03.0 System Components

Content Area: **CTE**
Course(s): **Computer Systems & Networking II**
Time Period: **October**
Length: **21 days**
Status: **Published**

Unit Overview:

This unit explores the topics: cases and form factors, power supplies, mother boards and buses, motherboard troubleshooting, processors, processor troubleshooting, memory, memory installation, memory troubleshooting, BIOS/UEFI, expansion cards, video, audio, and cooling.

Essential Questions:

- How does the video card affect the quality of the image on the monitor?
- How does adequate cooling improve performance and extend the life of components?
- Why must the case be matched to the motherboard?
- How does the case form affect the type of Power Supply you purchase?
- What factors should you consider when selecting a motherboard?
- What are the differences between the four levels of cache memory?
- What is the biggest limitation of using a 32-bit processor?
- What is the difference between SRAM and DRAM?
- How does DDR4 differ from DDR3?

Enduring Understandings:

- Computer cases must be matched to the motherboard
- The form factor is a specification that determines the motherboard's dimensions. It defines the width and height, the locations of mounting holes, back panel ports, and expansion slots.
- Power supplies have two primary functions. They convert AC power to DC power, and they provide voltage of DC power to components.
- The motherboard is where all the computer components connect and it handles the communications between each of the devices.
- The brains of the computer is the central processing unit, CPU, or processor. It is an integrated circuit that's built on a slice of silicon and contains millions of microscopic circuits.
- Computer memory is a generic term for all of the different types of data storage technology that a computer may use for tempoary data access.
- BIOS/UEFI is a chip on the motherboard that contains programs that the CPU needs in order to communicate with various devices on the motherboard.
- Expansion buses and slots allow you to extend the capabilities of a computer by adding a pre-programmed circuit card into the computer.

Standards/Indicators/Student Learning Objectives (SLOs):

ITEC.9-12.9.4.12.K.(2).1	Perform user support to maintain service.
ITEC.9-12.9.4.12.K.(2).2	Manage software systems to maintain and update service.
ITEC.9-12.9.4.12.K.(2).3	Use hardware design, operation, and maintenance knowledge and skills to provide user support.
ITEC.9-12.9.4.12.K.54	Identify and demonstrate positive work behaviors and personal qualities needed to succeed in the classroom and/or to be employable.
ITEC.9-12.9.4.12.K.56	Demonstrate skills related to seeking and applying for employment in a desired job.
ITEC.9-12.9.4.12.K.58	Demonstrate skills in evaluating and comparing employment opportunities in order to accept employment positions that match career goals.
ITEC.9-12.9.4.12.K.59	Identify and exhibit traits for retaining employment.
ITEC.9-12.9.4.12.K.60	Identify and explore careers in one or more career pathways to build an understanding of the opportunities available in the cluster.
ITEC.9-12.9.4.12.K.61	Examine requirements for career advancement to plan for continuing education and training.
ITEC.9-12.9.4.12.K.62	Research professional development opportunities needed to keep current on relevant trends and information within the cluster.
ITEC.9-12.9.4.12.K.63	Examine licensing, certification, and credentialing requirements at the national, state, and local levels to maintain compliance with industry requirements.
ITEC.9-12.9.4.12.K.68	Demonstrate knowledge of the hardware components associated with information systems.
ITEC.9-12.9.4.12.K.70	Identify and compare new information systems trends and technologies to build an understanding of their potential influence on industry practices.
ITEC.9-12.9.4.12.K.72	Demonstrate technical knowledge of the Internet to develop and maintain information technology systems.
ITEC.9-12.9.4.12.K.73	Access and use Internet services to service and update information technology systems and to complete other information technology tasks.
ITEC.9-12.9.4.12.K.74	Install and configure software programs to maintain and update information technology systems.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.2.12.A.CS3	The relationships among technologies and the connections between technology and other fields of study.
TECH.8.2.12.B.CS3	The role of society in the development and use of technology.
TECH.8.2.12.B.CS4	The influence of technology on history.
TECH.8.2.12.D.4	Assess the impacts of emerging technologies on developing countries.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

Lesson Titles:

