CTE Standards Unpacking
Network Technologies

Course: Network Technologies
Course Description: Students in the Network Technologies course prepare for careers that involve network analysis, planning, and implementation, including design, installation, maintenance, and management of network systems. The successful establishment and maintenance of networking infrastructure is critical to the success of organizations.
Career Cluster: Information Technology
Prerequisites: Introduction to Information Technology Careers (Recommended), Computer Applications (Recommended), Computer Hardware & Software (Recommended)
Program of Study Application: Part of the Networking & Hardware pathway. Recommended courses include: Introduction to Information Technology Careers, Computer Applications, and Computer Hardware & Software.

INDICATOR #NT 1: **Demonstrate knowledge of designing and implementing a networking system.**
SUB-INDICATOR 1.1 (Webb Level: 1): Demonstrate knowledge of basic network communications
SUB-INDICATOR 1.2 (Webb Level: 1): Demonstrate knowledge of basic network classifications and topologies
SUB-INDICATOR 1.3 (Webb Level: 1): Demonstrate knowledge of common network hardware
SUB-INDICATOR 1.4 (Webb Level: 4): Apply knowledge of local area network (LAN) physical media
SUB-INDICATOR 1.5 (Webb Level: 1): Demonstrate knowledge of communication standards for networks
SUB-INDICATOR 1.6 (Webb Level: 4): Plan, design, and create network architecture
SUB-INDICATOR 1.7 (Webb Level: 2): Demonstrate knowledge of Network Operating Systems (NOS)

Knowledge (Factual):	Understand (Conceptual):	Skills (Application):
Concepts of designing and implementing a networking system.	The process and procedures necessary to create a network.	Understanding the architecture of the network operating system.

Benchmarks

Students will be assessed on their *ability* to:

- Describe the channel reservation process used on wireless carrier sense multiple access/collision avoidance protocol.
- Discuss the carrier sense multiple access/collision detect process on wired network.
- Identify and define elements found in physical and logical networks.
- Define and evaluate a variety of network architectures.
- Identify networking components and explore device options and features to specific needs.
- Connect appropriate media to internetworking devices.
- Differentiate between WAN and LAN requirements.
- Build a physical network as outlined in design.
- Compare and contrast services offered by a network operating system (NOS).

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): **Language Arts Standards:** RI1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. RI4.Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text. RI7.Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	**Sample Performance Task Aligned to the Academic Standard(s):** In a research paper or in a multi-media presentation, students will explain the differences between WAN and LAN requirements. - In a research paper or in a multi-media presentation, students will explain the architecture of a network operating system. Students will plan, design, and implement their own network architecture. - In a research paper or in a multi-media presentation, students will explain the channel reservation process used on wireless carrier. - Students will evaluate a variety of network architectures. - In a research paper or in a multi-

SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose and audience.	media presentation, students will Compare and contrast services offered by a network operating system (NOS).

INDICATOR #NT 2: Perform network operating system installation and configuration.

SUB-INDICATOR 2.1 (Webb Level: 2): Install a network operating system

SUB-INDICATOR 2.2 (Webb Level: 2): Configure a network operating system

SUB-INDICATOR 2.3 (Webb Level: 4): Troubleshoot and resolve network problems

Knowledge (Factual):	Understand (Conceptual):	Skills (Application):
Steps necessary to successfully install, configure and troubleshoot a network operating system.	Components of installing, configuring and troubleshooting a network operating system.	Install, configure and troubleshoot a network operating system.

Benchmarks

Students will be assessed on their *ability* to:
- Install server operating system.
- Setup proper IP addressing and directory services as well as creating network users.
- Identify policies and procedures for routine administration.
- Resolve IP addressing conflicts.
- Use appropriate network utilities to troubleshoot connectivity issues.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): **Language Arts Standards:** RI1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. RI4.Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text. RI7.Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	**Sample Performance Task Aligned to the Academic Standard(s):** Students will read a manual to identify policies and procedures for routine administration. In a research paper or in a multi-media presentation, students will Install, configure and troubleshoot a network operating system.

INDICATOR #NT 3: **Apply knowledge of network security systems.**
SUB-INDICATOR 3.1 (Webb Level: 3): Apply proper procedures for securing a network
SUB-INDICATOR 3.2 (Webb Level: 2): Demonstrate penetration testing and ethical hacking

Knowledge (Factual):	Understand (Conceptual):	Skills (Application):
Procedure for securing a network.	The need for detailed network security systems.	Create a secure network.

