Identify the purpose and characteristics of common system components (e.g. tower, storage devices, power supply, removable media, expansion cards) |
| 7.2 | Demonstrate the basic procedures for adding and removing common system components and recognizing associated cable connections |
| 7.3 | Delineate the names, purposes, and performance characteristics of common peripheral ports |
| 7.4 | Demonstrate the proper procedures for installing and configuring common peripheral devices |
| 7.5 | Identify issues that must be considered when upgrading a computer/electronic device |
| 7.6 | Establish procedures for the various types of preventive maintenance of computers and peripherals (e.g. cleaning and defragmenting drives) |
| **STANDARD 8.0 MAINTAIN MOTHERBOARDS, PROCESSORS, AND MEMORY** |
| 8.1 | Identify CPU chip types and associated sockets |
| 8.2 | Distinguish differences between surface mount technology (SMT) and socketed components |
| 8.3 | Identify the operational characteristics of RAM (e.g. speed, type, size) |
| 8.4 | Identify the responsibility of the various components of the motherboard (e.g. expansion slots, chipsets, battery) |
| 8.5 | Identify the basic compatibility guidelines of the motherboard/processors/memory |
| 8.6 | Explain the role of BIOS and CMOS in computer technology |
| 8.7 | Explain the significance of Moore’s Law as it relates to computer performance |
| 8.8 | Explain how environmental factors including heat, airborne particulates, humidity, vibration, and shocks can affect equipment |
| **STANDARD 9.0 INSTALL AND MAINTAIN PRINTERS** |
| 9.1 | Compare and contrast printer technologies including laser, ink dispersion, solid ink, thermal, and dye sublimation |
| 9.2 | Determine the optimal interface option for each printer technology |
| 9.3 | Distinguish the options to upgrade a printer (i.e. memory, hard drives, NICS, FAX, etc.) |
| 9.4 | Resolve common printer problems |
| **STANDARD 10.0 DEMONSTRATE THE USE OF BASIC NETWORKING HARDWARE** |
| 10.1 | Differentiate common types of network cables and their characteristics |
| 10.2 | Install and configure network cards |
| 10.3 | Compare common network protocols |
| 10.4 | Identify common networking topologies |
| 10.5 | Differentiate common technologies available for establishing network connectivity (e.g. routers, wireless, hubs, modem, switches) |
| 10.6 | Diagnose simple hardware problems in networking equipment |
| **STANDARD 11.0 UNDERSTAND THE BASICS OF COMMON OPERATING SYSTEMS** |
| 11.1 | Distinguish the major desktop components and interfaces and their function (e.g. taskbar, menus) |
| 11.2 | Differentiate the characteristics of common operating systems on computers/electronic devices (e.g. Windows, IOS, Android, Linux) |
| 11.3 | Compare and contrast the differences between native and virtualized operating system environments |
| 11.4 | Navigate major operating system interfaces (e.g. file management, administrative tools, command line) |
| 11.5 | Identify the function of major system files (e.g. REGEDIT, Task Manager, system utilities) |
| 11.6 | Explain command-line functions and utilities to manage the operating system including the proper syntax and switches |
| 11.7 | Demonstrate basic concepts and procedures for creating, viewing, and managing drives, directories, and files |
| 11.8 | Demonstrate the proper procedures for changing file attributes and the ramifications of those changes including security issues |
| 11.9 | Identify common hard drive redundancy options, i.e. RAID, cloud storage |
| **STANDARD 12.0 INSTALL, CONFIGURE, UPGRADE AND TROUBLESHOOT THE OPERATING SYSTEM** |
| 12.1 | Install operating systems using customized installation options |
| 12.2 | Backup and restore user data |
| 12.3 | Identify common symptoms and resolve problems encountered during installations or upgrades |
| 12.4 | Perform operating system upgrades |
| 12.5 | Demonstrate basic system boot sequences and boot methods including an emergency boot disk with utilities |
| 12.6 | Install and add a device including loading, adding, and configuring device drivers and required software |
| 12.7 | Optimize the operating system and its major subsystems |
| 12.8 | Migrate a user from one system to another, retaining all user software options and documents |
| 12.9 | Interpret the meaning of common error codes and startup messages from the boot sequence and identify steps to correct problems |
| 12.10 | Use common diagnostic utilities and tools as required |
| 12.11 | Identify common operational and usability problems and determine how to resolve them |
| **STANDARD 13.0 CONFIGURE A NETWORK** |
| 13.1 | Assess the networking capabilities of common operating systems |
| 13.2 | Configure protocols (e.g. TCP/IP, NetBIOS) |
| 13.3 | Demonstrate the ability to use network troubleshooting applications (e.g. IPCONFIG, PING, TRACERT, NSLOOKUP, DIG, NETSTAT, NBTSTAT, and ARP) |
| 13.4 | Define the basic internet protocols and terminologies (e.g. HTTP, HTTPS, FTP, SMTP, DNS, DHCP, POP) |
| 13.5 | Identify procedures for establishing internet connectivity |
| 13.6 | Install and configure browsers including enable/disable script support, configure proxy settings, configure security settings |
| 13.7 | Configure personal firewall protection |
| 13.8 | Install and configure email applications |
| 13.9 | Install and configure secure wireless networking |