- 3.0 SYSTEM COMPONENTS
- 3.1 Cases and Form Factors
- 3.1.1 Cases and Form Factors (6:23)
- 3.1.2 System Case Facts
- 3.1.3 Practice Questions
- 3.2 Power Supplies
- 3.2.1 Power Supplies (4:10)
- 3.2.2 Power Supply Facts
- 3.2.3 Identify Power Supply Components (6:00)
- 3.2.4 Change the Power Supply (7:16)
- 3.2.5 Install a Power Supply
- 3.2.6 Practice Questions
- 3.3 Motherboards and Buses
- 3.3.1 Motherboard Components (4:42)
- 3.3.2 Motherboard Facts
- 3.3.3 Install a Motherboard (6:21)
- 3.3.4 Motherboard Installation Facts
- 3.3.5 Choose and Install a Motherboard
- 3.3.6 Practice Questions
- 3.4 Motherboard Troubleshooting
- 3.4.1 Motherboard Troubleshooting (8:19)
- 3.4.2 Motherboard Troubleshooting Facts
- 3.4.3 Troubleshoot System Power
- 3.4.4 Troubleshoot Power Supply Problems
- 3.4.5 Practice Questions
- 3.5 Processors
- 3.5.1 Processor Concepts (11:33)
- 3.5.2 CPU Facts
- 3.5.3 CPU Performance Facts
- 3.5.4 CPU Socket Facts
- 3.5.5 Install a Processor (6:35)
- 3.5.6 CPU Installation Facts
- 3.5.7 Select and Install a Processor 1
- 3.5.8 Select and Install a Processor 2
- 3.5.9 Practice Questions
- 3.6 Processor Troubleshooting
- 3.6.1 Processor Troubleshooting (6:18)
- 3.6.2 Processor Troubleshooting Facts
- 3.6.3 Troubleshoot Processor Installation 1
- 3.6.4 Troubleshoot Processor Installation 2
- 3.6.5 Practice Questions
- 3.7 Memory
- 3.7.1 Random Access Memory (4:28)
- 3.7.2 DRAM Types (6:13)
- 3.7.3 RAM Facts
- 3.7.4 Memory Speed (13:16)
- 3.7.5 Memory Speed Facts

- 3.7.6 Practice Questions
- 3.8 Memory Installation
- 3.8.1 Memory Characteristics (14:47)
- 3.8.2 Memory Facts
- 3.8.3 Select Memory by Sight
- 3.8.4 Select the Correct Memory Module (7:18)
- 3.8.5 Install Memory (7:52)
- 3.8.6 Memory Installation Facts
- 3.8.7 Install Triple Channel Memory
- 3.8.8 Practice Questions
- 3.9 Memory Troubleshooting
- 3.9.1 Memory Troubleshooting (6:35)
- 3.9.2 Test Memory (4:26)
- 3.9.3 Memory Troubleshooting Facts
- 3.9.4 Troubleshoot Memory 1
- 3.9.5 Troubleshoot Memory 2
- 3.9.6 Practice Questions
- 3.10 BIOS/UEFI
- 3.10.1 BIOS/UEFI (12:03)
- 3.10.2 PC Boot Process (4:05)
- 3.10.3 BIOS/UEFI Facts
- 3.10.4 Edit BIOS/UEFI Settings (14:35)
- 3.10.5 Use Built-in System Diagnostics (2:37)
- 3.10.6 Flash the BIOS (6:21)
- 3.10.7 Find BIOS/UEFI Settings
- 3.10.8 Clear CMOS Settings
- 3.10.9 Practice Questions
- 3.11 Expansion Cards
- 3.11.1 Expansion Buses and Slots (4:30)
- 3.11.2 Expansion Bus Types
- 3.11.3 Install an Expansion Card (4:18)
- 3.11.4 Install Expansion Cards
- 3.11.5 Practice Questions
- 3.12 Video
- 3.12.1 Video Cards (5:32)
- 3.12.2 Video Card Facts
- 3.12.3 Install a Video Card (6:12)
- 3.12.4 Video Card Installation Facts
- 3.12.5 Upgrade a Video Card
- 3.12.6 Practice Questions
- 3.13 Audio
- 3.13.1 Digital Audio (9:07)
- 3.13.2 Sound Cards (3:35)
- 3.13.3 Sound Card Facts
- 3.13.4 Manage Audio Devices (11:22)
- 3.13.5 Sound Card Installation Facts
- 3.13.6 Sound Card Connectors
- 3.13.7 Select and Install a Sound Card
- 3.13.8 Practice Questions

- 3.14 Cooling
- 3.14.1 System Cooling (7:55)
- 3.14.2 System Cooling Facts
- 3.14.3 Practice Questions

Career Readiness, Life Literacies, & Key Skills:

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
LA.RST.11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LA.RST.11-12.5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
LA.RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LA.RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
MA.A-CED.A	Create equations that describe numbers or relationships
LA.K-12.NJSLSA.SL2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
LA.WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.WHST.11-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Equity Considerations:

Holocaust Mandate

Topic: Herman Hollerith (February 29, 1860-November 17, 1929) was a German-American statistician, inventor, and businessman who developed an electromechanical tabulating machine for punched cards to assist in summarizing information and, later, in accounting. His invention of the punched card tabulating machine, patented in 1884, marks the beginning of the era of mechanized binary code and semiautomatic data processing systems, and his concept dominated that landscape for nearly a century.