Benchmarks

Students will be assessed on their *ability* to:
- Configure wireless security settings for an integrated router.
- Configure firewall settings.
- Create permissions to secure data on a host network.
- Utilize software for ethical hacking to identify vulnerabilities.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	Sample Performance Task Aligned to the Academic Standard(s):
Language Arts Standards: RI1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. RI4.Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text. RI7.Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem. SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning,	In a research paper or in a multi-media presentation, students will explain and/or show how to configure wireless settings for an integrated router and firewall settings. Create permissions to secure data on a host network and create software that takes into consideration hacking and unethical practices.. Students will compare/contrast case studies to identify hacking and unethical vulnerabilities.

alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose and audience.

INDICATOR #NT 4: Demonstrate knowledge of common help desk tools, resources and techniques.

SUB-INDICATOR 4.1 (Webb Level: 2): Use proper documentation and incident reporting

SUB-INDICATOR 4.2 (Webb Level: 3): Incorporate customer service skills

Knowledge (Factual):	Understand (Conceptual):	Skills (Application):
Demonstrate common help desk tools, resources and techniques.	Perform troubleshooting techniques and communicate with clients professionally.	Operate a help desk.

Benchmarks

Students will be assessed on their *ability* to:
- Install and utilize an information technology support ticket.
- Use remote software to guide end users to solve problems.
- Communicate effectively with clients.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): **Language Arts Standards:** SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose and audience.	Sample Performance Task Aligned to the Academic Standard(s): Students will perform/receive mock phone calls and support issues to practice effectively communicating with clients to solve problems. Students will listen to recorded calls from a help center and provide theories and troubleshooting ideas.

INDICATOR #NT 5: Explore Careers in Network Technology

SUB-INDICATOR 5.1 (Webb Level: 1): Identify skills, interests, and abilities related to network technology
SUB-INDICATOR 5.2 (Webb Level: 2): Compare personal interest survey results with network technology occupations
SUB-INDICATOR 5.3 (Webb Level: 3): Research labor market information for network technology
SUB-INDICATOR 5.4 (Webb Level: 2): Demonstrate necessary job skills needed for information technology industries

Knowledge (Factual):	Understand (Conceptual):	Skills (Application):
Skills, interests, and abilities related to network technology.	Career options available in network technology.	Explore how their skills, interests, and abilities match network technology careers

Benchmarks
Students will be assessed on their *ability* to:
- SDMyLife assessments such as career matchmaker and ability profiler.
- Consider the financial impact of a network technology career.
- Display ability to work as part of a team and take direction from others.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
Language Arts Standards:	
RI1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	In a research paper or in a multi-media presentation, students will explain and/or show how the skills and abilities needed in network technology careers. They will also explore skills, interests and abilities related to the technology field.
RI4.Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text.	In a reflective piece of writing, students will determine/explain what technology field they think they would be best suited for and why.

RI7.Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

W1.Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W2.Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

W6.Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

INDICATOR #NT 6: Maintain a safe and environmentally conscious environment.		
SUB-INDICATOR 6.1 (Webb Level: 2): Determine safe working practices to avoid or eliminate physical and electrical hazards		
SUB-INDICATOR 6.2 (Webb Level: 1): Research environmental considerations when disposing of material		
Knowledge (Factual): Identify safe working practices and procedures when working with electronics or electrical material.	**Understand (Conceptual):** Proper practices and methods of working with electrical hazards.	**Skills (Application):** Maintain a safe working environment.

Benchmarks

Students will be assessed on their *ability* to:

- Identify and explain proper safety procedures and equipment when working with electricity.
- Identify proper disposal methods for toner cartridges, batteries and hardware.
- Explain local, state and federal environmental regulations.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
RI1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	In a research paper or in a multi-media presentation, students will explain and/or show the local, state, and federal regulations for maintaining a safe working environment.
RI4.Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text.	Students will evaluate hardware and software for safety issues.
RI7.Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	
W1.Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	
W2.Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	

Additional Resources
Please list any resources (e.g., websites, teaching guides, etc.) that would help teachers as they plan to teach these new standards.

http://www.techsoup.org/support/articles-and-how-tos/networking-101-concepts-and-definitions

http://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm

http://study.com/academy/lesson/types-of-networks-lan-wan-wlan-man-san-pan-epn-vpn.html

http://www.certiology.com/computing/computer-networking/types-of-networks.html