Hollerith founded a company that was amalgamated in 1911 with several other companies to form the Computing-Tabulating-Recording Company. In 1924, the company was renamed "International Business Machines" (IBM) and became one of the largest and most successful companies of the 20th century.

Investigative journalist and historian Edwin Black documents the strategic technology services rendered by American-based multinational corporation International Business Machines (IBM) and its German and other European subsidiaries for the Nazi government of Adolf Hitler. Black outlines the key role of IBM's technology in the Nazi genocide, by facilitating the regime's generation and tabulation of punch cards for national census data, military logistics, ghetto statistics, train traffic management, and concentration camp capacity.

Materials Used: Black, E. (2012). *IBM and the Holocaust: The strategic alliance between Nazi Germany and America's most powerful corporation*. Dialog Press.

Addresses the Following Component of the Mandate:

- Holocaust Studies

Climate Change

CS.9-12.8.1.12.DA.1	Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
TECH.9.4.12.DC.8	Explain how increased network connectivity and computing capabilities of everyday objects allow for innovative technological approaches to climate protection.

Asian American Pacific Islander Mandate

Topic: Numerous Asian Americans and Pacific Islanders have created innovations that we use everyday.

Materials Used: Delgado, C. M. (2021, May 27). 8 Asian Americans and Pacific Islanders whose innovations have changed your life (really!). ideas.ted.com. Retrieved July 20, 2022, from https://ideas.ted.com/8-asian-americans-and-pacific-islanders-whose-innovations-have-changed-your-life-really/

Addresses the Following Component of the Mandate:

- Social, Political, Economic

LGBTQ and Disabilities Mandate

Topic: Some of the most influential and notable people in tech identify as LGBTQ+. This list includes Tim Cook of Apple and the co-founder of Facebook.

Materials Used: Leskin, P. (2019, June 2). The 23 most powerful LGBTQ+ people in Tech. Business Insider. Retrieved July 20, 2022, from https://www.businessinsider.com/most-powerful-lgbtq-people-in-tech-2019-2

Addresses the Following Component of the Mandate:

- Social, Political, Economic

Resources & Materials:

- networking equipment
- networking posters
- networking tools
- PowerPoint presentations

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Lab - Install a Power Supply
- Lab - Choose and Install a Motherboard
- Lab - Troubleshoot System Power
- Lab - Troubleshoot Power Supply Problems
- Lab - Select and Install a Processor 1
- Lab - Select and Install a Processor 2
- Lab - Troubleshoot Processor Installation 1
- Lab - Troubleshoot Processor Installation 2
- Lab - Select Memory by Sight
- Lab - Install Triple Channel Memory
- Lab - Troubleshoot Memory 1
- Lab - Troubleshoot Memory 2
- Lab - Find BIOS/UEFI Settings
- Lab - Clear CMOS Settings
- Lab - Install Expansion Cards
- Lab - Upgrade a Video Card
- Lab - Select and Install a Sound Card

Instructional Strategies:

- Summarizing & Note Taking
- Direct Instruction
- Provide opportunities for student practice
- KWL Chart
- Chapter study guide

- Large group discussion

Blooms/DOK:

- Level 1: recall/remember vocabulary
- Level 2: categorize the unit's technology
- Level 3: compare and contrast various technologies
- Level 4: students analyze and create a project utilizing the learned technology

Modifications

ELL Modifications:

- Digital translators
- Provide ELL students with multiple literacy strategies
- Front load information
- Focus on domain specific vocabulary and keywords
- Group students
- Use manipulatives where possible
- Use visuals
- Use graphic organizer
- Use real objects when possible
- Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience
- Tap prior knowledge
- Establish a framework allowing ELL students to understand and assimilate new ideas and information
- Provide support as ELL students move through all levels of language acquisition: scaffold learning, processing time, as well as other modifications mentioned above
- Utilize explicit learning strategies that are well planned in advance (intentional planning)
- Assess ELL students continuously using formative assessment methods
- 1:1 testing
- Repeat, reword, clarify
- Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- Offer alternate/or modify assessments
- Be flexible with time frames and deadlines
- Offer resources for specific topics in primary language (YouTube web resources)

IEP & 504 Modifications:

- Testing modifications:

    - higher level reasoning questions would have less weight than other questions or provided as extra credit questions to provide exposure to these questions but not something that will be a detriment to the student's ability to share knowledge of content
    - rewording questions so that there are not higher level vocabulary within the question (you are testing for understanding of the content not the ability to understand the question)
    - less questions per page (so not visually overwhelming)
    - less none of the above, all of the above, which of the following apply, or which do not apply type questions (again it is testing for understanding of the question not the content)
    - if not directly testing directly for reading comprehension offering paraphrasing of quotes, etc... if the student is expected to be testing on understanding that paragraph or quote to answer future questions
    - word banks, multiple choice, matching questions help when possible
    - less questions overall if the student takes so much extra time that they are going into future days (then missing instruction) to take the test
    - allowing student to correct mistakes or answer wrong questions correctly for additional credit if failed the first test (another way to re-teach material)
    - math tests could have formula's available on the test and/or sample problems
    - students could use calculator and/or other math tools (x grids, chips, ect)
- Instructional modifications/accommodations:
    - teaching the main ideas/concepts (limiting not needed details)to be taught and repeating them in several different ways over several different days (goal is 7 different ways same concept for students with learning disabilities)
    - providing students with content vocabulary prior to teaching a lesson including that vocabulary (pre-teaching)
    - providing study guides that don't lead the student to study too much extraneous information (less unnecessary details)/scaffolded study guides
    - scaffolded notes
    - allowing student to take notes in class for reinforcement but also providing a copy of completed/correct notes to study from
    - modeling and showing lots of examples
    - allowing co-teaching with general education and special education teachers in the same classroom so that the special education teacher can re-teach students with special needs in a different way in a smaller group (pulled to the side)
    - if not in a co-teaching setting allowing time in the schedule for a special education teacher to consult with general education teachers on what specifically can be modified or how to paraphrase things in a different way specific to that lesson
    - direct teaching and/or assistance for organization, social skills/peer interactions
    - providing paraphrased or modified reading materials at the student's reading level for science and social studies and elective classes
    - speaking to students privately when redirecting behaviors
    - reducing homework length to just those most important for review
    - allow student to edit with teacher comments the first attempt at a graded written assignment
    - breaking larger assignments/projects into shorter tasks with clear deadlines for each section
    - monitoring student moods/behavior fluctuation patterns to report to casemanager

G&T Modifications:

- Encourage students to explore concepts in depth and encourage independent studies or investigations.

- Invite students to explore different points of view on a topic of study and compare the two.
- Determine where students' interests lie and capitalize on their inquisitiveness.
- Refrain from having them complete more work in the same manner.
- Employ differentiated curriculum to keep interest high.
- Avoid drill and practice activities.
- Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning.
- Encourage students to make transformations- use a common task or item in a different way.
- Different test items.
- Annotating
- Journal article analysis

At Risk Modifications

- review, restate, reword directions
- guided notes
- outlines & graphic organizers
- study guides
- modeling
- visuals
- hands-on Instruction
- slower pacing of materials
- center-based instruction
- more resources/supports
- additional help during tutoring/Delsea One/Academic Enrichment
- retesting
- providing students with content vocabulary prior to teaching a lesson including that vocabulary (pre-teaching)
- scaffolded notes
- allowing student to take notes in class for reinforcement but also providing a copy of completed/correct notes to study from
- modeling and showing lots of examples
- non-verbal redirection of behaviors
- speaking to students privately when redirecting behaviors
- reducing homework length to just those tasks most important for review
- allow student to edit with teacher comments the first attempt at a graded written assignment
- breaking larger assignments/projects into shorter tasks with clear deadlines for each section
- preliminary or "draft" due dates for written assignments, allowing for teacher input prior to the actual assignment due date
- testing modifications

Formative Assessment:

- Anticipatory Set
- Classwork worksheets
- Closure
- Exit tickets
- Gimkit (Live Quiz Learning Game)
- One-minute paper
- Unit review game (Jeopardy / GimKit)
- Warm-Up

Summative Assessment:

- Alternate Assessment
- Homework
- Marking Period Assessment
- Networking notebook
- Unit Test on System Components

Benchmark Assessments:

Skills-based assessment

Reading response

Writing prompt

Lab practical

Alternative assessments:

Alternative assessments:

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Technology Materials and Standards:

- interactive whiteboard
- LabSim (simulation labs)
- student computers
- TestOut (IT Certification Training Courseware)

TECH.8.1.2.A.5	Enter information into a spreadsheet and sort the information.
TECH.8.1.2.A.6	Identify the structure and components of a database.
TECH.8.1.2.A.7	Enter information into a database or spreadsheet and filter the information.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.E.2	Research and evaluate the impact on society of the unethical use of digital tools and present your research to peers.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.2.12.B.3	Analyze ethical and unethical practices around intellectual property rights as influenced by human wants and/or needs.
TECH.8.2.12.B.4	Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.
TECH.8.2.12.B.CS3	The role of society in the development and use of technology.
TECH.8.2.12.B.CS4	The influence of technology on history.
TECH.8.2.12.C.2	Analyze a product and how it has changed or might change over time to meet human needs and wants.
TECH.8.2.12.D.4	Assess the impacts of emerging technologies on developing countries.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.2	Analyze the relationships between internal and external computer components.
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

Computer Science and Design Thinking Standards:

CS.K-12.2.a	Cultivate working relationships with individuals possessing diverse perspectives, skills, and personalities.
CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
CS.K-12.6.b	Identify and fix errors using a systematic process.